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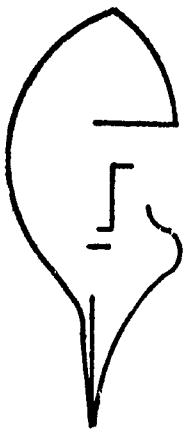
MULTIDISCIPLINARY STUDY
"TRADITIONAL USE OF COCA LEAF IN BOLIVIA"
FINAL REPORT



Museo Nacional de Etnografía y Folklore
La Paz-Bolivia
Year 1978

PN-ABP-853

EXECUTIVE SUMMARY

OF THE

MULTIDISCIPLINARY STUDY

"TRADITIONAL USE OF COCA IN BOLIVIA"

I. PLAN AND METHODOLOGY OF THE STUDY

The goal of this project was to study the existing marketing structure, distribution and legal use of the coca leaf in Bolivia and to identify some of the economic and social aspects which should be considered in attempting to reduce coca leaf production.

Specific areas of research on coca production and marketing included: (i) Analysis of the marketing structure for coca leaf at all levels, including information concerning how the system operates, the nature of the people involved in the marketing processes, and relationships between producers, intermediaries, wholesalers, retailers and consumers; (ii) Examination of the relationships between cost/price and demand/supply of coca leaf; (iii) Examination of income generated by those involved in the legal marketing of coca, including intermediaries, truckers, wholesalers, retailers and governmental entities at the Municipal, provincial, departmental and state levels, and (iv) collection of information on the number of people involved in the marketing of coca, both at the wholesale and retail levels.

The study of consumption of coca leaf included: (i) Definition of the structure of traditional use in all its general aspects; (ii) Examination of social and economic relationships among producers, intermediaries, truckers and consumers; and (iii) Estimation, by province, of the quantity of coca leaf marketed and the quantities demanded for traditional uses.

In order to calculate production of coca leaf, various secondary data sources were consulted, such as recent PRODES studies, DNCSP coca crop registration records, records from the agricultural customs stations, and tax records kept by the government. Primary information on marketing and consumption was gathered from interviews with producers, intermediaries, wholesalers, retailers and consumers and through direct observations in regional and local markets.

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Because of limitations on both time and money, only six of the nine departments in Bolivia were selected for study. These were chosen because they contain the principal production zones for coca leaf, as well as the traditional consumption areas. The capital cities of these six departments and the three tropical departments of Santa Cruz, Pando and Beni were not included. Because DNCSP control sheets indicate that more coca leaf is presently marketed in the Santa Cruz deparment than in any other department of Bolivia, it is imperative that future research activities include that department.

Two anthropologists were used as the principal researchers, one to supervise the work in the Quechua-speaking area and the other to control activities in the Aymara-speaking area. All six interviewers used were bilingual, either Spanish/Aymara or Spanish/Quechua. Of the 955 cantones located in these six departments, 100 were selected randomly for the sample and a total of 3,086 interviews were completed from the period beginning in November, 1976, and lasting until September, 1977.

Categorizing the 100 cantones by ecological zones gave the following result: Highlands (Altiplano) 33; Valleys, 38; and Tropics, 29. The division according to predominant language was: Quechua, 39; Aymara, 30; and Spanish, 31.

II. THE ECONOMICS OF COCA PRODUCTION

A. ASPECTS OF COCA PRODUCTION

As mentioned earlier, in order to undertake an analysis of coca production, it was necessary to use secondary data from various sources, since there was no one single source which had time series information. Because none of the sources had attempted to compatibilize their methodologies for collection of information, the resulting data inconsistencies make the job of determining changes in production and area under cultivation of coca leaf during the past five years almost impossible to calculate. Although the authors are not satisfied that they have been able to accurately construct this production picture, they must use their calculations due to the lack of any better information presently available. At such time when USAID is able to complete its planned area and production surveys in the Yungas and Chapare areas, it may be necessary to revise the production figures used in this report.

During the period 1972-1977 it appears that in the Yungas area under coca cultivation, total coca production and the number of coca

producers have declined, while yields have increased. During this same period in the Chapare, area under coca cultivation and number of coca producers have declined, while yields and production have increased. The areas under coca cultivation in both zones have probably been reduced as a consequence of government pressure to reduce production.

When comparing production of the two areas with the amount controlled by the agricultural customs offices in the La Paz and Cochabamba Departments, it may be observed that the amounts of coca marketed for legal use in the former are well controlled, while that in the latter are not. In the case of Cochabamba, this means that: (i) the agricultural customs office in Cochabamba is not managing the statistics in a responsible manner; (ii) coca production for the Chapare is highly overestimated;or (iii) considerable coca from the Chapare is marketed illegally.

Since most coca producing units also grow other crops for on-farm consumption, more specific research should be undertaken on the basic family production unit, including both coca and other crops, in order to determine more accurately the real socio-economic status of the coca producer.

B. MARKET STRUCTURE FOR COCA

There are a large number of coca producers acting independently and a relatively small number of purchasing intermediaries (oligopsony). Of the Approximately 7,000 coca producers in the Yungas (according to DNCSP registration figures), 85 percent sell directly to the intermediaries at the farm gate.In like manner 92 percent of the 5,500 coca producers in the Chapare (DNCSP) sell at the farm gate. Producers are generally connected to the intermediaries through the provision of certain basic services by the latter to the former, such as the purchasing of coca at the farm gate, inputs and financing for production, and food, medicine, clothes and household goods from the city.

The two principal distribution points for wholesalers of coca are Cochabamba and La Paz. According to DNCSP during the first semester of 1977, the greatest quantities of coca from the Chapare were sent to the Departments of Potosi (301,208 kgs.) and Santa Cruz (267,697 kgs.), while that from the Yungas went to the Departments of Potosi (396,954 kgs.) and Tarija (216,784 kgs.)

The amount of gross income, expenditures and net income generated at the farm, intermediary, transportation, wholesale and retail levels, as well as the number of participants in each group, is detailed in the study. There is also a section on the generation of income through the collection of various taxes on coca marketed at the national, departmental and municipal levels and the distribution of those proceeds, amouting to approximately US$660,000 in 1976.

There are usually strong linkages between the wholesaler and retailer which are influenced by natural and/or political parentage ties. This is particularly true in the department of Cochabamba.

The wholesalers interviewed by this study indicated that they had handled much larger quantities of coca than was reported by the Department of Production and Marketing Control of DNCSP. This is probably because people involved with either production or marketing of coca tend to underestimate their participation when interviewed by representatives of an organization like DNCSP which has the power to control and/or reduce their activities related to coca.

III. SOCIO-CULTURAL ASPECTS OF COCA CONSUMPTION

A. INCIDENCE OF USE

Among farmers interviewed only 8 percent did not use coca, while only 4 percent of the miners abstained. The majority of users (75 percent) purchased their coca weekly. Average consumption per family was determined by dividing total amount consumed by the sum of user and non-user families. For farm families interviewed average family annual consumption amounted to 30.58 pounds, while among miner families it totalled 55.77 pounds, or about twice as much.

In an attempt to explain the incidence of use of coca, three principal factores were considered:

(i) Ecological zone (Highlands, Valleys, Tropics)

Levels of coca consumption are higher in the Valleys for farmers than the other two zones, and are greater in the Tropics for miners than the other two zones. This completely contradicts everything that has been written about coca being principally a mechanism for adapting to high altitudes. Thus, use appears to be more a question of cultural habit and tradition than adaptation to the rigors of high altitudes. The possible explanation of higher farmer use in the Valleys could be tow-fold. First, income in the Valleys tends to be higher than in the Highlands because of better soils and climate. With higher incomes, more can be purchased, including coca. Second, the number of Protestants (preaching total abstention from alcohol and coca) in the Highlands is greater than in the Valleys.

(ii) Age of person interviewed

The youngest group interviewed (15-24 years) is consuming about as much on a weekly basis as is the average for the total population. Thus, there appears to be no significant difference in levels of coca consumption by age of consumer.

(iii) Level of academic preparation

Education seems to be the key in reducing coca consumption. There is a definite inverse relationship between levels of coca consumption and levels of education. The key explanation for this relationship seems to lie in the types of jobs according to educational level. Those with little or no instruction tend to have physically more demanding jobs and are exposed to harsher weather conditions than those with higher educational levels. Farmers with no education consume 10 ounces weekly. However, only 12 percent of the sample interviewed had more than five years of academic preparation, so that the overall impact on coca consumption of education has been limited.

An additional factor of importance in incidence of coca use was the relative isolation of the community (directly related to the maintenance of tradition). There is an inverse relationship between accessibility and levels of coca consumption. There is little difference between those communities which are located within 50 kilometers of commercial centers and those which are further away but served by good highways. But a notable difference does appear in truly isolated communities where traditions are still maintained, including high levels of coca consumption. It is interesting that although these communities are very isolated, there appears to be no problem in getting an adequate supply to these areas.

B. PRINCIPAL REASONS FOR USING COCA

Both among farmers/laborers and miners, the four most important reasons for using coca, in order of importance, were:

(i) For work

Coca is considered indispensable for the working man, since it is considered a source of energy for resisting hard agricultural and mining tasks. Various studies have

indicated that chewing coca increases metabolism, level of glucose in the blood, increases cardiac rhythm and muscular force, and reduces the perception of fatigue.

The greatest use of coca among farmer/laborers is for the planting and harvesting seasons. The availability of coca is very important for hiring labor, since the owner of the field is expected to provide coca for all laborers.

(ii) For medicinal purposes

Among those interviewed the principal uses of coca for medicinal purposes were for combating stomach aches and colds, although the following were also mentioned: speed up delivery of babies, control cholera, remedy tooth and head aches, heal cuts, cure rheumatism, remedy indigestion from overeating, and reduce pain of internal body injuries. However, in most mining centers, home remedies have been substituted with pharmaceutical medicines, coca being used principally in the form of tea or mate for stomach aches.

(iii) For combating cold

According to indigenous philosophy, foods are divided into hot and cold. Since coca is a "not" food, it should be taken to combat cold. In general, use of coca to combat cold is related to some specific task which obliges the person to be exposed to the harsh elements of weather.

(iv) For combating hunger

To date there has not been an adequately controlled nutritional study which can claim, without a doubt, that the coca consumers are nutritionally deficient relative to non-users of the same sex, socio-economic, educational and marital classes. Besides, there is an indication that the consumption of 100 grams of coca leaf from the Chapare more than satisfied the recommended daily allowance (RDA) of both men and women for calcium, iron, phosphorus and vitamins A, B_2 and E. Additionally, only 11 percent of these interviewed said they could replace coca with food.

Among the other reasons mentioned for using coca are the following: to combat fatigue and indigestion while traveling: to celebrate fiestas, to gain confidence in a meeting or discussion; to keep awake at night; to receive

visitors, to carry-out family rituals; to tell fortunes; to rest during work breaks; and to aid digestion after eating.

C. QUALITY AND PREFERENCE FOR COCA

Many studies of coca have indicated that coca from the Chapare is high in cocaine content. Nevertheless, coca from the Yungas is preferred for chewing because it is sweeter and milder. The bitter taste associated with the cocaine alcaloid is what makes the Chapare coca less preferable. Chapare coca is consumed because it is readily available and cheaper. Generally, prices of coca from the Chapare are bout 50 percent lower than those of coca from the Yungas. If coca from the Yungas were available throughout the country and its price were competitive, there would most likely be very little or no demand for coca from the Chapare.

Coca, is above all, an ethnic custom. In campesino households, no matter how rich or poor, coca is found. The quality of coca which is used, nevertheless, depends on the economic position of the family. The rich tend to consume first-class coca from the Yungas, while the poor tend to use second-class coca from the Chapare, or mix small amounts of coca from the Yungas with other leaves.

D. DEMANDS FOR LEGITIMATE AND TRADITIONAL USES

In addition to the amounts of coca that were consumed according to the interviews, the authors of this study have estimated that average annual family consumption in the capital cities varies from one-half to three pounds, while in the tropical areas it varies from one-half to ten pounds. This is very little in comparison to the areas interviewed. Nevertheless, the heart of traditional consumption is in the interviewed areas, not in the capital cities or non-interviewed tropical areas.

According to the interviews with consumers, annual consumption for the six departments within the sample frame, not including capital cities was determined to be 10,313,076 kilograms. The following four alternative levels of annual family consumption for capital cities and tropical areas not included in the survey were used: (i) capital cities; 1/2 lb., tropical areas, 1/2 lb.; (ii) capital cities 1 lb., tropical areas 1 lb; (iii) capital cities 2 lbs., tropical areas 5 lbs., (iii) capital cities 3 lbs., tropical areas 10 lbs. Using these alternative levels with the amount determined in the interviews, total demand varies from 10,396.637 to 11,164.479 kilograms per year, not including 867,632 kilograms for export.

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E. RELATIONSHIP BETWEEN SUPPLY AND DEMAND

The urgency of obtaining reliable data on coca production is clearly pointed out when a comparison between demand and marketable supply is made. Data for 1976 from DNCSP indicates a supply of 4,120,000 kilograms, while agricultural customs offices report 5,784,000 kilograms were marketed. Even using the supply calculated by the authors from secondary sources (9,638,810 kilograms), there would be a considerable deficit in supply ranging from 1,600,000 to 4,100,000 kilograms. Given this situation, it is impossible to speculate about the quantity of coca being used illegally. However, it is probable that legal consumption absorbs most of the Bolivian production. For the above information it can also be concluded that agricultural customs and marketing permits reflect only about 50 percent of coca actually marketed.

F. PATTERNS OF CHANGE

Of those farmer/laborers interviewed, 58 percent said that consumption had either increase or remained the same over the last five years. Of the miners, 79 percent responded in a like manner. The principal motives expressed for the preservation or increase of coca consumption were "tradition' and "work". Only three percent of the farmer/laborers interviewed attributed a decline in coca consumption to schooling.Even the most educated respondents place little importance on the influence of the educational system to reduce coca consumption. However, this perception directly contradicts the analytical results expressed earlier.

G. REACTION TO CONTROL PROGRAMS

All coca consumers, representing about 90 percent of the total sample, indicated that they could not adapt to the lack of coca if it were eliminated. Approximately half of these would be so upset that they would rebel in one form or another against the government. When rebellion was combined with the other responses of sickness and lower levels of production, the reaction of the miners would be more pronounced than that of farmer/laborers, since 86 percent of the miners would be involved, while only 69 percent of the farmers/laborers would be involved.

H. COMMENTARY BY AUTHORS

It has been proven that coca chewing does not lead to a physical dependence on coca, but it does have a psychological dependence based on

The customs and tradition of the Andean campesino and miner. These people have not historically abused the coca leaf, actually, they have known how to use it for their benefit. It is Western man that has abused the leaf with the consequence that a whole complex of widely practiced customs and beliefs of the traditional indigenous culture is being threatened by control and erradication of the coca leaf.

The phenomenon of coca in Bolivia is unique. To understand it and to establish an adequate, and humane, policy toward it is one of the great challenges of our times.

IV. 'AUTHORS RECOMMENDATIONS'

A. Actual coca production in Bolivia should be determined through a serious and responsable study. Until this is done, it will not be possible to accurately determine the relationship between marketable supply, demand for legal uses and amount being used for illegal purposes.

B. Because coca is such an integral part of the daily routine of farmers/laborers and miners, continued emphasis should be given to the present policy of protecting traditional consumption and limiting, not erradicating, coca production.

C. Because the coca from the Yungas, low in cocaine content, is preferred for traditional uses, it is this production which should be protected and not that of the Chapare.

D. Due to the precarious economic situation of the coca producers, their incomes should be guaranteed in one form or another before interfering with their productive activity. The agro-industrial development programs being planned for the Yungas and the Chapare are excellent and should be expanded.

E. It should be expected that the traditional use of coca in Bolivia will disappear of its own accord. Its use is so wide-spread that its disappearance could only happen through the extinction of traditional cultures. Since these cultures are considered as one of the principal riches of Bolivia, prohibiting the use of coca leaf among the members of these cultures could have serious consequences for Bolivia.

F. Serious and well-financed studies concerning he relationship between traditional consumption of coca and nutrition should be undertaken.

G. Studies should be undertaken concerning the long-run effects of coca chewing, using carefully controlled socio-cultural variables such a sex, age, religion, level of education, type of work, altitude, diet and consumption of alcohol and tabacoo. Only in this manner will it be possible to determine the type of effect which this widespread habit has upon the health of the coca consumers.

H. The distinction between coca leaf and cocaine should always be maintained. More research should be undertaken concerning the other alcoloides of the coca leaf (13 in total) in order to determine their influence on the traditional consumer. Also, the chemical processes of coca chewing should be studied in order to determine how this form of internalization of alcaloides differs from that of other forms.

I. The traditional consumer of coca should be considered an ally in the fight against illegal international drug trafficking. This traditional consumer believes that his traditions and needs are being threatened by this traffic and he is ready to collaborate in order to wipe it out.

J. It is evident that the present system of control and registration of coca are both inefficient and deficient. If a national and international policy of control is to continue, these systems will have to be restructured.

"TRADITIONAL USE OF COCA IN BOLIVIA"

CONTRACT USAID/BOLIVIA
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WITH MUSEO NACIONAL DE
ETNOGRAFIA Y FOLKLORE

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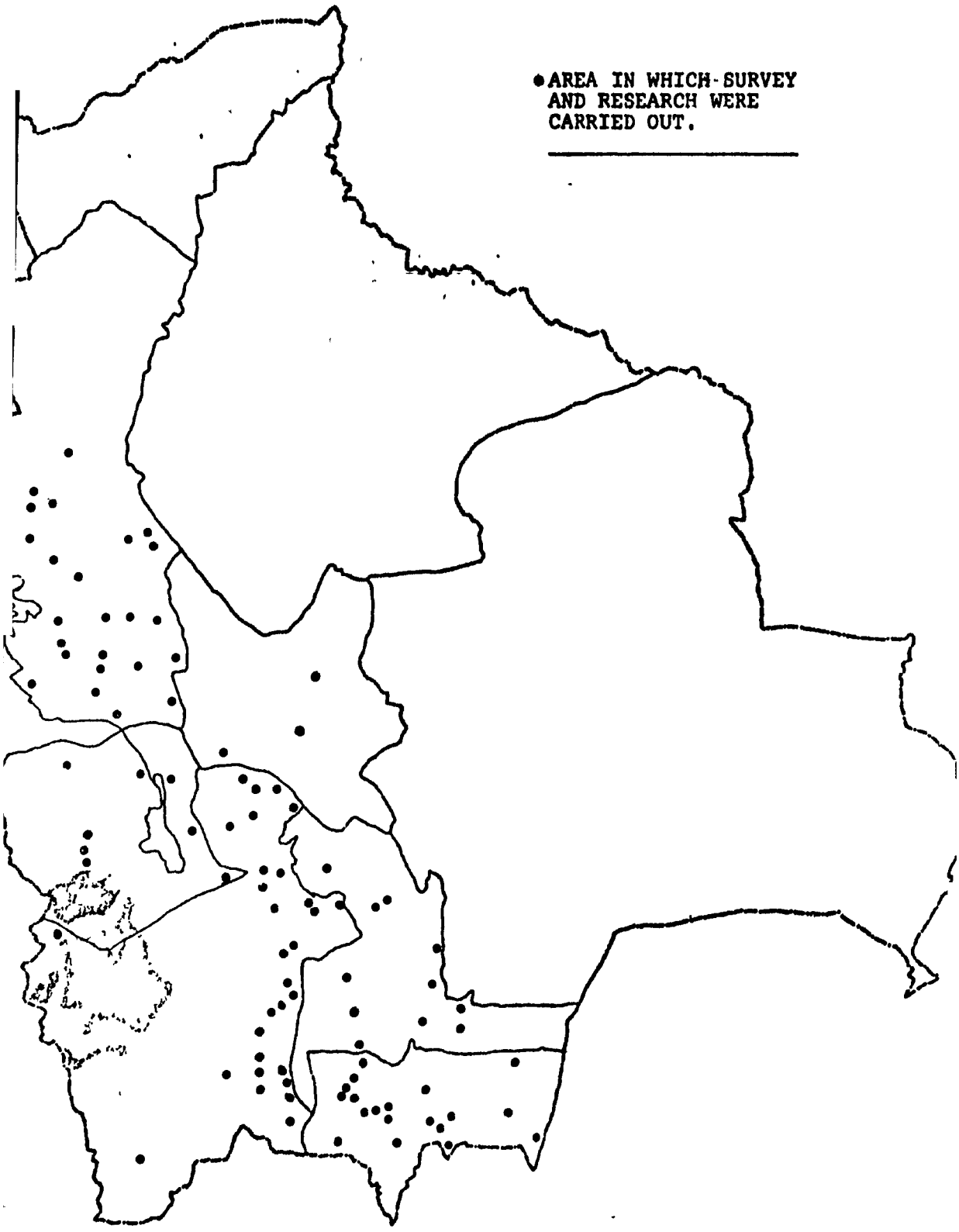
• AREA IN WHICH SURVEY
AND RESEARCH WERE
CARRIED OUT.

i. INTRODUCTION

1. General Research

Tha main objective of this project has been to investigate the present structure for the marketing, distribution, and legal use of the coca leaf, and to identify some of the economic and social factors that should be considered if the Bolivian government should desire a decrease in coca production to a level sufficient to cover only legal use. In pursuing this objective, our main approach has been to study the marketing system on the one hand, and the pattern and level of consumption on the other. Time as well as funding for the project have been limited. Therefore the field of research has been restricted to only six of the country's nine departments: La Paz, Oruro, Potosí, Chuquisaca, Cochabamba and Tarija. These departments were selected because they contain the main coca production zones, as well as most of the traditional consumer population. We thought of including the department of Santa Cruz, the principal department in the Bolivian lowlands, but scarcity of time and resources did not permit it. Since, according to the "guias de trânsito" of the National Department for the Control of Dangerous Substances, more coca is marketed at the present time in the Department of Santa Cruz than in any other department in the country, expansion of this type of research into that department must be considered an urgent need.

At the beginning of the project, USAID assured us that, before its conclusion, we would be provided reliable data on levels of coca production, emanating from research on production that was planned to run simultaneously. Some of these data should have come from samples of coca producers in the Chapare and the Yungas, while others should have come from a comprehensive areophoto survey of all production zones. Neither of the two studies was completed as projected. Therefore we have had to rely on other sources, all somewhat questionable, for everything related to production.

Despite these problems, we have attempted an estimate of production on the basis of a comparison of the data available for the Yungas with those collected by agrarian customs houses and coca customs houses, and also with data from a coca merchants census compiled in 1977 by the Direction of Narcotics. We are not satisfield, that we have been able, due to these circumstances to produce a reliable picture on production, and we suggest that, should the research originally planned by USAID be some day completed, the conclusions herein presented may need to be altered. Until this occurs, we are forced to work with data which we consider possibly deficient, but that are the only ones available.

We wish to thank Direction of Narcotics for their excellent cooperation, and especially Mr. Winston Estremadoiro, Director of PRODES, who obtained for us access to the confidential files held by said Direction. In the section on "Economic Factors and Relations" more details will be given regarding the manner by which information from these different sources was evaluated and coordinated.

The general objectives of the economically oriented segment of the project were multiple:

i. To analyze the market structure of the coca leaf at all levels, considering questions such as the way in which the system functions, the

characteristics of individuals involved in the system, its financing, and relationships among producers, buyers, wholesalers, retailers, consumers, and others.

ii. To examine cost/price and demand/supply relations.

iii. To examine the income generated by those involved in the legal marketing of coca, including buyers, hucksters, truckers, wholesalers, retailers, and various levels of government at municipal, provincial, departmental, and state levels, both as a percentage of market price and in terms of annual income for intermediaries and government entities.

iv. To obtain information on the number of persons involved in coca marketing, be they wholesalers or retailers.

The same sources on production to which we have already referred provided much information on these topics. We were able to complement this with data and analyses coming from three recent studies on coca productions in specific areas (PRODES, IESE, HENKEL). The rest of the information that could be compiled stems from interviews, both open and closed, with producers, hucksters, wholesalers, retailers, and consumers,plus observation in many markets, regional as well as local. In the main redistributional centers, e.g. in departmental capitals and market towns, we conducted a wholesaler and retailer census, and directly observed daily transactions.

We had planned to estimate the margin of error in customs house records by direct observation at the main customs house offices. However, we found that this technique was not practical. Due to the combined pressure of taxes and the pursuit of the manufacture and sale of cocaine, we discovered that today many coca shipments are hidden under such products as fruit, coffee and potatoes, or are disguised as still something else, Fortunately, we have the Henkel report, based on research completed a few years ago in the Chapare, in which the author controlled for margin of error in customs house records during the first week of each month for an entire year. This offers us some guideline. In addition in the section on economic factors, by comparing production, marketing, and consumption statistics, we can gather even more light on the basic problem of the validity of data emanating from the customs houses.

Besides obtaining information from the registries of the Direction of Narcotics, case studies, agrarian and coca customs offices, and interviews with producers, merchants, and consumers, tax registries at various government levels were examined. Here we found impressive discrepancies among the procedures and efficiency of the various departments, and even among different taxes collected within the same department.

By a detailed analysis of the proveniences and destinations named in the census of La Paz and Cochabamba merchants provided by the Direction of Narcotics, we could establish distributional networks for Bolivia's principal production zones. Analysing the transaction incidence for each merchant, we could also evaluate the validity of information obtained by techniques of random sampling and participant observation. Finally, by comparing the quantity of coca marketed, as reported in the census of coca merchants, with various taxes levied by different government levels, we could evaluate the efficiency of the tax structure. We assume that the census of merchants contains information on only those who participate in the legal market. Even with this assumption, certain anomalies appear from department to department that demand explanation.

Given all these uncertainties surrounding coca production and legal marketing, we suggest that the data obtained on consumption patterns are even more important than we believed they would be when the original objetives for the research were determined. Regarding consumption, the following had been proposed:

i. To define traditional consumption structure in all its general aspects, including the use of coca in work, rituals, divining, and medicine.

ii. To examine social and economic relations among producers, hucksters, truckers, and consumers of the coca leaf.

iii. To examine, for each province, the amount of coca distributed, and the amount needed for traditional uses.

Using as our base the many years of field experience of our research team members, all of whom were native quechua and aymara speakers, the questionnaires that were developed were the following: a questionnaire for peasants administered to both coca users and non-users; a questionnaire for miners, also administered to both users and non-users, and a questionnaire for vendors, both wholesalers and retailers.

Once the instruments were developed, they were pretested on individuals who were not to form part of the final sample. On the basis of this pretest, the instruments were altered to their final form.

We desired that our sample of users and non-users be completely representative of the entire population of peasants and miners in the six departments in which coca has traditionally been consumed in Bolivia. To accomplish this end, at the time of signing the contract, we thought that we would have to work with projections of old census data, i.e. data from the census of 1950. Fortunately , the results of a recent pre-census arrived in time to be of use in the selection of the sample. This permited us to make a representative sampling of the relevant populations.

For the study to have been truly complete, we should have included departmental capitals. Unfortunately, lack of funds and personnel did not permit it. In our conclusions, we make an estimate of alternative amounts of coca possibly consumed in these major cities of the republic. But it should be emphasized that these are estimates only; consumption in Bolivia's principal cities should be the object of serious study in the near future.

To interview a population representative of the six highland departments of Bolivia is an immense task. Many communities are still incredibly isolated, accesible only by four wheel drive vehicles, on horse back, and even by foot. We used two principal anthropological investigators, one to supervise the work in the quechua speaking area, the other one to do the same in the aymara speaking area. To each of them were assigned three interviewers. All were native speakers of quechua or aymara, the two main languages of peasants and miners in these departments, but all also had full command of Spanish.

The research plan called for interviews in 100 cantons of the 955 located in the six highland departments, with a total of 2,989 interviews divided among the 100 cantons. In addition there were to be interviews with vendors. The total number of interviews, in the end, reached 3,086, and the task accupied the research team full time between November 1976 and August 1977.

During the same period in which the researchers administered the questionnaires, they obtained qualitative data by means of open ended interviews and participant observation. The fact that, for a long period of time, the team had access to only one vehicle complicated the interviewing process, but at long last all interviews that had been projected were concluded. The section on statistical procedures which follows will explain in detail the way in which the respondents were selected and their representativity.

Unfortunately, neither funds nor time were sufficient to include either departmental capitals or the three departmencs of the Bolivian lowlands. So that the picture may be complete in the future these important sectors of the Bolivian population should be studied in the way that we have done here with regard to the more traditional population of Bolivian coca users.

2. Sample Design

i. Characteristic

We can define as the principal characteristics of our research the following that are related to use of the coca leaf:

1. Proportion of consumers
2. Level of instruction
3. Age at which use of the coca leaf began
4. Type of consumer
5. Purposes of use
6. Sex of the user
7. Mean weekly consumption per household
8. Reasons for prefering specific varieties of the leaf
9. Number of times coca is "chewed" per day ("pijchus").
10. Mean weekly expenditures per household for purchase of the leaf
11. Alternatives for replacing coca

ii. Framework

The study population is made up of household residents in the following departments:

Department 1/	Number of households 2/	Number of cantons
Chuquisaca	54,750	117
La Paz	208,655	229
Cochabamba	120,238	82
Potosí	138,892	220
Oruro	137,375	131
Tarija	30,944	176
Total	690,762	955

iii. Type of sample

To the end of obtaining precision and a degree of realiability, we developed a random sample. This was dictated by two basic considerations. First of all, as occurs with all research, our resources, both human and economic, were limited. This led us to focus on demographic groupings, respecting the existing administrative and political divisions of the country. Second, since our unit of research was the household, and since no two cantons contain the same number of households, we opted for a bietapic sample.

iv. Primary and final units

As our primary unit, we selected cantons, as these are defined by Bolivia's administrative and political structure. As the final unit we selected the household. We justify these decisions with the following reasoning:

a) A canton does not suffer variation over time, at least during intercensal periods.
b) Selection of cantons permits a ranking by ecology, language, and economic base.
c) By developing the random sample on the basis of cantons, the amount of physical movement required of the research team is reduced.
d) As a consequence of the previous point, a limited team of researchers can interview a larger number of households than it could if households were chosen at random without reference to the cantonal unit. At the same time the team can exercise better control over sample selection and administration of the survey instrument.

1/ Excluding departmental capitals.

2/ The pre-census, from which these figures are taken, was carried out by school teachers, agricultural extension agents, and personnel especially contracted for the purpose by the National Statistics Institute (INE). The effort took some 18 months. Its basic methodology consisted in actually counting the number of households in each canton, whether the members were present or not. Segments developed by the pre-census served as the basis of the 1976 national population census.

v. Sample size

To determine the size of the sample, we used the following formula:

$$n \geq \frac{N t^2 PQ}{t^2 PQ + NE^2}$$

where:

- n = size of the sample in households
- N = size of the population in households
- t = Parameter of fit for 95% reliability
- E = Absolute desirable error
- P = Proportion of the most significant characteristic
- Q = 1 - P

therefore:

- N = 690762
- t = 2
- E = .0175
- P = 0.35

then:

$n \geq 2959$

In order to have maximum logistical coverage, it was decided to select 100 cantons.

vi. Selection of the primary units

In order to have reliable estimates, these should be based on some type of adequate systematic selection. For the present study we ranked the cantons by ecology, language, and type of economy. The specific cantons in which we worked were then selected on a random basis from the total listing of households in Bolivia's preliminary census (pre-censo).

CANTONS	NUMBER OF HOUSEHOLDS IN THE CANTON	TOTAL NUMBER OF HOUSEHOLDS
C_1	n_1	n_1
C_2	n_2	n_1+n_2
C_3	n_3	$n_1+n_2+n_3$
⋮	⋮	⋮
C_j	n_j	$\sum_{i=1}^{j} n_i$
⋮	⋮	⋮
C_m	n_m	$\sum_{i=1}^{m} n_i = N$

The period of the random starting point (k) was ontained in the following manner:

$$k = \left[\frac{\sum_{i=1}^{m} n_i}{100} \right]$$

where the random starting point (AA) responds to property:

$$AA \in [1, N]$$

in such a way that the cantons selected correspond to:

AA ; AA + k ; AA + 2k ; ---- ; AA + 99k . . . module N; in the column of accumulated totals.

m = 955

$N = \sum_{i=1}^{m} n_i = 690762$ $\qquad$ $k = \left[\frac{690762}{100} \right] = 6907$

$AA \in [1 , 690762]$ $\qquad$ [ ] integer part

vii. Selection of final units

For each canton, we determined the number of households that would be on the basis of the following equation:

$$\mathcal{V}_i = \frac{n}{N} \quad V_i \quad \text{such that} \quad i = 1,100$$

where:

$\mathcal{V}_i$ = number of households to be surveyed in canton i

V_i = number of households in canton i

$\frac{n}{N}$ fraction of the sample

With which we developed the table of cantons selected and the number of households in the sample.

CANTONS CLASSIFIED BY ECOLOGY, ECONOMY AND LANGUAGE

LANGUAGE AND ECONOMY	E C O L O G Y			
	Highland	Valley	Tropics	Total
QUECHUA	147	207	1	355
Agriculture	47	102	1	
Grazing	6	0	0	
Mixed farming	76	104	0	
Mining	18	1	0	
AYMARA	246	24	40	310
Agriculture	76	23	33	
Grazing	75	0	0	
Mixed farming	90	1	6	
Mining	5	0	1	
SPANISH	10	128	152	290
Agriculture	10	110	24	
Grazing	0	0	42	
Mixed farming	0	18	86	
Mining	0	0	0	
T O T A L	403	359	193	955

SAMPLE CANTONS CLASSIFIED BY ECOLOGY, ECONOMY AND LANGUAGE

LANGUAGE AND ECONOMY	E C O L O G Y			
	Highland	Valley	Tropics	Total
QUECHUA	14	25	0	39
Agriculture	7	14	0	
Grazing	1	0	0	
Mixed farming	5	11	0	
Mining	1	0	0	
AYMARA	19	2	9	30
Agriculture	6	2	6	
Grazing	6	0	0	
Mixed farming	6	0	3	
Mining	1	0	0	
SPANISH	0	11	20	31
Agriculture	0	9	1	
Grazing	0	0	7	
Mixed farming	0	2	12	
Mining	0	0	0	
T O T A L	33	38	29	100

CANTONS SELECTED, TOTAL OF HOUSEHOLDS AND NUMBER OF HOUSEHOLDS SURVEYED IN EACH CANTON

T A R I J A

N°Cantons per department.	Total of Households	Number of households in the sample
1 Junacas	152	8
2 Alto de España	108	5
3 San Jacinto	50	2
4 San Telmo	77	4
5 Bajada Baja	11	1
6 Capirenda Norte	43	2
7 Agua Blanca	104	5
8 Yacuiba	2,814	140
9 Ibobobo	56	3
10 Sanandita	317	16
11 San Pedro de las Peñas	75	4
12 Tomatitas	100	5
13 Coimata	50	2
14 Carachi Mayu	98	5
15 Bermtisupitin	55	3
16 Chiquiaca	129	6
17 El Portillo	104	5
18 Camacho	190	10
19 Fuerte Viejo	44	2
	4,385	228

O R U R O

20 Challacollo	391	19
21 Cruce Culta	784	39
22 Curahuara de Carangas	968	48
23 Florida Norte	12	1
24 Florida Sur	20	1
25 Charcollo	128	6
26 Pazña	698	35
27 Vicente Ascarruna	625	31
	3,626	180

C H U Q U I S A C A

28 Arabate	249	12
29 San Pedro	378	19
30 J. A. Padilla	182	9
31 Huacareta	583	29
32 Afimbo	490	24
33 Chiñimayu	477	24
34 Pilaya	177	9
35 Santa Rosa	6	0
36 Sapirangui	960	48
37 Bororigua	42	2
38 Boicobo	24	1
	3,568	177

C O C H A B A M B A

39 Tiraque	3,258	162
40 Changolla	891	44
41 Paracaya	587	29
	4.736	235

P O T O S I

Nº Cantons per department.	Total of Households	Number of households in the sample
42 Pulaxi	75	4
43 Otuyo	1,248	62
44 Chayanta	1,851	92
45 Chocaya	1,504	75
46 Espicaya	238	12
47 Rio Blanco	1,308	65
48 Quetena Chico	67	3
49 Pararani	118	6
50 La Lava	810	40
51 Turuchipa	1,443	72
52 Poco Poco	832	41
53 Suipacha	283	14
54 Chifloca	166	8
55 Viluyo	33	2
56 Vichacla	244	12
57 La Carreta	146	7
58 Pululus	94	5
59 Germán Busch	181	9
60 Guadalupe	538	27
61 San Vicente	122	6
62 Totora	267	13
63 Toracarí	268	13
64 Catacora	119	6
65 Palaya	105	5
66 Huaríraca	47	2
67 La Palca	534	26
68 Añahuasi	106	5
69 Charcamarcavi	32	2
70 Pitantora	499	25
71 Cerrillos	68	3
	13,346	662

L A P A Z

72 Ayo Ayo	1,596	79
73 Collpa Cucho Belen	362	18
74 Chiar Jake	326	16
75 Arco Pongo	672	33
76 Choquetanga	999	50
77 Cavari	1,161	58
78 Curva	441	22
79 Amarete	766	38
80 Ayata	1,748	87
81 Luquisani	430	21
82 Yanacachi	1,924	95
83 Villa Aspiazu	400	20
84 Palos Blancos	317	16
85 S. Miguel de Huachi	290	14
86 Chulumani	1,628	81
87 San Lorenzo	1,115	55
88 Apolo	1,274	63
89 Sapahaqui	1,457	72
90 [illegible]	703	35

Nº Cantons per department.	Total of Households	Number of households in the sample
91 Isla del Sol	213	11
92 Zampaya	618	31
93 Patamanta	1,037	51
94 Viacha	6,783	336
95 Calla Baja	248	12
96 Santiago de Machaca	1,791	89
97 Achiri	1,595	79
98 Consata	167	8
99 Chacapa	157	8
100 Obispo Bosque	211	10
	30,429	1,509 1/
Grand Total	60,290	2,991

Once a determination was made as to the number of households to be surveyed in each canton, the problem remained as to the selection of the specific households. Since the list of cantons did not lend itself to this type of selection, individual households were chosen in the following manner:

a. Nucleated Settlements

For the selection of households in nucleated settlements, we used cartography from the INE census. Maps in this series contain information not only on discrete population segments, but even on individually numbered households. With such enumeration, we were able to locate random samples quite easily.

b. Dispersed Settlements

Unfortunately, such cartography does not exist for dispersed settlements. Here we had to develop our own household lists for each canton. The majority of these contons, were divided into discrete communities, in each of which there existed an authority (corregidor, leader or other), who would give us information as to their components. This made the enumeration easier. Once the households were numbered, a selection was then made, using a table of random numbers, until the total quota of households to be surveyed in each canton was filled. The research team was given prior instructions as to use of the table.

All the questionnaires used in the survey were numbered consecutively from the first to the last. Each one of the interviewers was assigned a specific number of questionnaires, corresponding to the number of interviews he was expected to complete, and these were registered in a book, with his name, the numbers of the questionnaires, and the volume of households and cantons to be surveyed.

Once the questionnaires were completed, the name of the interviewer was registered anew, as well as the number of questionnaires used, the place of the survey, and names of those surveyed. In this way a strict control was maintained.

The interviewers, of course, used the questionnaires in an ordinal fashion, that is from the first to the last. Each person had at his disposal a specific number of unnumbered questionnaires in case some of his numbered questionnaires were misplaced or lost by accident. The questionnaires were filed, when completed, in accord with the number of the respondent and the interviewer.

Analysis and verification for consistency, important stages in all scientific work, were carried out in the following fashion:

1/ Note that through proportional distribution of the sample for each canton we obtained the sum of 2991 households and not 3000, as we had calculated in round figures. Even then the size of the sample surpasses the value calculated for minimin sample size (2959)

Each completed questionnaire was reviewed to see that all questions had been answered, and that the respondent was appropriate for the sample design. Next, an exhaustive analysis was made of the information included in each questionnaire to detect possible errors, such as lack of information, contradictions, lack of internal consistency, ambiguity, altered question format, etc., and corrections were made immediately in consultation with the appropriate interviewers. Fortunately, the survey team with whom we worked was homogeneous and experienced enough in field work to avoid any major problems in this regard.

In all, our field workers interviewed 2,712 peasant-workers in 99 cantons, and 277 miners in 10 cantons. In nine cantons, interviews were carried out with both groups. In only one - Catacora - all the interviews were with miners, reflecting the fact that few peasants live in that canton. Over and above this total of 2989 interviews with representatives of both the consuming and non-consuming public, one interview per canton was carried out with vendors, there being no pre-selection as to their mode of operation, i.e. whether they were wholesalers or retailers. The total number of interviews with vendors was only 97, due to the fact that, in three of the cantons surveyed, no coca vendors existed.

The population surveyed thus represents some 65 per cent of all households in the country, according to the latest pre-census. Above all, it represents that sector of the Bolivian public that, by tradition, consumes the coca leaf daily for work, social relations, and medicine.

I. THE ECONOMY OF COCA

A. PRODUCTION

1. General Characteristics of Coca-producing Areas. Coca production in Bolivia is carried out mainly in two of the country's principal regions, each of which has peculiar ecological characteristics. The productive system of each of these two regions is heavily influenced by climatological conditions, soil, and topography, which together determine the quality and economy of the final product.

a. Chapare

The Chapare is a province of the department of Cochabamba. It is part of a large region that forms a belt extending from the Yapacani River, along the eastern flank of the Moseten Mountain Range, becoming part of the department of La Paz, and finally continuing toward Perú. It is situated between 14°52' and 17°24' South Latitude and between 64°20' and 65°10' West Longitude. Most of the Chapare is an extensive plain with an area estimated at 7,000,000 hectares. It has an altitude which varies between 200 and 400 meters above sea level and an annual mean temperature that varies between 23 and 25°C. Annual rainfall oscillates between 2000 and 4000 millimeters.

According to Holdridge's classification the Chapare contains three ecological types: humid tropical forests, very humid tropical forests, and very humid sub-tropical forests. Its soils originate from the effects of erosion of the foothills of the eastern range of the Andes, and are mainly alluvial or colluvial. The land ranges from sharply sloping to flat. Drainage in the flatlands varies from good to poor. The soils are hydromorphic, lithosols with rocky outcropings, recently alluvial, and alluvial plains which tend to flood. The latter, in general, are poor in nutrients. 1/

The principal crops of the area are coca, rice, corn, bananas, and citrus fruits. Because of inadequate technical orientation, its agricultural productivity indices are very low. Having satisfied their own needs, the peasants of Chapare sometimes have a small marketable surplus.

However, coca is the only crop which might be called "commercial". The region's agricultural production is largely handled by immigrants in either spontaneous or directed colonies who employ traditional and subsistence agricultural techniques. In general, the region is characterized by a low standard of living, deficient housing, deficient nutrition, and deficient health.

b. Yungas

This region covers the provinces of North and South Yungas, and part of the province of Inquisivi, all in the department of La Paz. It has an area of approximately 20,000 square kilometers; it is estimated that some 20 per cent of this is used for agriculture and livestock production by peasants who, in general, produce for their own consumption, with a small marketable surplus.

The ecological characteristics of the region strongly condition its agricultural production and economy. The climate is semitropical and humid; the altitude fluctuates between 900 and 2,200 meters above sea level; and temperatures vary between 16 and 36°. Annual rainfall oscillates between 1,000 and 2,000 milimeters; most rain falls between November and March. There are no freezes and hail falls only occasionally. Droughts however, are frequent, especially in the province of Inquisivi.

1/ First Conference on the Development of the Chapare, Cochabamba, October 1969.

The topography is irregular and gradients are often extreme. In general, the soils have a layer of slate some 30 to 60 centimeters below ground level. The surface soil is usually loam or limolithic loam. This soil is brown, red or yellow and is moderately acid. In the rockier regions the soil can be very shallow, especially that which has been under cultivation for a long time.

Sheet erosion, especially in coca-producing areas, has washed the soil intensively leaving it shallow and rocky. Those soils located near the rivers and in less abrupt regions are deeper and more fertile. Because of the marked slope of much of the land, the possibility of mechanized agriculture is present only in very few and small areas. The higher, natural grasslands are suitable for livestock.

The principal crops of the region are coca, coffee, citrus, fruits, corn, bananas, yucca, waluza, and racacha. The first three are for commercial market, whereas the rest are used for personal consumption. Practically no chemical fertilizer is used and very few farmers use pesticides to combat plagues and diseases.

2. Distribution of Production by Region

In order to develop this analysis, it has been necessary to use statistical data from diverse sources. It was found that each of these sources obtained, processed, and compiled its data without verifying the compatibility with other possibly existent sources. This has forced us to make many adjustments. The most serious deficiency has been the fact that temporally sequential data are not available. Appendix 1 illustrates this problem.

In 1972 an advisory group from the University of Utah, in cooperation with the Ministry of Peasant Affairs and Agriculture (MACA), made a sample survey of rural production, consumption, and income; the results have not been officially published. By special request for this study however, the Interamerican Consortium for Development (ICK-USAID) has made available the following estimates based on data from said survey.

TABLE 1 TOTAL ESTIMATES OF THE PRODUCTION OF COCA BY REGION (1972) 1/

	Kilograms (Thousands)	%	Number of Producers
1. Chapare	5.912.77	72.8	5.517
2. Yungas	1.799.51	22.2	10.162
- South Yungas	641.40	7.9	3.566
- North Yungas	788.00	9.7	4.381
- Inquisivi	370.11	4.6	2.215
3. Franz Tamayo a/	410.00	5.0	1.052
TOTALS	8.122.28	100.0	16.731

a/ Apolo, Pelechuco
SOURCE: Lebaron September 1977

1/ In order to obtain the figures on area and production for Yungas, base estimates were accepted of 0.76 hectares per producer with a yield of 303.54 kg/ha.

For various reasons we feel that the University of Utah data presented in Table No. 1 merit consideration.

1. They are more in accord with the amount of coca registered by the agricultural Customshouse than are the IESE data presented in Table No. 2. The latter, purporting to be global production figures, are based on area planted to coca, and are lower than the Customshouse figures for both the Chapare and Yungas (cf. Appendix No. 1). We cannot accept that the volume controlled by the Agricultural Customshouses be greater than that reported for production itself.

2. The production volumes reported by the University of Utah for 1972 adhere much closer to those volumes registered by the Customshouses. Only in the case of La Paz is the production figure lower than that reported by the Customshouse, and even here the difference is relatively small (2,209,510 kg. as compared to 3,435,600 kg.)

3. Although the Utah data do not include figures on area and yield, they do provide us with estimates as to number of producers and overall production, both of which are important for establishing a base for comparison in future years.

The University of Utah data, then, take us one step forward. But they are for a single year, and do not include information on area and yield. These two factors are basic to any productive system, and their neglect leads us to conclude that the University of Utah production data are probably also underestimates. In an attempt to arrive closer to reality, we have developed Table No. 2, through which we derive higher estimates of production, especially for the Yungas region of La Paz. The table is based on a combination of sources. To avoid subestimation, we have selected the highest figure available in the extant literature for each major factor in the productive system. For the Department of La Paz, this method yields the following:

1. No. of producers (U. of Utah study Appendix 1)	11,214
2. Area, total number of hectares under coca cultivation Mean no. of hectares per producer (based on area from MACA Chulumani study and number of producers from Utah study, Appendix 1 and Table 2- 11,214 X 0.76).	8,522.64 hectares
3. Mean yield per hectare (IESE study, Appendix 2)	303.54 kilograms
4. Total production (# 2 multiplied by # 3)	2,587,000.00 kilograms

For the Chapare, again selecting the highest value available in the extant literature, we arrive at the following figures:

1. No. of producers (U. of Utah study, Appendix 1)	5,517
2. Total production (U. of Utah study, Appendix 1)	5,912,770.00 kilograms
3. Mean yield per hectare (IESE study, Appendix 2).	959.23 kilograms
4. Area, total number of hectares under coca cultivation (# 2 divided by # 3)	6,164.08 hectares

TABLE 2

ESTIMATE OF AREA, YIELD, AND PRODUCTION OF COCA BY REGION

(1972 - 1977)

YEAR	YUNGAS a/				CHAPARE			
	AREA ha	YIELD kg/ha	PRODUCTION (thousands of Kg.)	Nº OF PRODUCERS	AREA ha.	YIELD kg/ha	PRODUCTION (thousands of Kg.)	Nº OF PRODUCER
1972	8.522.84	303.54 b/	2.528.48	11.214	6.164.08	959.23	5.912.77	5.517
1974					2.478.44	2.168.13	5.373.58	3.599
1975					7.249.00	1.897.50	13.755.00	8.237
1977	5.320.00	464.92	2.473.37 c/	7.000	4.840.00	2.168.13	10.443.75 d/	5.500

a/ Including the province of Franz Tanayo (Apolo, Pelechuco).

b/ Yield taken from IESE (Institute for Social and Economic Studies, Universidad Mayor de San Simón).

c/ Estimate based on data from the survey of agricultural production, costs, and returns of coca, citrus fruits, and coffee for the Chulumani area (0.76 ha/farmer).

d/ Estimate based on data of IESE (0.88 ha/farmer).

Although this procedure gives us production estimates for the Yungas larger than those resulting from the University of Utah study, the difference is relatively small (2,587,000 kilos as opposed to 2,200,510 kilos). As to the Chapare, the largest figures are already those presented by the University of Utah; because, in our desire to avoid underestimation, we have opted for the highest figures available for the base year 1972, we simply present them as given in the University of Utah report.

Data presented in Table 2 for the years 1974, 1976, and 1977 come from the following sources:

1974 Chapare		
1. No. of Producers (DESEC, Appendix 1)	5,517	
2. Area, total number of hectares under coca cultivation (DESEC, Appendix 1)	2,478.44	
3. Total production (DESEC, Appendix 1)	5,373,580	kilograms
4. Mean yield per hectare (#3 divided by #2)	2,168.13	kilograms
1976 Chapare		
1. No. of producers (MACA, Appendix 1)	8,237	
2. Area, total numbers of hectares under coca cultivation (MACA, Appendix 1)	7,249.00	
3. Total production (MACA, Appendix 1)	13,755,000	kilograms
4. Mean yield per hectare (#3 divided by #2)	1,897.50	kilograms
1977 Yungas		
1. No. of producers (National Directorate for the Control of Dangerous Substances, Appendix 1)	7,000	
2. Area, total number of hectares under coca cultivation (#1 multiplied by 0.76 ha. per producer - MACA Study of Chulumani, cf. Table 2).	5,320.00	
3. Mean yield per hectare (MACA study of Chulumani, cf. Table 2), based on estimate of 0.76 ha. per producer.	464.92	kilograms
4. Total production (#2 multiplied by #3)	2,473,374.40	kilograms
1977 Chapare		
1. No. of producers (National Directorate for the Control of Dangerous Substances, Appendix 1).	5,500.00	
2. Area, total number of hectares under coca cultivation (IESE, and Table 2, estimate of 0.88 hectares per grower).	4,840.00	ha.
3. Mean yield per hectare (DESEC, cf. Appendix 2 - data for 1974).	2,168.13	kilograms
4. Total production (#2 multiplied by #3)	10,493,750.00	kilograms

The fact that, to reconstruct the developments in coca production over the past five years, we have been forced to use such diverse and incompatible sources demonstrates one of the most basic problems in the whole coca question. There have been studies in the past but they have seldom looked at the same thing. Some give us data on overall production, others on yield, others on number of producers, others on area under cultivation, and still others on the size of the producing units. Serious, comprehensive studies of coca production over time are desparately needed. Until we have them, our production estimates will continue to be of questionable merit.

A temporal analysis of the data presented in Table 2 and Appendices 1 and 2 will help clarify the seriousness of the problem. Between 1972 and 1977 it would appear that the area planted in coca in the department of La Paz, as well as the number of producers in the department, has diminished 37.58 per cent. At the same time, there would appear to have been an increase in yield of 53.16 per cent and a small decline in overall production of 4.4 per cent.

As to the Chapare, changes would appear to have been even more pronounced and suggest a real inconsistency in the primary data. According to available figures, between 1972 and 1974 there would appear to have been a substantial decline in cultivated area (59.80%) and the number of producers (34.76%). In subsequent years, i.e. between 1974 and 1977, there would appear to have been an abrupt about face, with an increase of 192.48 per cent in cultivated area and of 128.87 per cent in the number of producers. Yet at the end of this period, i.e. in 1977, we find a dramatic decline in the number of producers and extent of cultivated area (33.23 per cent in each case). Finally, these inexplicable fluctuations notwithstanding, when the five year period is taken as a whole, we find that cultivated area shows a reduction of 21.48 per cent and the number of producers one of only 0.31 per cent, with yield increasing 125.00 per cent and production 77.5 per cent.

Such lack of internal consistency in the extant figures convinces us that we have no accurate fix on coca production. That this must be true is given additional support in the fact that the production figures presented in Table 2, when reduced by appropriate percentages to arrive at marketable rather than gross supplies (cf. Table 4) are insufficient to respond to even the legal market demand of traditional consumers.

Several organizations are laboring to solve the quandry of production. Two of the most active are the National Directorate for the Control of Dangerous Substances and the Ministry of Peasant and Agrarian Affairs (MACA). Between the time the Spanish language version of this report was completed and the present, the National Directorate for the Control of Dangerous Substances issued a confidential memorandum (La Paz, May 1978), in which it estimated that total 1977 production for the Chapare region was 19,512,000 kilos, and that for the Department of La Paz was 5,691,000 kilos, for a total of 25,203,000 kilos. To these figures it added 30 per cent to cover those producers that it believed had not participated in the registry of producers on which the production figures had been based.

We believe that our figures on production, based on past studies by a variety of organizations, are unrealistically low. By the same token, we believe that those recently issued by the National Directorate for the Control of Dangerous Substances are unrealistically high. We base this convinction on a number of factors:

1. Yield figures have been based on MAXIMUM rather than mean productivity. This procedure is inadmissable for the determination of the real production of any agricultural product. Mean, rather than maximum, yield must be the basis for such calculations.

2. The yield figures presented in our own study are in general agreement with all yield figures previously published. Those offered by the National Directorate for the Control of Dangerous Substances are approximately twice as great as any presented previously in statistical research of coca production.

3. In the summary table of the National Directorate's report, the amount of coca auto-consumed by the producer and his family is estimated as only 1.05 per cent of his total production. At the same time, in the text of the report (pp. 11-12) completely different percentages are presented:

a. For the aculli	33.6 per cent
b. For medicinal purposes	16.7 per cent
c. For other purposes	0.3 per cent
Total	50.6 per cent

Our data indicate that auto-consumption by the producer and his family is neither as high as the latter nor as low as the former figures would indicate (cf. Table 4). Both auto-consumption and crop losses are important factors in differentiating global production from marketable supply, and these will be discussed in det il in the following section.

Other recent though tentative figures on production have been presented by the Ministry of Peasant Affairs and Agriculture. In June, 1978, the Department of Statistics of this Ministry evaluated the estimates made by the National Directorate for the Control of Dangerous Substances, and concluded tentatively that the production estimates may be inflated by as much as 9,603,000 kilograms, and those on area planted to coca by some 2,800.5 hectares. It attributes the differences in the statistics produced by the Directorate and by the Ministry to differences in data collecting techniques. Preliminary production data provided by the Ministry are the following:

1975

Area, Has.	Yield, Kg/Ha	Production, kilograms
8,550	1,380	11,800,000

1976

Area, Has.	Yield, Kg/Ha.	Production, kilograms
10,000	1,300	13,000,00

1977

Area, Has.	Yield, Kg/Ha.	Production, kilograms
12,000	1,300	15,600,000

The Statistics department of the Ministry is continuing with its survey of coca production in traditional producing zones, obtaining data on area, production, and yield per surface unit. Some of these data have already been submitted to the National Computing Center (CENACO) for processing. It is hoped that the first results will be available by the end of July, 1978. When these are available, we should have a better idea as to the true magnitude of coca production in Bolivia. Until then, it is premature to make any final judgements. All that we can say is that, at present, confusion reigns as to the amount of coca produced yearly in Bolivia and, as a consequence, the percentage being used for legal markets on the one hand and illegal on the other. Because of this situation, we shall use the published data base in comparing production with legal consumption (Table 159), recognizing that all production data available are questionable if not actually inadequate. Our basic conclusion regarding the matter of production and marketable supplies is that serious and broadly based research is urgently needed.

3. Fluctuations in the Supply

a. Due to the lack of sequential data on the supply of coca in the producing areas of La Paz for the years 1972-1977, it is not possible to carry out an analysis of fluctuations based on a historical series of data. For this reason, in our analysis, we shall first present a comparison between the total production of coca by regions and the volume registered by the Agricultural Customshouses. In doing so, our initial step will be the determination of the marketable supply of coca, based on our calculations in Table 2. Then a historical analysis of the quantities of coca registered by the Agricultural Customshouses (La Paz and Cochabamba) will be presented for the period between 1966 and 1976. Although these data are also questionable, they are used because the Customshouse is the only institution which, through the years, has kept a more or less complete record.

TABLE 3 GLOBAL SUPPLY OF COCA FROM MAJOR PRODUCING REGIONS (1972, 1976, and 1977) (In Thousands of Kilograms)

YEAR	Yungas a/	Chapare	Regional Totals
1972	2,587.00	5,912.77	8,499.77
1976		13,755.00	13,755.00
1977	2,473.37	10,443.75	12,917.12

a/ Including the province of Franz Tamayo (Apolo, Pelechuco).

SOURCE: Appendix 1.

Table 3 reports on the global supply of coca without taking into consideration consumption by growers, pickers, and general public of the production zones. Losses due to adverse climatological factors, plagues, and diseases, which in greater or lesser degree contribute to the reduction of the marketable supply, are not included. This loss of volume is presented in Table 4, and indicates a reduction of 22.76 per cent in total production for coca producing areas of La Paz and one of 26 per cent for the Chapare. These percentages are based on a variety of information sources. In the case of the Chapare, they include:

1. Open ended interviews with individuals involved in the Cochabamba coca feria. The sample, which was purposely stratified, consisted of four producers, five wholesalers, and four truckers. Data obtained were the following:

   a) There are normally four harvests each year. The most important occurs between January and March and is accompanied by a sharp seasonal drop in coca prices. Drying of the harvested leaf during this season of the year is seriously jeopardized by heavy rains. Our respondents estimated that an average of 50 per cent of the harvest is thus lost.

   b) Although not all growers consume coca, the vast majority do. Even those who abstain set aside a certain percentage for their family, workers, visitors, and fiestas. Our respondents estimated that, on the average, some 200 pounds (2 quintals of 46 kilograms each) are set aside for such purposes. They also estimate that from 200 to 500 pounds are lost to bad weather, citing in particular the effect of heavy rains.

2. Another source of information for these matters is a report prepared in 1972 by the Commission for Peasant Social Security (Comisión del Seguro Social Campesino, Volumen III, Marco Agroeconómico, La Paz, 1972). On the basis of interviews with 26 growers, the following means were presented:

a) Area under cultivation:	1 Hectare of coca.
b) Yield per hectare:	874 Kilograms.
c) Auto-consumption per grower:	92 Kilograms.
d) Loss to weather, disease, etc.	138 Kilograms.
e) Total marketable product per grower (1 hectare):	644 Kilograms.

Comparing the data from these two different sources, we see that there is no basic contradiction. The first source gives us a mean loss of 161 kilograms, and the second of 138 for each producing unit. Using data for 1972, we arrived at the figure of 26 per cent loss for the Chapare. We then employed that percent to calculate losses for 1977. The basis of our calculations was as follows:

a) Auto-consumption in the producing zone	92 kg/ha
b) Losses in the producing zone	161 kg/ha
c) Total reduction	253 kg/ha
d) Global supply (Table No. 3)	5,912,770 kg
e) Total reduction of global supply	1,559,259 kg

Basis of calculation. 253 kg/ha X 6,164.08 has (Table No. 2)= 1,559,259 kilograms.

Detailing the percentage of reduction, we have:

a) Auto consumption	9.59	per cent
b) Losses	16.78	Per cent
	26.37	per cent, rounded to 26 per cent.

In the case of the Yungas region of La Paz, our estimates for losses and auto-consumption are based on the following:

1. Estimates made by the National Directorate for the Control of Dangerous Substances indicate that growers, on the average, set aside one tambor of coca (23 kg.) annually for use by themselves, their family, and their workers.

2. In light of the fact that no data exist for crop losses due to disease, weather, etc. for the Yungas area, we have calculated that these would be approximately 20 per cent the amount reported for the Chapare. This is based on the presumption that weather is less extreme in Yungas, and that less is lost to prolonged, heavy rainfall. We consider this estimate to be minimal, but adhere to it in order to avoid overestimation. By using the approximate 20 per cent figure, we arrive at a mean loss of 29.5 kg/prod/yr.

When we combine the above calculations for auto consumption with those for crop loss, we arrive at a 22.76 percentage reduction of global supply in estimating marketable supply.

a) Auto-consumption in the producing zone	23 kg/grower
23 kg X 11,214 growers (Table No. 2)	257,922 kg.
b) Losses in the producing zone	330,813 kg.
c) Total reduction of global supply	588,735 kg.
d) Total area under cultivation (Table No.2)	8,522.64 ha
e) Global supply (Table no. 3)	2,587,000 kg.
f) Total reduction in global supply, 22.76 per cent	588,735 kg.

g) Calculation: 2,587,000 ----100
257,922 ---- X

X = 9.97 per cent(reduction by auto consumption)

2,587,000 --- 100
330,813 --- X
X = 12.79 per cent (reduction by crop loss)

h) In absolute terms (relation kg/ha):
a) Auto consumption: 30.26 kg/ha (approximately)
b) Losses: 38.83 kg/ha (approximately)
c) Total reduction: 69.08 kg/ha (approximately)

If we were to compare the differences between global supply and marketable supply for the Chapare and Yungas, we would find that they are much greater for the former region. In part this is due to the fact that,on the average, growers in the Chapare have more land under coca cultivation than do growers in Yungas. In part it would also be due to differences in weather.

Table 3 reports on the global supply of coca without taking into consideration consumption by growers, pickers, and the general public of the production zones. Losses due to adverse climatological factors, plagues, and diseases, which in greater or lesser degree contribute to the reduction of the marketable supply, are not included. This loss is presented in Table 4, based on the above calculated reductions of 22.76 percent for coca producing areas of La Paz and 26.00 per cent for the Chapare.

TABLE 4 MARKETABLE SUPPLY OF COCA AS COMPARED WITH VOLUMES REGISTERED BY THE AGRICULTURAL CUSTOMSHOUSE (1972,1976,AND 1977)
(In thousands of kilograms)

YEAR	YUNGAS a/	CHAPARE	REGIONAL TOTAL	AGRICULTURAL CUSTOMSHOUSE LA PAZ	AGRICULTURAL CUSTOMSHOUSE COCHABAMBA	TOTAL
1972	1,998.20	4,375.45	6,373.65	2,435.60	4,246.31	6,681.91
1976		10,179.00	10,179.00	2,404.40	3,379.41	5,783.81
1977 b/	1,910.43 b/	7,728.38	9,638.81	2,117.30 c/	4,656.00	6,773.30

a/ Including the province of Franz Tamayo (Apolo,Pelechuco)
b/ January - September c/ 1977
SOURCE: Appendices 1,2, and calculations in previous text.

From the preceding table it can be observed that when one compares the total supply of the producing areas for the year 1972 (6,373,650 kg) with the amounts registered by the Customshouses (6,681,910 kg), there is a deficit in supply of 308,260 kg. This would appear to be due principally to an underestimate of production for the department of La Paz, which shows a deficit of 437,400 kg with respect to the amount registered by the respective Customshouse. According to results presented in the table, the opposite appears to have occurred in the Chapare during 1976.In that region,there appears to have been a surplus of supply of 6,799,590 kg.,or some 66.80 per cent, with respect to the amount registered by the Agricultural Customshouse of Cochabamba.For 1977 there is a deficit of 206,870 kilograms of coca in La Paz with respect to the amount registered by the Customshouse in this district.On the other hand, the supply of coca of the Chapare shows a surplus of 3,072,380 Kg. when compared with the total volume registered by the Agricultural Customshouse of Cochabamba during that year. The total supply of coca for both regions (9,638,810 Kg) represents a surplus of 2,865,510 Kg. with respect to the amount registered by the Agricultural Customshouse of La Paz and Cochabamba(6,773,300 Kg.)

In general,it can be contended that there is relative parity between the reported marketable supply of coca in La Paz and the amount registered by the respective Customshouse.This would seem to imply that the supply of coca for this department is fairly well controlled and, thus, probably destined for legal consumption. On the other hand, in the case of coca produced in the Chapare, apparently only between 33.2 per cent and 50 per cent of reported marketable supply is so controlled. We can say nothing of the destination of the remainder (between 50 per cent and 66.8 per cent).

Without a doubt, there are deficiencies in the handling and control of the statistics on coca. There is much speculation about its illegal use, measures for the control of production, marketing, etc. This is done without having a clear picture of the conditions of cultivation, system of exploitation, and the cultural and socio-economic importance of coca for the producer and the legal consumer, especially rural workers and miners who continue to use coca in traditional ways.

b. Before entering a historical analysis of the volumes of coca handled by the Agricultural Customshouses of La Paz and Cochabamba between 1966 and 1976 (cf. Appendices 3 and 4), it would be instructive to know of the volumes of coca registered by the Agricultural Customshouse of La Paz for this period. The figures indicate which of the regions of La Paz have been the principal producers of the registered product.

TABLE 5 TOTAL AMOUNTS OF COCA ACCORDING TO PLACES OF ORIGIN AS CONTROLLED BY THE AGRICULTURAL CUSTOMSHOUSE OF LA PAZ (1966 - 1976)

Place of Origin	Kilograms (thousands)	%
1. Yungas a/	21.683.20	90.6
2. Franz Tamayo Province b/	1.433.96	6.0
3. Inquisivi Province c/	814.00	3.4
TOTALS	23.931.16	100.0

a/ The provinces of North and South Yungas.
b/ The production areas of Apolo and Pelechuco.
c/ The Yungas zone of this province.

SOURCE: Agricultural Customshouse of La Paz

Table 5 clearly shows that during these ten years the major coca producers in the department of La Paz were the provinces of North and South Yungas (90.6%), followed by the province of Franz Tamayo (6.0%) and the province of Inquisivi (3.4%).

Table 6 presents a historical sequence as to the variation in volumes of coca during this same period. In general, starting with 1966-1968, there appears to have been a tendency toward a relative decrease. From 1969 through 1973, there is a more or less sustained increase in flow, reaching a maximum of 26.1 per cent for La Paz, of 64.3 per cent for Cochabamba, and of 50.1 per cent nationally. From 1974 to 1976, the general tendency is toward diminished supplies, the greatest oscillations being those of the Agricultural Customshouse of La Paz. The supply during the period from 1966 to 1977 shows an increase of 3.8 per cent for the Agricultural Customshouse of La Paz, an increase of 35 per cent for the Agricultural Customshouse of Cochabamba, and a national increase of 23.4 per cent.

TABLE 6 HISTORICAL SEQUENCE AT LOCAL AND NATIONAL LEVELS OF VOLUMES OF COCA CONTROLLED BY THE AGRICULTURAL CUSTOMSHOUSE (1966 - 1976) (in thousands of kilograms)

YEAR	AGRICULTURAL CUSTOMS-HOUSE OF LA PAZ		AGRICULTURAL CUSTOMS-HOUSE OF COCHABAMBA		CUSTOMSHOUSE TOTAL (NATIONAL)	
	kg.	Index 1966=100	kg.	Index 1966=100	kg.	Index 1966=100
1966	2.038.1	100.0	3.446.8	100.0	5.484.9	100.0
1967	1.948.3	95.6	3.105.9	90.1	5.054.2	92.1
1968	1.727.2	84.7	2.787.6	80.9	4.514.8	82.3
1969	1.866.5	91.6	2.951.8	85.6	4.818.3	87.8
1970	1.970.0	96.7	2.813.9	81.6	4.783.9	87.2
1971	2.248.8	110.3	2.666.1	77.3	4.914.9	89.6
1972	2.435.6	119.5	4.246.3	123.2	6.681.9	121.8
1973	2.569.2	126.1	5.662.6	164.3	8.231.8	150.1
1974	2.150.5	105.5	5.643.9	163.7	7.794.4	142.1
1975	2.572.5	126.2	4.199.4	121.8	6.771.9	123.5
1976	2.404.4	117.9	3.379.4	98.0	5.783.3	105.4
1977	2.117.3	103.8	4.156.0	121.0	6.773.3	123.4

SOURCE: Agricultural Customshouses of La Paz and Cochabamba.

B. THE DEMAND FOR COCA

The concept of demand implies an analysis of market components, what they accomplish, their interrelationships, and the benefits generated by the market system. For our study, this analysis will have two phases:

1) Analysis of production outlets (La Paz and Cochabamba). 2) Analysis of internal distribution.

It should be noted that our concept of demand structure refers only to the legal maketing of the coca leaf. To fully understand it, we have used all available information and complemented it with data from field research.

1. Production Outlets

Normally, production outlets are characterized by direct relationships between the producer and the buyer. In general, for some agricultural products and especially for those produced by a large number of peasants, this type of market is of great importance. The Bolivian coca market is a case in point. It is characterized by a large number of producers who articulate with a small number of buyers. Indispensible for this type of market is a good medium of transportation.

a. Activity of the Producers

(1) The Marketing System. The largest and most representative component of direct production outlets markets are the producers themselves. Despite their number, they have the disadvantage of acting individually, reflecting the dispersed nature of their units of production. Many producers have little knowledge of prices of the market in general.

Table 7, based on data from Table 2 (1977), presents an estimate of the number of producers involved in the cultivation of coca in the major producing regions of La Paz and Cochabamba.

TABLE 7 ESTIMATE OF THE TOTAL NUMBER OF COCA PRODUCERS, B. MAJOR PRODUCING REGIONS (1977)

PRODUCTION REGION	NUMBER OF PRODUCERS
Yungas a/	7.000
Chapare	5.500
T O T A L	12.500

a/ Including the province of Franz Tamayo (Apolo, Pelechuco)

Coca producers from both regions have similar marketing systems, as demonstrated by Table 8, based on data provided by IESE.

TABLE 8 MARKETING SYSTEM (SALE) OF COCA, BY REGION

SYSTEM OF SALE	CHAPARE PRODUCERS %	YUNGAS PRODUCERS a/ %
At farm to intermediary	84.82	92.02
At local market	5.80	4.78
At urban center	7.59 b/	3.20 c/
Combination	1.79	.-
TOTALS	100.00	100.00

a/ Provinces of North and South Yungas
b/ City of Cochabamba
c/ City of La Paz

According to the preceding table, 92.02 per cent of the coca producers from the Yungas area market their product through rescatadores (intermediaries). This percentage is somewhat smaller in the Chapare (84.82%). 7.59 per cent of the Chapare producers sell their coca directly in Cochabamba, while only 3.2 per cent of those from Yungas sell in La Paz. The rest of the producers in both regions are individuals who sell their coca in local (rural) markets.

Based on the above, it can be seen that coca producers are involved more with intermediaries than with the actual market itself. In the relationship the producer receives certain basic services from the middleman. In the first place, the sale of his coca is easy since it occurs right on the farm: in the second place, the intermediary provides him with some necessities such as food, medicine, clothing, tools, and other urban produced household goods. Obviously, however, even if the producer receives such benefits, he does not always come out ahead in the exchange.

(2) Economic Aspects. Table 9 presents a comparative analysis of costs, prices, and income per hectare of coca. Unfortunately, only prices and not costs of production for the Chapare in 1975 and for both areas in 1977 appear in the table.

As can be observed, in the Yungas region, between 1972 and 1975, the costs of production rose dramatically (802.91%), prices rose moderately (145.56%), and yields increased only slightly (53.16%). Net income grew by only 21.89 per cent. This demonstrates the fact that agricultural prices do not always increase in proportion with costs; normally the intermediary sector benefits more than do the producers.

TABLE 9

PRODUCTION COSTS, PRICES, AND INCOME PER HECTARE OF COCA, BY PRODUCING REGION (1972, 1975, AND 1977)

(In Bolivian pesos)

ITEM	YUNGAS 1972 a/	YUNGAS 1975 b/	YUNGAS 1977	CHAPARE 1972 a/	CHAPARE 1977
Cost of production/ha	902.07	8.144.95	-.--	1.031.41	-
yield/ha (kg).	303.54	464.92	-.-	959.23	-
Average Price/Kg.	9.13	22.42	38.7 c/	4.65	17 d/
Gross Income/ha,	2.771.45	10.423.51	-.-	4.460.42	-
Net Income/ha.	1.869.38	2.278.56	-.-	3.429.00	-

a/ Data from ILSE (source of quoted information).

b/ See Appendix 5.

c/ Department of Agricultural Marketing of the MACA. Average price for period of January through September of 1977, La Paz October, 1977.

d/ PROCDES (Development Project fo Chapare and Yungas). Report of the regional office of the Chapare. Average price for period of January through September 1977.

In terms of prices, Table 9 includes information of up to September of 1977. It can be observed that, between 1972 and 1977, prices increased by 323.88 per cent for Yungas and by 265.59 per cent for the Chapare. It should be emphasized that the price aspect of coca shows a marked difference from one area to the other. According to the table, coca prices for Yungas are more or less 50 per cent higher than those for Chapare coca.

To calculate total benefits generated by the cultivation of coca, we can use the data on regional marketable supply from Table 4 (1977). The results are given in Table 10.

TABLE 10 TOTAL BENEFITS GENERATED BY THE CULTIVATION OF COCA, BY REGION (1977)

REGION	SUPPLY (thousands of Kg.)	PRICE/kg. $b.	TOTAL BENEFIT (thousands of $b)	No. OF PRODUCERS
Yungas	1,910.43	38.7	73,933.64	7,000
Chapare	7,728.38	17.0	131,362.46	5,500

As can be observed from the preceding table, 7,000 producers from the Yungas region of La Paz received a total of $b. 73,933,640 for the sale of 1,910,430 kilograms of coca. If it is assumed that this amount is distributed equally among all producers, each would have an annual gross income, from coca, of $b. 10,562. Among the 5,500 registered producers of the Chapare, there was last year a reported gross income of $b. 131,362,460 for the sale of 7,728,380 Kilograms of coca, averaging $b. 23,887 per producer-year. This income is considerably greater than that for the Yungas area due to ecological variation and to differences in the systems of planting and care. The Chapare enjoys lower production costs combined with a larger supply of coca. In both regions, producers seldom limit themselves to coca. They also grow other crops to satisfy their basic needs, and sometimes sell small surpluses. Careful economic analysis of basic coca producing units is sorely needed. Until it is completed we can never have a precise picture of the socio-economic status of the coca producer.

(3) Financing of Production and Marketing. In general existing studies do not consider this matter. However, because of the relatively prescriptive conditions under which coca production and trade operate, it can be assumed that financing arises from the economic capacity and risks of each producer himself, with the occasional assistance of an intermediary.

b. Activity of the Intermediaries

(1) The marketing system. Marketing of coca has traditionally been dominated by intermediaries who operate in each area of production. Their form of operation varies substantially from one region to another.

Having gathered the coca, Chapare intermediaries move the product, by public transportation and on the highway, to Cochabamba. In the last few years, there has been a market established in Cochabamba which, because quantities smaller than one tambor (bale of 50 net pounds) of coca are not sold, should be considered basically a wholesale market. This market operates only on Mondays

throughout the year. It is held on the eastern sidewalk of the "Mercado Central de Ferias" ("Central Market of Ferias") in the south-eastern zone of the city of Cochabamba. Market begins at 6:00 A.M. as the trucks arrive from the Chapare and the coca is unloaded on the sidewalk. The feria continues the rest of the morning. The quantity and rapidity of sales are, logically, a function of prices, and these are dependent on the quality and amount of the coca available.

The suppliers for this feria are merchant-intermediaries, some merchant truckers, and a few producers. According to the Municipality of Cochabamba, which controls the use of the seller stalls 1/, there are some 145 merchants who operate permanently in the market, and an average of 60 people who operate sporadically, (among these, probably, some producers).

There are various types of buyers. Some who purchase small volumes and who come from the rest of the country ("interior"), especially those from the districts of Oruro and Potosí, are easily identified by their clothing. Other small scale purchasers take coca to the rural areas of the Cochabamba valley itself. More significant volumes of coca are purchased by merchants who should perhaps be called "Wholesale Distributors for Wholesalers". 2/

Among the services provided by intermediaries who operate in the Chapare, there are several over and above the simple marketing of coca:

- They provide loans for the planting and harvesting of coca.
- They sell supplies.
- They provide transportation.

With regard to the role of intermediaries in the Yungas area we have no precise data. However, utilizing the little information which does exist along with general knowledge about the Yungas itself, we can make some general observations. The intermediaries gather the product in the areas of production and then, using public transportation, take it to La Paz where relatively small amounts are marketed. Before entering the city, they pay the respective tax on coca charged by the Agricultural Customshouse at the control station at Unduavi 3/ The city of La Paz is not significant in itself as to the marketing of the coca leaf. It does, however constitute an important control point for the National Directorate for the Control of Dangerous Substances which registers the flow of this product toward the interior of the department and of the country in general. For purposes of control, they issue what are called the "Guias de Tránsito" (transit permits) for which they charge a service fee ($b. 5/tambor and $b. 3/Cesto) 4/ without which coca cannot legally be marketed in Bolivia. After the coca has been registered, it can then be distributed to the rest of the country.

Other relationships between Yungas producers and their respective intermediaries would appear to be similar to those characteristic of the Chapare.

1/ Different from a fair in that it is held periodically during the whole year.

2/ They sell the coca to other wholesalers, who then distribute it in the interior.

3/ The tax up to July, 1977 was $b. 30.5/tambor of 50 pounds. Since August, 1977, the tax has been $b. 62/tambor.

4/ A cesto is also a bale but only weighs 30 lbs.

(2) Economic Benefits

Data on such benefits exist only for intermediaries operating in the Chapare; as has been indicated, the production sector of La Paz presents another type of relationship with intermediaries which will be analyzed when we look at the "internal distribution market"

Using the figures on supply from Table 4 (1977) and the price information provided by the Regional Office of PRODES for the Chapare, it has been possible to calculate the benefits received by Chapare intermediaries. These are shown in the following table, where it is assumed that the volumes offered by the producers are handled in their entirety by these middlemen.

TABLE 11 ESTIMATED INCOME RECEIVED BY INTERMEDIARIES FOR THE MARKETING OF CHAPARE COCA. COCHABAMBA (January-October, 1977)

No. of merchants	Marketed Volume Kg.	Average Purchase Price $b./Kg.	Total Purchase Cost $b.	Average Sale Price a/ $b./Kg.	Gross Income $b.	Apparent Net Income $b.
205	7,728,380	17	131,382,460	19.53	150,935,260	19,552,800

a/ Coca feria of Cochabamba

Table 11 shows a preliminary estimate of annual net income of $b. 19,552.800 for 205 coca merchants operating between Cochabamba and the Chapare. In order to obtain an estimate more close to reality, from these figures must be deducted freight charges, fares, and the taxes charged by the Agricultural Customshouse in Paracty or in the city of Cochabamba (Table 12).

TABLE 12 ADDITIONAL COSTS FOR INTERMEDIARIES MARKETING COCA, CHAPARE - COCHABAMBA (1977)

No. of Merchants	Transported Volume Kg.	Freight Costs a/ $b.	Fare Costs b/ $b.	Tax c/ $b.	Total Additional Costs $b.
205	7,728,380	2,418,983	575,025	6,723,691	9,717,699

a/ $b. 0.313/Kg.
b/ The cost of a round-trip fare per person is $b. 55. Taking into account 51 weeks or fair days per year, we have a total fare cost of $b. 575,025.
c/ $b. 0.87/Kg.

According to the results shown by Tables 11 and 12, i.e.a. preliminary estimated income of $b. 19,552.800 and additional costs of $b. 9,717,699, one can obtain the more refined income estimate of $b. 9,835.101 per year. If this amount is divided by the corresponding number of intermediaries, the average per intermediary would be $b. 47,976.10 per year.

Before finishing this section, it should be mentioned that purchase prices for the different production areas of the Chapare

vary according to area 1/ and quality 2/ thus affecting the prices at the coca feria of Cochabamba.

TABLE 13 VARIATION OF COCA ACCORDING TO PRODUCTION ZONE ANI QUALITY, CHAPARE - COCHABAMBA (MARCH, AUGUST, ANI SEPTEMBER OF 1977) 3/

ZONE a/ QUALITY c/	Average price / load b/ of coca ($b.)					
	MARCH		AUGUST		SEPTEMBER	
	Producer	Feria	Producer	Feria	Producer	Feria
High Zone	750	900	1,200	1,250	1,200	1,300
Low Zone	650	700	1,000	1,050	1,000	1,200
Poor quality(black)	250	350	-	-	-	-
Medium quality (blackish green)	350	450	1,200	1,300	-	-
Good quality	300	700	-	1,400	-	-

a/ Report of the Regional FRODES Office for the Chapare, September 1977.
b/ Load of two bales of 50 net pounds apiece.
c/ Arteaga, October 1977, 4.

(3) Financing for the Marketing of Coca

Coca is a crop which is subject to restrictive measures. Marketing is controlled even for legal consumption. Therefore, coca merchants, most of whom have been in the business for years have their own resources with which to finance their commercial operations. To cope with market and other risks, the merchant is backed only by his accumulated capital.

c. Transportation

The transport of coca from production areas to the centers of marketing control and distribution plays a very important part within the marketing systems .

(1) Chapare - Cochabamba

There are three transport unions which, among other services provided, take coca from the Chapare to Cochabamba. The number of truckers is shown in the following table:

1/ High zone: Villa Tunari, Paracty, Agrigento, Eteremazama, San Lorenzo, and others. Low zone: San Miguel, Chipiriri, Villa 14 de Septiembre, Todos Santos, Ibuelo, Chimoré, Central Busch, and others. Coca from the high zone is thicker and more flexible: that from the low zone is thinner and more brittle.

2/ The quality is based upon the drying of the leaf, which is, in turn, basically a function of climatological conditions. With good weather and sun one obtains a green leaf; on cloudy or rainy days the drying is deficient and one obtains leaves ranging in color from blackish green to black.

3/ This table shows a certain inconsistency in prices established by zone and quality. This is due to the fact that the information was gathered from two independent sources in the month of September. Having been asked in this month about August and March, informants may not have remembered exact prices, especially for as far back as March.

TABLE 14 NUMBER OF UNIONIZED TRUCKERS WHO TRANSPORT COCA FROM THE CHAPARE TO COCHABAMBA (1977)

UNION	TOTAL NUMBER OF TRUCKERS	NUMBER OF TRUCKERS WHO HANDLE COCA
Chapare	400	50
Colomi	300	30
Sacaba	500	20
TOTAL	1,200	100

SOURCE: Arteaga October 1977:2

Each union member pays monthly dues of $b. 5 to the Federation of Trucker's Union of Cochabamba. The principal functions of the unions are to rationalize the distribution of freight and to defend memebers in case of conflicts due to the setting of or charging of transportation taxes.

Normally, trucks loaded with coca leave the Chapare on Sunday in order to arrive in Cochabamba early Monday for the feria. Rates in effect from January through October of 1977 appear in Table 15.

TABLE 15 TRANSPORTATION RATES FOR CHAPARE - COCHABAMBA (JANUARY - OCTOBER 1977)

RATES	$b.
1. Freight Charge / Kg.	
- For merchants	0.31
- For producers	0.35
2. Fare / person	
- Chapare - Cochabamba	25.--
- Cochabamba - Chapare	30.--
3. Agricultural Customshouse Tax	50.--

SOURCE: Arteaga, October 1977: 2

Among others, two things can be observed from this table. First of all there is a difference of $b. 0.04 per kilo in the amount charged to producers and merchants for transporting coca. This is due to the fact that producers are less regular customers of the truckers than are merchants. Secondly, although it is not his legal responsability, in general, it is the trucker who pays the agricultural tax at the control points of the Agricultural Customshouse (Paracty and Cochabamba). After having received payment of the tax, customs agents register, at the feria, the declared volumes on the control papers, stamping the bales with the name of the owner, in many cases the trucker himself. The trucker then charges the merchants for the tax, freight charges, and fares ; this is paid in cash either before or after the sale of the coca in the feria.

Table 16 shows estimated global benefits received by transporters of coca.

TABLE 16 GROSS INCOME RECEIVED BY TRANSPORTERS OF COCA, CHAPARE - COCHABAMBA (1977)

No. of Truckers	Transported Volume Kg.	Freight Charge Income a/ $b.	Fare Income b/	Total Benefits $b.	Trucker's Benefits $b.
100	7,728,380	2,418,983	575,025	2,994,008	29,940.08

a/ $b. 0.313 Kg.
b/ Round-trip fare for 205 people at $b. 55 apiece and considering 51 week or feria days per year.

According to Table 16, truckers average a gross income of $b. 29,940.08 per year. Because of a lack of data about operational costs (fuel, parts, etc.), it is not possible to establish the net income received by this sector. It should be noted however that the truckers receive, in addition, considerable miscellaneous income for services rendered during the rest of the week. The major flow of transportation generally occurs during the month of March, the period of greatest production. This flow is notably reduced between August and October. The tonnage of the trucks transporting coca between the Chapare and Cochabamba varies from 60 to 140 quintals (46 kilograms/quintal).

The financing of transport equipment, in other words the acquisition of the vehicle, fuel, parts, etc., including all risks, is the responsibility of the owner. The vehicle is generally bought on credit available as either a short or long term loan (five years as a maximum). The buyer makes a down payment to the import house. In general, truckers have their capital, just as we have seen is the case with merchants.

We know, on the basis of specific information, that many of the truckers, in addition to transporting coca, become directly involved in its marketing. It should also be noted that many of truckers' wives sell coca in both ferias and stores.

(2) Transportation from Yungas and other Coca-producing areas to the city of La Paz

One encounters various difficulties when he tries to gather information about the number of truckers transporting coca from the production zones of Yungas to the city of La Paz. To have truly reliable information, one would have to place at least two people, for a minimum of one month, at the control points of exit and entry to the city of La Paz. This has been impossible because of lack of time, personnel, and economic resources. We did however, interview the head of the transport union serving the area in order to obtain some idea of the size and nature of their operation. The results of this inquiry were the following:

- 250 people take part in the union organization. Of these, 150 are drivers and the remainder drivers and/or owners. The union places a limit of two vehicles for each owner.
- Pay for transportation services is in cash at the place of destination and the transaction is a direct one between the trucker and the customer.
- Information about the number of truckers and the volume of coca taken to La Paz and other destinations is gathered at the checkpoints of Chuquiaguillo (entry) and the Alto (exit).
- Financing is handled by the owners. Vehicles are acquired either for cash or through short or long term credit.

SOURCE: Interview with the Permanent Secretary of the Long Distance Transportation Union, La Paz.

Table 17 shows average transportation rates (January-September, 1977).

TABLE 17 AVERAGE TRANSPORTATION RATES FROM COCA PRODUCING AREAS OF THE YUNGAS TO THE CITY OF LA PAZ (1977)

PRODUCTION ZONE	FREIGHT CHARGE/Kg. $b.	FARES a/ To La Paz	FARES a/ From La Paz	TOTAL FARE $b.
Coroico	0.41	20.00	13.50	33.50
Chulumani	0.45	20.00	15.00	35.00
Coripata	0.45	20.00	15.00	35.00
Irupana	0.54	25.00	19.00	44.00
Yungas Average	0.46	21.25	15.60	36.80
Apolo b/	2.50	250.00	250.00	500.00

a/ Fare per person
b/ By air.
SOURCE: Department of Agricultural Marketing, Ministry of Peasant Affairs and Agriculture, September 1977.

Because no information exists with regard to the number of truckers (transporters in the case of Apolo), estimated income for this sector must be presented in global form, and by production area.

TABLE 18 REPORT OF GROSS INCOME FROM THE TRANSPORTATION OF COCA FROM PRODUCTION AREAS TO THE CITY OF LA PAZ (1977)

PRODUCTION AREA	TRANSPORTED VOLUME Kg.	FREIGHT CHARGES INCOME a/ $b.	FARE INCOME b/ $b.	TOTAL BENEFITS $b.
Yungas	1,757,600	808,496	292,780.80	1,101,276.80
Apolo	152,830 c/	382,075	287,500.00	669,575.00
T O T A L S	1,910,430	1,190,571	580,280.80	1,770,851.80

a/ Average freight charge: Yungas - La Paz, $b. 0.46/Kg; Apolo - La Paz, $b. 2.50/Kg. (by air).
b/ Average fares (round trip): Yungas - La Paz, $b. 36.8/person and considering 156 permanent merchants operating 51 times a year.
Average fares (round trip): Apolo - La Paz, $b. 500/person and considering 23 permanent merchants operating 25 times a year.
c/ Estimated 8% of total coca volume in La Paz.

2. Internal Distribution Market

a. Wholesalers' Activities

(1) The marketing system, estimated number of wholesalers, and volumes sold.

In analyzing the role of intermediaries in the major coca-producing regions of the Chapare and Yungas, we have already seen that there are clear differences in marketing between the two regions. The point of concentration and wholesale distribution for Chapare coca is the coca feria which is held in the city of Cochabamba. Control over legal marketing also occurs in the city itself. The point of concentration, control, and distribution for Yungas and Apolo coca

is the city of La Paz. The La Paz marketing system is different however, from that of Chapare, in that no central coca market, or feria, exits. In its place are a large number of independent warehouses, wholesalers and truckers.

(2) Wholesale distribution from Cochabamba to the interior of the Country

Fully to understand this distributional network, we would need precise information as to the relationship between the wholesaler and those to whom he supplies coca. Unfortunately such information does not exist. Appendix 6 does, however contain some data relevant to the problem over a six month period and we shall now turn to it for our analysis.

Table 19, taken from data in Appendix 6, gives detailed relationships between the number of wholesalers and the volumes of coca they handle, broken down by principal consumer districts, major cities and other population centers (townships, communities, etc.) that correspond to each of seven of Bolivia's major departments. Two aspects are noteworthy:

- The fluctuation between the numbers of "permanent" and "sporadic" merchants.
- The varying degree of economic concentration among the several departments as a function of volumes of coca handled by participants in the wholesale marketing networks Overall, "sporadic" 1/ far outnumber " permanent" 2/ merchants, accounting for 1,020 out of a total of 1,392 (77,6 percent).

Some of these merchants, because they function during the same month in more than one major coca market, appear to have been counted twice. Correcting for these duplications, we find that the actual total number of registered wholesalers is 1,208, i.e., 184 less than indicated in the figures quoted above (cf Appendix 6).

Among the different cities there appear to be markedly different degrees of market control. Concentration seems most pronounced in La Paz and Oruro where, in the former, 28 merchants handle 93% of the total volume of coca marketed in the entire department and, in the latter, 76 merchants handle 82% of the total. In both cases there would appear to be a form of oligopolistic market with respect to the total volume handled within the respective departments.

1/ This term is used to denote those who operate between 1 and 3 months out of every six.

2/ Those who operate between 4 and 6 months out of every six.

TABLE 19 NUMBER OF WHOLESALE MERCHANTS OF CHAPARE COCA, WITH VOLUMES AND DESTINATION OF THE PRODUCT (Jan - June 1977)

DEPARTMENT	NUMBER OF MERCHANTS SPORADIC	PERMANENT	TOTAL NUMBER OF MERCHANTS	VOLUME HANDLED	%
1. La Paz					
City	24	4	28	71,392	93.0
Other centers	11	1	12	5,198	7.0
Subtotal	35	5	40	76,590	100.0
2. Cochabamba					
City	5	-	5	1,426	1.2
Other centers	193	65	258	121,486	98.8
Subtotal	198	65	263	122,912	100.0
3. Santa Cruz					
City	63	16	79	37,835	14.1
Other centers	349	88	437	229,862	85.9
Subtotal	412	104	516	267,697	100.0
4. Oruro					
City	57	19	76	127,995	82.0
Other centers	47	10	57	28,267	18.0
Subtotal	104	29	133	156,262	100.0
5. Potosí					
City	68	11	79	118,772	39.4
Other centers	168	28	196	182,436	60.6
Subtotal	236	39	275	301,208	100.0
6. Chuquisaca					
City	38	16	54	68,770	48.6
Other centers	56	54	110	72,703	51.4
Subtotal	94	70	164	141,473	100.0
7. Tarija					
Yacuiba	1	-	1	575	100.0
GENERAL TOTALS	1,080	312	1,392	1,066,717	100.0

SOURCE: Department for the Control of Production and Marketing of Coca, National Directorate for the Control of Dangerous Substances, Cochabamba and La Paz, October 1977.

(3) Economic Benefits

For this analysis, we are assuming that wholesale activities for Chapare coca are limited to the coca feria which operates on Mondays in the city of Cochabamba. To estimate income received by wholesale merchants operating in the feria, we turn first to the mean purchase price in said feria. For the first six months of 1977, this was $b. 17.39 per kilogram of coca. We next turn to the price received by the wholesaler when he resells to retailers. Although this information exists only for control and distribution centers at the departmental level, and only for the cities of La Paz, Cochabamba, Oruro, and Potosí, this is sufficient to provide us with a valuable frame of reference for understanding the general behavior of such transactions. Table 20 indicates purchase and sale prices from wholesaler to retailer broken down by specific consumer markets, for the first six months of 1977.

TABLE 20 PURCHASE AND SALE PRICES FOR CHAPARE COCA, FROM WHOLESALER TO RETAILER, ACCORDING TO CONSUMER MARKET (Jan-June, 1977)

MARKET	PURCHASE PRICE IN COCHABAMBA a/ $b.	SALE PRICE $b.	GLOBAL MARGIN %
La Paz	17.39	20.40 b/	17.31
Cochabamba	17.39	20.87 a/	20.00
Oruro c/	17.39	33.04 c/	90.00
Potosí c/	17.39	36.71 c/	111.10

a/ Arteaga. October 1977:4
b/ Department of Agricultural Marketing, Ministry of Peasant Affairs and Agriculture , La Paz, November of 1977.
c/ Appendix 13

Included in the prices and global margins, naturally, are the costs of transportation and the tax paid by the wholesale merchants to the Na - tional Directorate for the Control of Dangerous Substances (DNCSP). These should be subtracted in order to obtain net margins, and are detailed in Table 21.

TABLE 21 OPERATIONAL COSTS WHOLESALERS OF CHAPARE COCA (Jan - June 1977)

MARKET	TAX D.N.C.S.P. $b./Kg.	FREIGHT CHARGES $b./Kg.	TOTAL COSTS $b./Kg.
La Paz	0.22	0.435	0.65
Cochabamba	0.22	-	0.22
Oruro	0.22	0.435	0.65
Potosí	0.22	0.870	1.09

SOURCE: Department for the Control of Marketing and Production of Coca. C.N.C.S P., Cochabamba and La Paz, October 1977.

With the data presented above (Tables 19, 20, and 21), we can now estimate the net income of wholesalers operating out of Cochabamba. These estimates are shown in Table 22.

Due to the lack of data pertaining to prices and transportation costs for coca moving from the control centers (cities) to the interior of each department, we are forced to limit our analysis to purchase and sales data coming from the control centers (i.e. cities) themselves. As can be observed from Table 22, the total number of 711 wholesale merchants working out of Cochabamba obtained a net return of $b. 8,416,393 for the sale of 656,972 kilogram of coca, during a period of six months. This represented a net global margin of return of 73.7%. Said merchants would have received an average per merchant of 11,837.40 for the six month period. Special note should be taken of the apparent concentration of sales within the cities themselves, a concentration that lies at odds with the fact that the vast majority of traditional users live outside city limits (cf.Tables 22 and 23).

TABLE 22 INCOME OBTAINED BY WHOLESALE MERCHANTS OPERATING IN THE CITY OF COCHABAMBA AS A FUNCTION OF CONSUMERS MARKETS (Jan - June 1977)

CONSUMER MARKET	NUMBER OF MERCHANTS	VOLUME HANDLED Kg.	PURCHASING COSTS a/ $b.	SALE INCOME $b.	GROSS INCOME $b.	MINUS MARKETING COSTS $b.	NET RETURN $b.
La Paz b/							
City	28	71,592	1,241,506.8	1,456,396.8	214,890.0	46,404.5	168,485.2
Other centers	12	5,198	90,393.2	106,039.2	15,646.0	3.378.0	12,267.3
Subtotal	40	76,590	1,331,900.0	1,562,436.0	230,536.0	49,782.5	180.752.5
Cochabamba c/							
City	5	1,126	24.798.1	29,760.6	4,962.5	313.7	4,648.8
Other centers	258	121,186	2,112,641.5	2,535,412.8	422,771.3	26,726.9	396,044.4
Subtotal	263	122,912	2.137.439.6	2,565,173.4	427,733.8	27,040.6	400,693.2
Oruro d/							
City	76	127,995	2,225,833.0	4,228,954.8	2,003.121.8	83,196.7	1,919,925.1
Other centers	57	28,267	491,563.1	933,941.7	442,378.6	18,373.5	424,005.1
Subtotal	133	156,262	2.717.396.1	5,162.896.5	2,445,500.4	101,570.2	2,343,930.2
Potosi e/							
City	79	118,772	2,065,445.0	4.360,120.1	2,294,675.1	129,461.5	2,165,213.6
Other centers	196	182.436	3.172,562.0	6,697,225.5	3,524,663.5	198,855.2	3.325,808.3
Subtotal	275	301,208	5,238.007,0	11,057,345.6	5,819.338.6	328,316.7	5,491,021.9
GRAND TOTALS	711	656.972	11,424,742,7	20,347,851.5	8,923,108.8	506,710.0	8,416,397.8

a/ $b. 17.39/kg.
b/ $b. 20.40/kg. (sale price)
c/ $b. 20.87/kg. (sale price)
d/ $b. 33.04/kg. (sale price)
e/ $b. 36.71/kg. (sale price)

TABLE 23 ECONOMIC CONCENTRATION OF WHOLESALE MERCHANTS AS A FUNCTION OF PURCHASE - SALE OPERATIONS IN URBAN CONSUMER MARKETS - (Jan - June of 1977)

CITY	NUMBER OF MERCHANTS	VOLUME HANDLED /kg	PURCHASING COST $b.	SALE INCOME $b.	TOTAL RETURN $b.	MINUS MARKETING COSTS $b.	NET RETURN $b.
La Paz	28	71,392	1.242,506.8	1,456,396.8	214,890.0	46.404.8	168,485.2
Cochabamba	5	1.426	24,798.1	29,760.6	4,962.6	313.7	4,648.8
Oruro	76	127,995	2,225,833.0	4,228,954.8	2,003,121.8	83,196.7	1,919,925.1
Potosi	79	118,772	2,065,445.0	4,360,120.1	2,294,675.1	129,461.5	2,165.213.6
GRAND TOTAL	188	319,585	5,558,582.9	10,075,232.3	4,517,649.5	259,376.7	4,258,272.7

It can be seen, in analyzing Tables 22 and 23, that the 188 merchants handling coca destined for the nation's cities received, during the first six months of 1977, approximately 50.6% ($b. 4,258,273) of the net total return ($b. 8,416,398), with the greatest economic concentration ocurring in the cities of Potosí and Oruro ($b.2,165,214 and 1,919,925, respectively).

It should be noted that if one were to take into account the higher prices of coca obtained outside the departmental capitals, it is probable that the margins of return for merchants operating in such sectors would be even greater.

(4) Financing and Relationship between Wholesalers and Retailers.

As with other individuals involved with the coca market, wholesale merchants provide their own capital and assume all necessary risks. The ties between wholesalers and retailers are not known in depth because of the lack of research. Despite this fact, when retailing is further discussed, brief comments on these relationships will be included.

(5) Wholesale Distribution from La Paz to the Interior of the Republic

As has already been indicated, the only available information on this subject derives from the "transit permits" issued by the National Directorate for the Control of Dangerous Substances (see Appendix 7). Table 24, based on data found in Appendix 7, shows the relationship between the number of wholesale merchants and the volumes of coca flowing from different production zones of the department of La Paz and grouped by consumer districts, as these are reported in the permits themselves. It can be observed from the Table that, as we have already seen in the case of Cochabamba, there are two types of wholesale merchants: the sporadic who operates between 1 and 3 months out of every 6 months, and the permanent merchant who operates between 4 and 6 months during the same period of time. Out of a total of 721 merchants listed in the table, 565 could be classified as sporadic, and 156 as permanent. The total of the two gives us a figure smaller than that presented in Appendix 7, the difference being 204. 1/ This difference is probably due to the fact that one wholesale merchants can operate simultaneously in different consumer centers and thus may be duplicated on the "transit permit"

Of the total number of wholesalers (925) and volume (906,465.3 Kg.) the greatest concentration would appear to occur in the department of Potosí where approximately 43% of total registered wholesale merchants (399) handle some 43.8% of the total registered volume of coca. In general the number of wholesalers lies in direct relationship to the volume of coca sold. In this sense, no clear differences emerge separating the departmental capitals from their hinterlands. (see percentage column , Table 24).

(6) Economic Benefits

To assess what these may be, we turn first to the mean purchasing price paid by wholesalers during the period Jan - June, 1977.

1/ Difference: 64 sporadic and 140 permanent (total of 204).

TABLE 24 WHOLESALERS OF PACEÑA COCA AND THEIR RESPECTIVE CONSUMER MARKETS (Jan - June 1977)

DEPARTMENT	NUMBER OF WHOLESALERS SPORADIC	PERMANENT	TOTAL WHOLESALERS	VOLUME HANDLED Kg.	%
1. La Paz					
City	2	-	2	82.8	0.2
Other centers	50	15	65	40,963.9	99.8
Subtotal	52	15	67	41,046.7	100.0
2. Cochabamba					
City	1	-	1	13.8	7.7
Other centers	1	-	1	165.6	92.3
Subtotal	2	-	2	179.4	100.0
3. Santa Cruz					
City	50	24	74	51,912.8	46.5
Other centers	34	21	55	59,640.8	53.5
Subtotal	84	45	129	111,553.6	100.0
4. Oruro					
City	88	41	129	83,927.5	80.0
Other centers	37	22	59	21,034.0	20.0
Subtotal	125	63	188	104,961.5	100.0
5. Potosí					
City	76	39	115	128,958.2	32.5
Other centers	203	81	284	267,996.0	67.5
Subtotal	279	120	399	396,954.2	100.0
6. Chuquisaca					
City	5	2	7	1,407.6	4.0
Other centers	17	15	32	33,578.1	96.0
Subtotal	22	17	39	34,985.7	100.0
7. Tarija					
City	30	15	45	74,459.3	34.3
Other centers	35	21	56	142,324.9	65.7
Subtotal	65	36	101	216,784.2	100.0
GRAND TOTALS	629	296	925	906,465.3	100.0

According to declarations made by these wholesalers the total value is $b. 27,787,114.

SOURCE: Department for the Control of Production and Marketing of Coca, National Directorate for the Control of Dangerous Substances, Cochabamba and La Paz, October, 1977.

This for Paceña coca purchased directly in the production areas of Yungas and Apolo, was $b. 19.35 per kilogram 1/ Data on the sale price from wholesaler to retailer for this period exist only for the cities of La Paz, Cochabamba, Oruro, and Potosí. They are presented in Table 25.

1/ According to information from the Department of Agricultural Marketing, MACA, November 1977.

TABLE 25 MEAN PURCHASE AND SALE PRICES FROM WHOLESALER TO RETAILER FOR PACEÑA COCA (Jan - June 1977).

MARKET	PURCHASE PRICE IN PRODUCTION AREA $b./kg.	SALE PRICE $b./kg.	GLOBAL MARGIN % a/
La Paz	19.35	23.76	22.79
Cochabamba	19.35	47.82	147.13
Oruro	19.35	56.52	192.10
Potosí	19.35	64.59	233.80

a/ The margin is reduced if we subtract freight charges and taxes.

To obtain the net margin of return, we should subtract from the global margin figures all transportation costs, and taxes paid to the Agricultural Customshouse (Unduavi) and to the National Directorate for the Control of Dangerous Substances. These costs are shown in the following table:

TABLE 26 COSTS FOR WHOLESALERS MARKETING PACEÑA COCA (Jan - June 1977)

MARKET	TAX D.N.C.S.P.	AGRICULTURAL CUSTOMSHOUSE TAX ($b./kg.)	FREIGHT CHARGE PRODUCTION AREA LA PAZ ($b./kg.) a/	FREIGHT CHARGE FOR DISTRIBUTION TO CONSUMER MARKET ($b./kg.) b/	TOTAL COSTS $b./kg.
La Paz	0.226	0.777	0.542	-	1,545
Cochabamba	0.226	0.777	0.542	0.725	2,270
Oruro	0.226	0.777	0.542	0.362	1,907
Potosí	0.226	0.777	0.542	1.812	3,357

a/ Coca arriving to La Paz from Apolo has a transportation cost of $b. 2.50/kg. Because it constitutes between 6 and 8% of the total produced volume, only 25% of said cost ($b. 0.625/kg.) has been averaged in with the freight charges from Yungas (see Table 17).

b/ Table 36

Based on data presented in Tables 24, 25, and 26, an estimate can now be made of the net income received by wholesale merchants of Paceña coca. This is given in Table 27. Due to the lack of data on prices and transportation costs from the distributional nodes to the interior of each department, Table 27 has been constructed, assuming that general price levels (see Table 25) are established at these nodes. This does not mean that all coca registered and priced at the nodes is necessarily consumed there.

Based on these assumptions, estimates presented in Table 27 are that the total number of 656 wholesale merchants obtained a net return of $b. 20,440,225 for the marketing of 543,141.8 kilograms of Paceña coca during the first six months of 1977. This would represent a net global margin of return of 194.8%. The mean would come to $b. 31,172.50 per merchant over the six month period.

(7) Validity of marketing data gathered by the Directorate of Narcotics

In order to assess the validity of the data provided by the Department for the Control of Production and Marketing of Coca of the National Directorate for the Control of Dangerous Substances, we interviewed 97 sellers in 97 different cantons. The sellers were selected totally at random. Thirteen of them were wholesalers, 14 feria merchants, 16 street retailers, and 54 storekeepers. Since interviews were open and carried out without the threat of control which inevitably accompanies officials

TABLE 27 INCOME OBTAINED BY WHOLESALERS OF PACEÑA COCA (Jan - June 1977)

CONSUMER MARKET	NUMBER OF MERCHANTS	VOLUME KG.	PURCHASE COSTS a/ $b.	SALE PRICE $b.	GROSS INCOME $b.	MINUS MARKETING COSTS $b.	NET RETURN $b.
La Paz b/							
City	2	8[illegible].8	1,602.2	1,967.3	365.1	127.9	273.2
Other centers	65	40,933.9	792,651.5	973,302.3	180,650.8	63,289.2	117,361.6
Subtotal	67	41,046.7	794,253.7	975,269.6	181,015.9	63,417.1	117,634.8
Cochabamba b/							
City	1	13.8	267.0	660.0	393.0	31.3	361.7
Other centers	1	165.6	3,204.4	7,919.0	4,714.6	376.0	4,338.6
Subtotal	2	179.4	3,471.4	8,579.0	5,107.6	407.3	4,700.3
Oruro d/							
City	129	63,927.5	1,623,997.1	4,743,582.3	3,119,585.2	160,049.7	2,959,535.5
Other centers	59	21,934.0	407,007.9	1,188,841.6	781,833.7	40,111.8	741,721.9
Subtotal	188	104,861.5	2,031,005.0	5,932,423.9	3,901,418.9	200,161.5	3,701,257.4
Potosi e/							
City	115	128,953.2	2,495,341.1	8,329,419.1	5,834,069	432,913.0	5,401,156.0
Other centers	284	267,936.0	5,185,722.6	17,309,861.0	12,124,139	899,662.5	11,224,477.0
Subtotal	399	396.954.2	7,681,063.7	25,639,280.1	17,958,208	1,332,575.5	16,625,633.0
TOTAL	656	543,141.8	10,509,793.8	32,555,552.6	22,045.750	1,596,561.4	20,449,225.5

a/ $b. 19.35/kg.
b/ $b. 23.76/kg. (Sale price)
c/ $b. 47.82/kg. (Sale price)
d/ $b. 56.52/kg. (Sale price)
e/ $b. 64.59/kg. (Sale price)

representing the National Office for the Control of Dangerous Substances, those interviewed, in general, answered openly and freely. Data they provided on volumes of coca marketed and profits received differ considerably from those obtained by the Department for the Control of Production and Marketing of Coca. This could be due to the fact that the population we interviewed was small and, therefore, not representative. We think, however, that a much more fundamental factor is that individuals underestimate their economic activity when interviewed by representatives of any institution with the power to control or to impose taxes. Our interviewers were all native speakers of either Aymara or Quechua and were of approximately the same social status as those interviewed. This could also explain in part the difference in the data obtained. The technique of our interviewers was not to immediately start the interview, but to take time to socialize and to establish an openess with respondents before requesting that they provide data.

The interviews included various questions about volumes and prices of coca:

When coca is scarce, how much do you pay for it?
When coca is scarce, how much do you sell it for?
When coca is abundant, how much do you pay for it?
When coca is abundant, how much do you sell it for?
How long does it take you to sell a cesto of coca?
At which ferias do you sell, and how much do you sell in each feria?
How much coca do you buy per week?
How much coca do you buy per month?
How much do you pay in taxes?
At what price are you selling your coca today?

Using the answers to these questions, we have been able to calculate the gross profit (without taking into consideration the costs of marketing) for each type of merchant The amount reported by the wholesalers was several times larger than that derived from the data provided by tha National Directorate for the Control of Dangerous Substances. This is principally due to the fact that the wholesalers we interviewed spoke of handling much larger volumes than those reported in the official records of the National Directorate for the Control of Dangerous Substances.

TABLE 28 VOLUMES HANDLED AND INCOME RECEIVED BY 13 WHOLESALE MERCHANTS OF COCA (1977 - 12 months)

VOLUME HANDLED kg.	GROSS INCOME $b./kg.	ANNUAL GROSS INCOME $b.
Range 2,880-103,680	3.84	11,059 - 398,131
Mean 36,412		139,822

We were unable to obtain data on marketing costs incurred by these 13 wholesalers. But using a mean of these costs as estimated in Table 21 ($b. 094/kg), one can calculate that the mean net return per year for each these 13 merchants is of some $b. 126,678. We believe this figure is closer to reality than those based on data collected by the National Directorate for the Control of Dangerous Substances. From our own impressions obtained while interviewing farmers, workers, and miners, we are certain that those who market coca are continuously looking for ways to evade control, taxes, and official listing. There are three principal ways of evading these. One can falsify the destination of the product on the permit, bringing the coca into the city of

its true destination as in-transit merchandise. Secondary roads bypassing the checkpoints can be used. Or, using major highways the merchandise can be unloaded and transferred to animals or to local trucks and buses which, in general, are not required to stop at the checkpoints.

Among farmers and workers, coca wholesalers are known as people of great wealth who often live in luxurious housing and own expensive trucks. If these wholesalers were to receive, as indicated above, an average net return of more than $b. 100,000 per year, this amount would be in accord with such a lifestyle and with the respect given such individuals by the common man. That the data compiled in this small random sample differ so much from those provided by the National Directorate for the Control of Dangerous Substances, demonstrates how difficult it is to obtain trustworthy economic data, especially for such a controversial product as coca.

b. Activity of the Retailers

The retailer may be defined as that person who sells coca by the pound, by the ounce, or by the handful (raleo) , thus constituting the last phase of the marketing system that relates producers to consumers. Basically, there are three types of retailers: those who sell in stalls on the street, those who sell in the ferias, and those who sell in stores.

It is difficult to estimate the volumes handled and the profits received by retailers; they are not apparent from official documents. A logical approach would appear to be a comparison of figures on the quantity of coca destined for a given city with the number of retailers operating in that city. But, as will be seen, such an approach is far from satisfactory.

Appendix 8 presents the type of information obtained from the transit permits issued by the National Directorate for the Control of Dangerous Substances. For each department, destinations of the product are divided between the departmental capital and other centers. The contrast from department to department, in terms of destination figures, is immediately obvious. In some, more than 80% of coca shipments are reported as destined for the capital city, while in others barely one percent is so reported. This would appear to indicate that the criteria used by the officials filling out the permits vary substantially from one department to another.

A more specific analysis of the quantities arriving in each capital city clarifies this problem considerably. It can be observed from Table 29 that the quantities of coca going to each capital city, according to the declaration of the wholesaler on the respective "transit permit", is not in accord with what the population of these cities could possibly consume. Among consumers in these cities are factory workers, construction workers, peasants and miners living near the cities, and some people who use coca mainly for medical purposes. The total of 766,953 kilograms of coca for the cities represents 39% of the national consumption, which, according to these same "transit permits", is 1,973,182 kilograms(see Appendix 8). In other words, the mining and agricultural workers of the country would be left with barely 61 percent, a situation which, knowing what we do about heavy use among these sectors of the population, would seem highly unlikely.

TABLE 29 VOLUMES OF COCA OFFICIALLY ROUTED TO DEPARTMENTAL CAPITALS (Jan - June 1977)

CITY	QUANTITY kg.	%
La Paz	71,475	9.32
Oruro	211,923	27.63
Sucre	70,178	9.15
Potosí	247,730	32.30
Tarija	74,459	9.71
Santa Cruz	89,748	11.70
Cochabamba	1,440	0.19
T O T A L S	766,953	100.00

SOURCE: Department for the Control of Production and Marketing of Coca, National Directorate for the Control of Dangerous Substances, Cochabamba and La Paz, October 1977.

One explanation for these figures may be that wholesalers declare volumes which do arrive to said cities, but which may be subsequently taken elsewhere, either for legal consumption in provincial areas or for illegal use as contraband to bordering countries and for certain other "non-permissible" uses within Bolivia itself. These are simply assumptions which should be subject to verification by other studies on the use of this product.

It seems evident, then, that the declared volumes on the "transit permits" are probably not accurate. According to table 29, 247,730 kilograms, representing 32.30 % of total volume shipped, should go to Potosí, and 211,923%, representing 27.73% of the total, to Oruro. On the other hand only 1,440 kls.(90.19%) should go to Cochabamba, and only 71,475 kilograms (9.32 % of the total) to La Paz.

These figures bear no relationship to the relative population size of the various cities. Because of this apparent magnitude of error, it would appear that the only way to estimate with some accuracy the activity of the retail merchant would be by observation and direct interviewing. In an attempt to accomplish this for at least one city, a complete census was made of retailers operating in the city of La Paz. Semi-open interviews were also conducted with 84 retailers in 84 of the 100 cantons picked for the basic sample.

The census of retailers in La Paz revealed that 217 operate in this city. Of these, 196 sell on sidewalks, in ferias, and in public marketplaces. The remainder are storekeepers. When the census took place, their places of business had supplies amounting to 1,777.3 kilograms of coca. Their places of business were clustered in such a way that, although they represented 217 merchants, they formed only 26 nuclei. These nuclei, as might be expected, were concentrated in the lower class sections of the city, near to factories and markets frequented by workers and by visitors from the countryside.

Not all retailers receive the same margin of return. That for retailers in La Paz, who deal in Yungas coca, is 24 percent; that for retailers in Cochabamba, dealing in Chapare coca, is only 19.3 per cent. When La Paz retailers deal in Chapare coca, their margin of return is barely 11.4 per cent, and when they deal in coca from Apolo, it is even lower, 8.5 per cent. 1/

1/ The Apolo coca leaf is small and sweet and, therefore, much esteemed by those who know of it. It is, however, relatively unknown.

TABLE 30 AVERAGE COCA PRICES AT THE RETAIL LEVEL IN THE CITIES OF LA PAZ AND COCHABAMBA (Jan - October, 1977)

	AVERAGE PRICES		
	Purchase	Sale	% Margin
IN LA PAZ:			
Coca from Yungas	39.63	49.10	24.0
Coca from Apolo	19.18	20.81	8.5
Coca from the Chapare	32.00	35.65	11.4
IN COCHABAMBA:			
Coca from the Chapare	19.53	23.30	19.3

SOURCE: Department of Agricultural Marketing, MACA, La Paz, November, 1977.

The gross income received by retailers interviewed varies by canton and by type of business. Of the 84 formally interviewed during our study, 16 were street vendors, 14 were feria merchants, and 51 were storekeepers. Those retailers handling the greatest quantities, and therefore earning the most, were the ones selling in ferias. Storekeepers earned much less, only a fraction of that earned by the feria merchants. Many storekeepers admitted they sold coca principally to attract business, hoping that, once in their store, customers would buy something besides coca.

Just as does gross income, percentage of profit per unit also varies by canton and by type of retailer. Street vendors realize an average of $b. 9.44 per kilogram, feria merchants $b. 11.04, and storekeepers $b. 19.20 . 1/ Table 31 shows the volume each of the three types of merchants handles, as well as the average gross income received for his or her activity. Because data on marketing costs faced by retailers have never been compiled, it is impossible to estimate what percentage of the gross income would remain as net income. It would probably be large, however, due to the fact that neither the feria merchant nor the street vendor has to pay rent, and the fact that storekeepers sell mostly other items.

TABLE 31 VOLUMES HANDLED AND INCOME RECEIVED BY 84 COCA LEAF RETAILERS (1977- 12 months)

TYPE OF RETAILER	AVERAGE VOLUME HANDLED kg.	AVERAGE GROSS INCOME $b.
Street vendor	7,392	17,447
Feria merchant	13,850	38,223
Storekeeper	1,786	8,590

Both men and women participate in the marketing of coca at all levels. It would appear that the latter predominate in feria activities, and the former in wholesale transactions. Of the 84 retailers and 13 wholesalers interviewed, the division by sex was as follows:

1/ Even though storekeepers receive more per unit, their profit is minimal due to the small amounts handled (Table 31.).

TABLE 32 TYPE OF MERCHANTS SURVEYED

TYPE	FEMALE NO	FEMALE %	MALE NO	MALE %	TOTALS NO	TOTALS %
Wholesaler	2	4.3	8	16.0	10	10.3
Street vendor	6	12.8	13	26.0	19	19.6
Feria merchant	11	23.4	3	6.0	14	14.4
Storekeeper	28	59.6	26	52.0	54	55.7
Totals	47	48.5	50	51.5	97	100.0

The types of coca handled by these merchants correlate with the department in which they operate. Both consumers and merchants identify coca not only by its true place of origen, e.g. Yungas, the Chapare, or Apolo, but also by various places which used to produce the leaf, but which, during this century, have ceased to do so. Tradition is well entrenched in the marketing of this product. So it is that some identify Yungas coca as Paceña co-

TABLE 33 TYPE OF COCA SOLD BY DEPARTMENT

TYPE OF COCA	Chuquisaca	La Paz	Cochabamba	Oruro	Potosi	Tarija
Apolo		X				
Cochabamba				X	X	
Chapare	X		X		X	
Paceña				X	X	X
Consata		X				
Yungueña		X			X	X
Zongo		X				
Vandiola	X				X	

ca; others as coca from Zongo. In the case of coca from the Chapare, some continue to call it Vandiola coca due to the fact that, until the Agrarian Reform, the region of Vandiola produced what was considered a first class product. Today neither Zongo nor Vandiola produce coca· their past prestige, however, is preserved, and many buyers insist that they be sold coca produced in those two regions.

Different types of salesmen tend to attract different types of buyers. Those who sell to townspeople would appear to be exclusively street vendors and storekeepers. Those who sell to the peasant majority are mainly feria merchants and storekeepers. Those who sell to miners tend to be street vendors.

TABLE 34 CONSUMER TYPE CORRELATED WITH SELLER TYPE

	Wholesaler %	Street Vendor %	Feria Merchant %	Storekeeper %
Townspeople	0	5	0	07
Peasants	62	63	86	79
Miners	08	16	07	07
No response	30	16	07	07
	100	100	100	100

All sellers, regardless of the scale or the type of their operation, are affected from time to time by an uncertainty in supply. They are almost unanimous in declaring that coca is sometimes scarce, and that this scarcity affects not only their operations but their profits as well. The only provinces in which merchants denied that periodic scarcity impairs their business were those of Sud Chichas in Potosí and O'Connor in Tarija. One explanation may be that these provinces are so distant that they suffer from chronic shortages of nearly everything, without the clearly discernable oscillations of more accessible areas.

TABLE 35 SCARCITY OF COCA BY TYPE OF MERCHANT

	YES %	NO %
Wholesaler	100	0
Street vendor	100	0
Feria merchant	93	07
Storekeeper	98	02

Those very same merchants who complain that their business is impaired by coca shortage admit that, at many times during the year, the product can be obtained without difficulty.

TABLE 36 ABUNDANCE OF COCA BY TYPE OF MERCHANT

	YES %	NO %
Wholesaler	100	0
Street vendor	95	5
Feria merchant	100	0
Storekeeper	94	6

Different types of sellers have different ways of obtaining the product. Because the distributional network is not uniform, it offers various alternatives to each type of operator. The fact that some wholesalers buy from tambos 1/ demonstrates the existence of the wholesalers' wholesaler. Neither wholesalers nor feria merchants buy from storekeepers, a logical fact because storekeepers are smaller scale merchants. Those feria merchants interviewed seldom or never buy directly from producers, a fact that indicates that their transactions are essentially provincial in scale, despite their constant trips from feria to feria.

TABLE 37 MANNER OF OBTAINING COCA BY TYPE OF MERCHANT

	Wholesaler	Street Vendor	Feria merchant	Storekeeper
Directly from Producer	X	X		X
From transporter		X	X	X
From a feria	X		X	X
From a tambo	X	X	X	X
From a store		X		X
From an agency	X	X	X	X

1/ The tambo is a combination warehouse-inn for wholesalers.

There appears to be little relationship between the manner in which coca is obtained and oscillation between shortage and abundance. All sellers complain of irresponsibility on the part of their respective suppliers. They also attribute periodic shortages to the fact that producers are harvesting other crops, that there may have been too much rain, that the previous coca harvest has been exhausted, that there is a lack of transportation, or that there has been poor production because of the cold and drought of winter.

TABLE 38 REASONS FOR SCARCITY BY TYPE OF MERCHANT

	Wholesaler	Street vendor	Feria merchant	Storekeeper
Bring too little	X	X	X	X
Harvest time of other products		X		X
Too much rain				X
Previous harvest exhausted	X	X	X	X
Lack of transportation		X		X
Because of winter	X	X	X	X
Do not know		X		X

Reasons given by the same merchant respondents for periodic abundance are only three: "it is no longer raining", "it is coca harvest time", and "the roads are in good condition". It should be noted that none of these is dependent on the type of supplier with whom the merchant deals.

TABLE 39 REASONS FOR PERIODIC ABUNDANCE OF COCA BY TYPE OF MERCHANT

	Wholesaler	Street Vendor	Feria Merchant	Storekeeper
It is no longer raining		X		X
Coca harvest time	X	X	X	X
Roads in good condition	X			X

A number of things induce certain people to enter the coca business, but it is only among wholesalers that there seems to be a dominant pattern: inheritance. Among other reasons given are imitation, chance, the lack of another profession, already owning a store, and the advice of godparents. Except for wholesalers' passing on the business from generation to generation, there does not appear to be a generalized motive for entering the business other than simply profit. People turn to the coca trade because they can earn more from it than from other activities.

TABLE 40 REASONS FOR ENTERING THE COCA TRADE BY TYPE OF MERCHANT

	Wholesaler %	Street vendor %	Feria merchant %	Storekeeper %
I was widowed	0	0	7	0
Because of advice of friends	0	21	14	31
Because of family inheritance	70	21	36	15
Other reasons	30	58	43	54
Totals	100	100	100	100

The ages of sellers surveyed covered practically all of the range found among the adult population of Bolivia. Most were in the age group of 35 to 54; this age group is always that of greatest economic activity and responsibility. Surprisingly, of the wholesalers interviewed, none were over 65. This could be a reflection of the constant travel required by the activity. For perhaps the same reason, there were no older people among feria merchants. On the other hand, storekeepers, who have more sedentary responsibilities, were fairly well represented in these older age categories.

TABLE 41 TYPE OF MERCHANT BY AGE GROUP

AGES	Wholesaler		Street vendor		Feria merchant		Storekeeper	
	No.	%	No.	%	No.	%	No.	%
15-24	1	10	2	10	1	6	2	4
25-34	2	20	7	35	2	13	12	21
35-44	2	20	5	25	6	38	14	25
45-54	3	30	2	10	5	31	14	25
55-64	2	20	2	10	2	12	10	18
65-74	0	-	1	5	0	-	3	5
75- +	0	-	1	5	0	-	1	2
TOTALS	10	100	20	100	16	100	56	100

No business is without its problems, and the marketing of coca is no exception. The nature of these problems would appear to vary according to type and level of operation. At all levels one finds complaints of cheating on weight. Some storekeepers complain that coca comes adulterated with other substances. Wholesalers, feria merchants, and storekeepers complain that the product is damaged by humudity and that it blackens. That they should mention this problem seems understandable in that they store their coca for long periods of time in dark rooms and closed bales. Significantly, this is less often mentioned as a problem by street vendors, i.e. by people who store their coca out-of-doors.

TABLE 42 PROBLEMS IN MARKETING COCA BY TYPE OF MERCHANT

	Wholesaler %	Street vendor %	Feria Merchant %	Storekeeper %
None	50	63	43	56
Sometimes cheat on weight	20	5	14	11
Coca blackens	30	16	29	28
Coca dries and loses weight	0	5	14	0
Coca is adulterated	0	0	0	5
No response	0	11	0	0
TOTALS	100	100	100	100

c. Financing and the relationship between the retailer and the wholesaler

In general, it can be said that the financing of retailing is sustained by the efforts, resources, and risks of the retailers themselves. Present information is so lacking in detail that we can say little as to specifics in the relationship between retailers and wholesalers. In general this relationship would appear to be more formalized in Cochabamba than in La Paz. Kinship often enters the picture. A report by IESE 1/ indicates how this may occur:

1/ IESE : Chapter III, p.3

"The relationship between wholesaler and retailer is strongly influenced by natural kinship or kinship by marriage; it is common for the wife, niece, sister in-law, compadre (name given reciprocally by the father and godfather of a child), etc. of the wholesaler to work in the market as a retail merchant." In addition, in Cochabamba , it has been observed that some coca wholesalers are at the same time truckers of the product, and wives and other relatives often look after the retail selling.

d. Transportation

Public transport is a key link in the distributional network of all of Bolivia's agricultural products, and coca is no exception. The cost of such transport may be gleaned from "transit permits" emitted by the National Directorate for the Control of Dangerous Substances. These appear in Table 43.

TABLE 43 FREIGHT CHARGES FROM LA PAZ AND COCHABAMBA TO VARIOUS CONSUMER MARKETS (Jan - June 1977) (In Bolivian pesos/kilogram)

	ORURO	POTOSI	TARIJA	SANTA CRUZ	COCHA-BAMBA	SUCRE	LA PAZ
From La Paz to:	0.362	1.812	1.630	1.450	0.725	1.522	-
From Cochabamba to:	0.435	0.870	0.870	0.435	--	0.652	0.435
AVERAGE	0.398	1.341	1.250	0.943	0.725	1.087	0.435

SOURCE: Department for the Control of Production and Marketing of Coca, National Directorate for the Control of Dangerous Substances, Cochabamba and La Paz, October of 1977.

At each major distributional node, additional controls exist. These correspond to various governmental entities, each of which receives some income from a coca tax. Without clearance from these entities and from the National Directorate for the Control of Dangerous Substances coca canot be legally marketed in Bolivia.

To obtain a valid estimate of income generated by the transportation of coca from the major distributional centers of La Paz and Cochabamba to markets in the rest of the country, one must begin with information on both the source of coca and its destination. This information has been extracted from the "transit permits" issued by the National Directorate for the Control of Dangerous Substances and appears in Table 44.

TABLE 44 FLOW OF COCA FROM LA PAZ AND COCHABAMBA TO VARIOUS CONSUMER MARKETS (Jan-June 1977) (In Kilograms)

	ORURO	POTOSI	TARIJA	CHUQUI SACA	SANTA CRUZ	COCHA BAMBA	LA PAZ	TOTAL
From La Paz to:	104,961	396,954	216,784	34,986	111,554	179	41,047	906,465
From Cochabamba to :	156,262	301,208	575	141,473	267,697	122,912	76,590	1,066,717
TOTALS	261,223	698,162	217,359	176,459	379,251	123,091	117,637	1,973,182

Based on data from tables 43 and 44, one can establish the income generated by the transportation of coca from the major distributional nodes of La Paz and Cochabamba to consumer markets throughout the country . These estimates appear in Table 45.

TABLE 45 . INCOME GENERATED BY THE TRANSPORTATION OF COCA FROM LA PAZ AND COCHABAMBA TO CONSUMER MARKETS THROUGHOUT THE COUNTRY. (Jan - June 1977) (In Bolivian Pesos).

	ORURO	POTOSI	TARIJA	CHUQUI-SACA	SANTA CRUZ	COCHA-BAMBA	LA PAZ	TOTAL
From La Paz to:	37,996	719,281	353,358	53,249	161,753	130	-	1,325,767.
From Cochabamba to:	67,974	262,051	500	92,240	116,448	-	33,317	572,530
TOTALS	105,970	981,332	353,858	145,489	278,206	130	33,317	1,898,297

It can be observed from Table 45 that figures exist for only the major cities of the country. Although additional income is generated by transporting to towns and communities within each department, we lack knowledge as to its magnitude. What we do know is the fact that truckers working out of La Paz enjoy the highest gross income. Of the total of $b. 1,898,297 obtained by truckers serving coca wholesalers in La Paz and Cochabamba, those operating out of La Paz have over twice the gross receipts ($b. 1,325,767) of those operating out of Cochabamba ($b. 542,530) . This could be attributed to a difference in freight costs, i.e. it is probably a function of the variance in distance and volume handled. 1/

Lack of information on the specific number of truckers serving the wholesale trade obviates the possibility of analysis at the individual level. We know as little about the individual handling of other products as we do about the individual handling of coca. Yet we can say with certainty that hardly any truckers transport only coca; the general pattern is to include coca along with other freight and passengers.

C. COCA TAXES AS INSTITUTIONAL RESOURCES 2/

1. The two major national centers for the distribution and control of coca are the cities of La Paz and Cochabamba. After coca is registered by the Agricultural Customshouse and, through its Department for the Control of the Production and Marketing of Coca, by the National Directorate for the Control of Dangerous Substances it is distributed and marketed in the interior of the country. Taxation begins at this central level, and continues throughout the distributional matrix.

a. Agricultural Customshouse (La Paz and Cochabamba)

Through a quick perusal of the data found in Appendices 4 and 10, one can appreciate fluctuations in the amount of taxes collected by Agricultural Customshouses during the period of 1966 through 1976.

1/ Net weights: La Paz tambor, 48 pounds; La Paz cesto, 30 pounds; Cochabamba tambor, 50 pounds.

2/ Information on coca taxes was obtained in Cochabamba, La Paz, Oruro, Potosí, Sucre, and Tarija.

TABLE 46 COCA TAX REVENUES COLLECTED AT AGRICULTURAL CUSTOMSHOUSES (1966 - 1976)

YEARS	COCHABAMBA $b.	LA PAZ $b.
1966	1,342,500	4,042,860
1967	1,272,400	4,992,510
1968	1,180,000	4,178,960
1969	1,249,400	4,666,200
1970	1,191,100	4,857,130
1971	1,128,600	5,209,590
1972	1,513,600	5,728,150
1973	2,620,800	7,340,520
1974	2,388,100	4,954,430
1975	3.703,300	8,157,300
1976	2,979,300	7,450,440
TOTALS	20,569,100	61,578,090

SOURCE: Agricultural Customshouse.

As table 46 indicates, fluctuations occurred in both La Paz and Cochabamba, with the greatest focussing on La Paz. Collections for both Customshouses peaked in 1975: $b. 3,703,300 for Cochabamba and $b. 8,157,300 for La Paz. Between 1966 and 1976, collections in Cochabamba increased by 121 92 %, whereas those in La Paz increased by only 84.28% . In spite of this fact, total collections of the La Paz Customshouse ($b. 61,578,090) were some three times greater than were those of Cochabamba ($b. 20,579,100).

Taxes collected by the Agricultural Customshouse are distributed to different agencies, including the Customshouse itself. The total collected in Cochabamba (see Table 46) was distributed in the following manner:

- National Road Service	51.59%
- Agricultural Customshouse	17.34%
- Social work for the Chapare	10.00%
- Departmental Governor's Office (Prefecturia)	9.50%
- Universidad Boliviana Mayor de San Simón	9.00%
- Chapare Customs Police	2.57%
TOTALS	100.00%

These different institutions employ the funds as they see fit, to support infrastructure, social work, security, etc.

The coca tax is handled differently by the Agricultural Customshouse of La Paz. No set percentages hold from year to year (see Appendix 10). However, on the basis of actual distribution of funds, it would appear that the governor's office receives approximately 60%, the National Road Service a little over 20%, and other institutions a fraction of what remains. Those institutions benefitting from the coca tax in the department of La Paz include the following:

- Departmental Governor's Office (Prefecturia)
- National Road Service
- Municipality of La Paz
- Provincial Municipalities (Coroico, Coripata, Irupana, and Chulumani)
- Internal Revenue (participated until 1973)
- Universidad Boliviana Mayor de San Andrés (participated until 1973)
- Ministry of Public Health (Participated until 1972)
- Ministry of Agriculture (participated until 1972)

Internal distribution of these funds follows patterns similar to those described for Cochabamba.

b. National Directorate for the Control of Dangerous Substances 1/

This directorate was created by Law No. 11245 of December, 1973. It registers all coca legally marketed in or exported from Bolivia. This is accomplished through its Department for the Control of the Production and Marketing of Coca, with central offices in La Paz and Cochabamba, and district offices in the interior.

The following table, compiled from statistical data provided by this institution, shows taxes it collected on coca during 1976, as these were divided among the various control centers.

TABLE 47 COCA TAXES COLLECTED BY THE NATIONAL DIRECTORATE FOR THE CONTROL OF DANGEROUS SUBSTANCES (1976)

CONTROL CENTER	QUANTITIES			TOTAL COLLECTIONS a/
	Tambores	Cestos	Kilograms	$b.
La Paz	55,227	49,250	1,899,062.1	423,806.5
Cochabamba	96,547 b/	-	2,220,581.0	482,735.0
TOTALS	151,774	49,250	4,119,643.1	906,621.5

a/ $b. 5/tambor and $b. 3/cesto (La Paz tambor, 48 pounds and cesto of 30 pounds - readjusted).

b/ Tambor of 50 pounds net (readjusted).

SOURCE: National Directorate for the Control of Dangerous Substances, October 1977.

Although the eventual destination of these funds is uncertain, we have reason to believe that they are divided among the following institutions:
- National Directorate for the Control of Dangerous Substances, with some 12-13% of the total for operational costs (maintenance, fuel,etc.).
- National Institute on Drug Addiction (Drug Addiction Rehabilitation Clinic).
- Ministry of Peasant Affairs and Agriculture (questionable).

c. Governor's office (Prefecturia) of the Department of Cochabamba and National Customshouses.

Through its Office of Coca Tax the Prefecturate of the Department of Cochabamba also benefits from the trade. First of all, they require an export permit for all coca leaving the country, at the rate of $b. 8 per twenty five pounds. This coca is also registered by the District Office of the National Directorate for the Control of Dangerous Substances. Unfortunately, no data are available on the revenue accruing to the Cochabamba government for the issuance of export permits. One would assume that it should somehow be related to collections of the National Customshouse in La Paz, since this institution controls all Bolivian imports and exports and also charges corresponding taxes.

1/ Technical departments of the Directorate started operating between 1975 and 1976.

According to Appendix 11, considerable coca has been legally exported over the last few years, and, apparently, duly authorized by the National Customshouses. However, export licenses often fail to specify the importing country, indicating instead the Bolivian port of exit. This mode of operation leads to the following conclusions:

1) If the exports listed in Appendix 11 are a true reflection of reality, the manner in which they were authorized seems highly questionable.

2) Coca, just as every other legally exported or imported agricultural product, should be subject to authorization by the corresponding governmental authority. 1/ Without such authorization, the National Customshouse should not permit the exit or entry of any product.

3) If by export we mean the exit of a product from the country after all legal formalities have been met, a product cannot be "exported" within the country. Such movement would fall, rather, under the rubric of "internal marketing".

4) Because coca contains alkaloids used in the manufacture of some medicines and has other legal uses, the exporting government as well as the importing one already have, through international agreements, mechanisms of strict control for the entry or exit of this product. These simply need to be implemented.

Because the process for legally exporting coca, especially to Argentina (see Appendix 11), is unclear, the figures given on export volumes cannot, for purposes of this study, be considered reliable. In the future, the institutions involved should carefully analyze the problem and clarify legal processes so as to insure adequate control of all coca exports.

d. Municipalities of La Paz and Cochabamba

(1) Municipality of Cochabamba 2/

Table 48 lists the revenue received by the municipality from the sale of permits and from annual fixed taxes as these apply to type of operation, e.g. the declared capital of storekeepers and the sentaje (right to sit) of street vendors in the coca fair.

TABLE 48 INCOME OF THE MUNICIPALITY OF COCHABAMBA FROM THE COLLECTION OF TAXES ON COCA (1976)

CATEGORY	NO. OF MERCHANTS	PERMITS $b.ea.	PERMITS Total	ANNUAL FIXED TAX $b.ea.	ANNUAL FIXED TAX Total	SENTAJE/YR a/ $b.ea.	SENTAJE/YR a/ Total	REVENUE/YEAR $b.
Large Store	22	70	1,540	1,216	26,730	-	-	28,270
Small Store	125	60	7,500	855	106,875	-	-	114,375
Fair	145 b/	-	-	-	-	510	73,950	73,950
	60 c/	-	-	-	-	510	30,600	30,600
TOTALS			9,040		133,605		104,550	247,195

a/ Considering 51 weeks a year and one day of sentaje a week for $b. 10, we have a total of $b. 510/year per person.
b/ Permanent
c/ Average of those who sell sporadically in the ferias.
SOURCE: Department of Income, Municipality of Cochabamba, September, 1977.

1/ Generally the Ministries of Peasant Affairs and Agriculture and of Industry Commerce, and Tourism issue these authorizations based on national production, conditions of internal supply, and other considerations.
2/ Arteaga, October 1977: 5.

Funds collected by the Municipality through these taxes are used for various works of infrastructure and urban improvement.

It should be noted, in addition, that a surcharge of 20 per cent is applied to all annual fixed taxes, with the proceeds going to the Universidad Mayor de San Simón. In 1976, this generated a total of $b. 26,712 ($b.133,605 x 20%).

(2) Municipality of La Paz 1/

The Municipality of La Paz also collects a fixed annual tax from storekeepers and a daily sentaje from street vendors. The present rates were set by Municipal Law in 1974. They are based on sectors rather than on specific products. For example, there is a "retail commerce" sector which includes all "agricultural products". Although coca is not specified, it is within the $b. 600 - 800 category for the fixed annual tax. This amount, however, can vary based on the capital declared by each merchant (see Appendix 12). A surcharge of 20% is added to this annual tax and is given to the Universidad Mayor de San Andrés. Another surcharge is added to pay for the tax receipt.

According to this system, within the retail commerce sector, places of business are divided into three classes:

1. Stores (individual ownership), which pay the fixed tax.
2. Places in markets owned by the Municipality, which pay the fixed tax plus a daily sentaje of $b. 0.50.
3. Street stalls, which pay a daily sentaje of $b. 0.50.

In general, because the fixed tax yields little income, coca is not a very important product for the Municipal Treasury (see Table 49). This is illustrated in Appendix 1[illegible] for the period between 1966 and 1977. Because of a continuing decrease in the number of businesses selling coca, the difference between tax revenue and cost of collection has become very small, and administrative costs of collection proportionately great.

An index of the lack of importance of coca tax collections for the city of La Paz today is the fact that, although the daily sentajes are paid, the Municipality has no information as to the precise number of merchants who sell coca on the street, in fairs, and in the markets.

TABLE 49 COCA TAXES COLLECTED BY THE MUNICIPALITY OF LA PAZ (1977)

CLASS	NO. OF CONTRIBUTORS	ANNUAL TAX a/ $b.	DAILY SENTAJE $b.	ANNUAL SENTAJE b/ $b.	TOTAL ANNUAL REVENUE $b.
Fixed places c/	21	610	-	-	12,810
Others d/	196	-	-0.5	150	29,400
TOTALS	217	610	0.5	150	42,210

a/ Including surcharge for forms. Excluding 20 per cent pro UDMSA surcharge.
b/ Considering 300 days of activity per year (excluding Sundays).
c/ 20 merchants sell in stores and one in an agency.
d/ Sale on the street, in ferias, and in markets.

In addition to these fixed sectorial taxes, a surcharge of 20 per cent is imposed for the benefit of the Universidad Boliviana de San Andrés. Table 50 lists the yield from this surcharge for 1976.

1/ Arteaga October 1977: 1,2

TABLE 50 FUNDS COLLECTED BY THE UBMSA FROM THE 20 PER CENT SURCHARGE ON MUNICIPAL FIXED TAXES (1976)

No. OF TAXPAYERS	ANNUAL FIXED TAX $b.	20 PER CENT SURCHARGE $b.	ANNUAL TOTAL $b.
21	600	120	2,520

Because the figures contained in Tables 49 and 50 are derived from data classified by sectorial rather than single product transactions, they may not reveal what the actual tax has been on solely coca. To arrive at a reasonable estimate of such tax, one must turn to data such as that found in appendices 9 and 12. This is based on interviews conducted individually with coca vendors in the city of La Paz by project personnel. The validity and consistency of such information have been recognized by the Municipality.

2. Tax Revenue for other parts of the republic

Coca flowing from La Paz or Cochabamba to other parts of the Republic is often subject to control by regional offices of the National Directorate for the Control of Dangerous Substances, 1/ the District Internal Revenue Service, departmental prefectures, universities, and municipalities. 2/. Basic information on these various levels of control and related taxes was obtained in situ by project personnel in Oruro 3/ and in the districts of Sucre, Tarija, and Potosí (see Appendix 13 for the corresponding report).

a. District Internal Revenue Service

Table 51 shows taxes collected by various District Internal Revenue Services. Between 1972 and 1976, annual collections appear to have increased substantially. The most pronounced increase was for Tarija where a total of $b. 1,209,207 (approximately 64% of the grand total of $b. 1,892,566.30) was collected. Increases over this period were 973.3% for Tarija and 421.83% for the whole.

In general, district internal revenue taxes are created by legal resolution in each district. For example the Supreme Decree No. 3430, of June 16, 1953, increased the sales tax on coca in the Department of Oruro to 10 per cent, to support public works throughout the Department.

b. Bolivian University

Table 52 shows the amounts received by each of the following universities from funds collected through the taxation of coca:

- "Juan Misael Saracho" in Tarija
- "Tomás Frías" in Potosí
- "Universidad Mayor, Real, y Pontificia de San Francisco Xavier" in Sucre
- "Universidad Boliviana Técnica" in Oruro.

From Table 52 it can be noted that, whereas in Tarija and Potosí the increases in revenue between 1972 and 1976 are quite regular, the Sucre and Oruro districts show marked irregularities. According to our

1/ They do not collect taxes they verify the volumes declared on the "transit permits" in La Paz or Cochabamba.
2/ Municipalities collect taxes only for use of market stalls and street stands.
3/ Arteaga October 1977: 7-11

TABLE 51 TAXES ON COCA COLLECTED BY THE DISTRICT INTERNAL REVENUE SERVICES (1972-1976)

YEAR	TARIJA $b.	POTOSI $b.	SUCRE $b.	ORURO a/ $b.	TOTAL COLLECTED $b.
1972	43,956	8,074,80	9,514,00	80,100,00	147.594,80
1973	53,452	8,250,00	10.824,00	70,000,00	142,526,00
1974	167,293	29,000,00	7,194,00	83,333,00	287,020,00
1975	402,312	47,400,00	10,524,00	85.000,00	545,236,00
1976	535,194	116.000,00	28,307,50	88,688,00	770,189,50
TOTALS	1,203,207	209,674,80	66,363,50	407.321,00	1,892,566.30

a/ The Prefecture of the Department collects these taxes, not the District Internal Revenue Service.

SOURCE: District Offices of the Internal Revenue Service.

TABLE 52 FUNDS RECEIVED FROM COCA TAXES BY THE UNIVERSITIES OF TARIJA, POTOSI, SUCRE, AND ORURO (1972-1976)

YEAR	TARIJA $b.	POTOSI $b.	SUCRE $b.	ORURO $b.	TOTAL COLLECTED $b.
1972	79,552	13,720,00	9,514,00	14,021,06	122,807,06
1973	130,776	20,220,30	10,824,00	17,201,25	188,021,55
1974	226,240	50,496,02	7,194,00	50,010,00	333,940,02
1975	405,350	87,876,30	10,524,30	104,502,10	608,252,70
1976	560,500	137,386,03	28,307,50	91,593,60	817,787,13
TOTALS	1.402.418	324,698,65	66,363,80	277,328,01	2.070,808,46

SOURCE: Finance departments of the various universities.

TABLE 53

NUMBER OF TAXPAYERS AND COCA TAXES COLLECTED BY THE MUNICIPALITIES OF ORURO, TARIJA, POTOSI, AND SUCRE (1976).

MUNICIPALITY	NUMBER OF TAXPAYERS	TAXES: LICENSE/ANNUAL FIXED TAX $b.	TAXES: SENTAJE $b.	TOTAL COLLECTED
Oruro	131 a/	51,602	16,500	68,102
Tarija	28	3,630 b/	-.-	3,630
Potosi	38 c/	3,268	22,800	26,068
Sucre	27	14,040 d/	-.-	14,040
TOTALS	220	72,540	39,300	111,840

a/ 76 merchants sold in stores and paid the annual fixed tax. The remainder sold in the markets and paid the fixed tax as well as sentaje.

b/ The Juan Misael Saracho university in Tarija received 20% of this total ($b. 726), and an additional 10% pro-school buildings ($b. 363).

c/ They paid both the annual fixed tax and sentaje.

d/ Includes the license authorizing the sale of coca.

SOURCE: Treasury department of each municipality.

respondents, this is due to deficiencies in the mechanisms for collecting these taxes. 1/ Of the grand total collected ($b.2,070,080,10) the Universidad Juan Misael Saracho in Tarija receives about 67.75 per cent ($b. 1,402,413) followed by the Universidad Tomás Frías of Potosí which receives 15.63% ($b. 324,698,65). The global increase in the total collected between 1972 and 1976 is 566%. As with the case of taxes imposed by district internal revenue offices, these taxes are also authorized through legal resolutions, to the end of giving general support for the institution.

c. Municipalities

The municipalities of the cities of Oruro, Potosí, Tarija, and Sucre receive income directly from taxes on the sale of coca to the public. Table 53 shows the number of contributors and the amount collected by each municipality through an annual fixed tax and a daily sentaje 2/ (1976). The Municipality of Oruro receives the largest amount and has the largest number of contributors (retail merchants). In 1976, this municipality collected 60.9% of the total ($b. 111,840) and controlled 59.55% of the total of 220 merchants in the four municipalities. The Municipality of Tarija collected the smallest amount (3.25%).

1/ The systems are: a) Charges by direct administration, and b) charges by contract (done by private individuals who receive a certain percentage of the funds collected).

2/ Oruro: $b. 1/day, Potosí: $b.2/day.

II. SOCIO-CULTURAL ASPECTS OF COCA USE

A. The Acullico

A number of terms are used, in both Aymara and Quechua, to describe the tradition of coca chewing. Some are common and in daily use. Others are employed only for special occasions such as social get-togethers, curing rites, religious festivities, and initiation to coca use itself. The terms vary from one dialect and one ecological region to another. Those most common are the following:

Aymara Altiplano	Quechua Valleys	Spanish Tropics
Ak'ulliña	Acullico	Acusi
P'ijchaña	Pijchay	Coquear
Pirast'aña	Chajchay	Hojear
Janch'uña	Marcar	Llojtear
Achtaña		

In spite of their number, these terms relate only to the chewing of the leaf; they do not encompass all terms associated with coca use. To "chew", in the English language, means simply to "bite and grind with the teeth or to masticate." The use of this word to describe the manner in which traditional users employ coca presents a problem. In our research we discovered that "chewing" coca does not consist simply of putting the leaf in one's mouth, keeping it there, or grinding it. One has to know how to use the leaf. The person who uses coca without such knowledge could be compared to the individual who has a lighted cigarette but who does not know how to smoke.

It could be said that the terms "to chew" or "to masticate" should be used only in reference to beginners, and that they never properly describe the action of those who have well entrenched habits of acullico. The beginner tends to chew the leaves up, and then swallow them. The experienced acullicador, on the other hand, leaves the bolus in his mouth approximately two and a half hours without grinding the leaves. He slowly moves the bolus from one side of his mouth to the other, thus extracting the coca juice. So carefully does he handle the bolus that, when it is discarded, the number of individual leaves can be counted. 1/ Because of such considerations, we shall use the term "acullicar" to distinguish this action from the mere act of chewing.

1/ In order to verify this impression, we collected a series of "chewed" coca boli. There was a marked difference between those of the beginners and those collected from experienced acullicadores. Our observations contradict those made by Emilio Ciuffardi in experiments carried out in Lima in 1948. According to Ciuffardi, between 3 and 7 percent of the leaves are ground and swallowed. The larger percentages correspond to those individuals who have consumed coca longer (Ciuffardi 1948). We are unable to explain this contradiction in basic data.

As we traveled through the six highland departments of the country, we found that the aculli can also connote a five to thirty minute rest period during which the coca bolus is renewed. As with the North-American "coffee break", the aculli occurs in the middle of the morning and in the middle of the afternoon. It is also commonly practiced at the start of each half-day of work. Thus, to "acullicar" has, for users, a double meaning: to have coca in one's mouth and to take a few minutes of rest from working.

Although the aculli is the most common way in which coca is used, it is far from being the only one. Users employ coca to ease social encounters, as medicine, as an oracle for diagnosing disease, and as a digestive aid after eating. Among peasants and miners, in both Altiplano and valleys, adult men who abstain constitute a definite minority and tend to belong to one or another Evangelical sect. However, not all Evangelicals are abstainers. Some are permitted by their religion to use coca for medicinal purposes. Others continue with their custom of the aculli despite the fact that it is prohibited by their religious superiors. Those who do openly practice the aculli defend their habit by saying, "Everything on earth was put there by God for man to use and to enjoy". Others continue the practice in secret; when they are confronted with their sin, they simply respond, "We shall be forgiven anyway".

In general, on the Altiplano and in the valleys of Bolivia, everyone, even those who are not acullicadores, uses coca for communal activities. These may be collective work parties, meetings, acceptance of leadership responsibilities, religious, civic, or family fiestas, or the simple requesting of a favor from some other member of the community. Many "non-users" purchase coca occasionally for just these purposes. During the last ten years, in a few peasant communities, some Evangelicals have introduced candy, cookies, and popcorn as substitutes for coca. The vast majority, however, still believe that some basic activities simply will not turn out well without the leaf. Two classic examples are planting and harvesting. If one wants to recruit help for these activities, he must have coca.

Acullicadores in the six departments studied differ considerably in terms of the ecological and economic circumstances under which they live, age, sex, level of education, and type of work. In some cantons on the Altiplano, the proportion of acullicadores among men and women is similar, although the work each does differs markedly. In others, men consume more coca than women. In some places only men practice the aculli, while women use the leaf mainly for medicinal purposes. In general, however, coca is considered to be an energizer which helps one resist the stresses of heavy agricultural and mining work. Most consider coca to be indispensible for the working man.

Among users, who represent the large majority of peasants and miners in Bolivia, coca is much more important than is coffee or tobacco among Northamericans or tea among the English. One of our respondents described the importance of coca in the following terms: "If I had no coca, it would be as if I were poverty stricken and had no food. This is what the lack of coca would represent for me". 1/

The use of coca is very much an ethnic custom. For centuries, its use, especially in the form of the aculli, has separated those who are proud of their Amerindian heritage from those who want to identify solely with European or Western cultures. Among peasants, coca is found in the most humble household as frequently as in the most prosperous.

1/ Interview with Martin Choquiviri, 36, Province Avaroa, Department of Oruro.

The quality of coca used, however, is clearly dependent on social status. Peasant society can be divided into three levels: well to do, average, and poor. In our research we have been able to verify that families in favored economic positions have preferences as to the type of coca they use, and generally will buy the most expensive kind. By contrast, individuals with limited resources lack the luxury of being able to choose; they must be content with what they can get. Finally, the dispossessed will accept anything that goes by the name of coca. Some are capable of working for nothing if they can be guaranteed a bit of the leaf. Or they may attempt to extend their limited coca supply by mixing it with other plants such as faba beans and anise.

One poor member of the community of Junta Palca gave us the following example: "We have an herb here called Wira-Wira and it is good for mixing with the coca that we use in the aculli". 1/ Some acullicadores have learned to economize by using their bolus or jach'u a second time, having previously removed it from their mouth and put it in the sun to dry.

The acullico of coca in the valleys is very similar to that on the Altiplano. Coca is used to predict the future, as a source of energy during travel, to combat the cold, for community festivities, for family rituals, and to ease social interaction. Just as on the Altiplano, there are some valley communities in which none of the women are acullicadores, and others in which the majority are. As on the Altiplano most men maintain that they cannot work without coca. The leaf is therefore intimately connected with all agricultural activity, be it communal or individual. As a general rule, acullicadores still attribute qualities to coca which have been attributed to the leaf since colonial days. They maintain that coca eases fatigue, hunger, and thirst. These purely subjective impressions appear to be based on real, albeit slight, physiological reactions which accompany the aculli.

Because our research was limited to only six highland departments of Bolivia, the majority of people surveyed lived either on the Altiplano or in the valleys. Four of these departments, however, also have tropical regions, and twenty per cent of those interviewed lived in the tropics. These constituted parts of the Paceña provinces of Franz Tamayo, North Yungas, South Yungas, Larecaja, the Chapare region of Cochabamba, and the Chaco regions of the departments of Tarija and Chuquisaca. The percentage of acullicadores in these areas was smaller than that of the Altiplano and valleys. Level of consumption per family unit was relatively high, however, indicating that, although coca is not used as formally and ritualistically as it is on the Altiplano and in the valleys, it is still very important to many people who live in these tropical areas. Their patterns of use would appear to be principally in the privacy of their homes or, informally, at work. Perhaps this very privacy and informality of use accounts for the fact that coca has not traditionally been identified with the Bolivian tropics. Our findings on the level of use in the tropical areas of the country indicate that these superficial impressions from the past may very well have been mistaken.

Incidence of Use among the Survey Sample

The statistical bases used for the administration of questionnaires regarding use have already been described in the section on research plan and methodology. The questionnaires were pretested in the province of Ingavi. They were then reworked, and administered to a total of 2,989 individuals in 100 cantons. Among the peasant-workers surveyed it was found that only 11 per cent of the women and 8 per cent of the men did not use coca in any shape or form. The majority of respondents were acullicadores: 68 per cent of the females surveyed and 82 per cent of the males. Of the total of 2,712 peasants/workers surveyed 2,151 were acullicadores, 330 users who did not practice the aculli, and only 231 abstainers (less than 10 per cent).

1/ Interview with Tomas Estalla Choque, 22, Jiscatara, Chayanta Potosi.

TABLE 54 PEASANT/WORKERS SURVEYED BY INCIDENCE OF COCA USE

$X^2 = 57.8 > X^2_{.005}(2) = 10.597$ Significant

	Women n = 532		Men n = 2,180		Totals
Acullicadores	361	68%	1.790	82%	2.151
Non-acullicadores But users	111	21%	219	10%	330
Non-users	60	11%	171	8%	231

Among miners surveyed, the incidence of abstinence was even lower. Of 277 miners representing 10 cantons, only 10 (4%), did not use coca. Twenty-two (8%) said that they used the leaf but did not practice the aculli; and 245 (88%) were acullicadores. Their average level of consumption per family unit was almost twice that reported by peasants/workers. This finding is in accord with the many reports previously published as to the importance of coca in the life of the miner.

TABLE 55 MINERS - SURVEYED BY INCIDENCE OF COCA USE

	No.	%
Acullicadores	245	88
Non-acullicadores but users	22	8
Non-users	10	4
T O T A L S	277	100

Due to the size of the peasants/workers sample, we can obtain a fairly good idea as to the influence that several basic factors, such as ecology, age, and level of education, may have on coca use. We feel that these three factors are especially important. Much has been said about the role that coca plays in man's adaptation to high altitudes. If, in fact, said role is important, one might expect to find that the incidence of use would rise in direct proportion to altitude. A greater percentage of peasants/workers on the Altiplano than in the valleys would thus be expected to consume coca, and a greater percentage of those in the valleys than in the tropics. With respect to age, the data should indicate whether, as is so often asserted, coca use among young people is disappearing. Should this prove to be so, the habit would easily disappear within one or two generations. Finally, if the use of coca is disappearing, does the national system of education have something to do with it? If the entire peasants/workers population were to be educated, could we expect the custom to disappear?

The results not only indicate that the use of coca still constitutes a strong tradition, but also that it is apparently more a question of cultural heritage than of adaptation to the rigors of high altitude. As we would have predicted, the smallest percentage of consumers, and especially of acullicadores, is found in the tropics. Surprisingly, however, the tradition of the aculli appears to be more firmly rooted and maintained in the valleys than on the Altiplano. There appear to be only two explanations for this phenomenon. In the first place, incomes of valley populations tend to be greater than those of the Altiplano. This is due to the more fertile land and more benign climate enjoyed by the vallunos. People from the valleys would appear to be freer to spend more and buy more of everything, including coca. In the second place, the percentage of Evangelicals on the Altiplano is much greater than in the valleys. One would have to compile a history of missions in Bolivia in order to explain this fact

It may, however, be related to the phenomenon that, traditionally, the foreigner who arrives in Bolivia identifies the Altiplano with the utmost scarcity and misery. If his mission is to "help the poor", he does not need to look beyond.

TABLE 56 PEASANTS/WORKERS - TOTAL SAMPLE
USE OF COCA, BY ECOLOGICAL REGION

$X^2=84.675>X^2_{.005}(4)=14.86$ Significant

	Altiplano n = 1.367	Valley n = 798	Tropics n = 547	X n = 2,712
Acullicadores n = 2,151	80 %	87 %	68 %	79 %
Non acullicadores but users n = 330	12 %	6 %	21 %	12 %
Non-users n = 231	8 %	7 %	11 %	9 %
Total n = 2,712	100 %	100 %	100 %	100 %

Having heard from so many sources in the city of La Paz that the young people of Bolivia no longer are interested in coca, and that they are fully accepting contemporary Western ways, we expected that very few would have started to use coca. From open ended interviews conducted while planning this study we had learned that the use of coca, and especially the aculli, tends to mark the transition from dependence as a child and adolescent to independence as an adult. Many start the practice of the aculli after marrying, when, for the first time, they have to assume the responsabilities and work of adulthood. We never expected to find a high index of use among the youngest age group interviewed, i.e. between 15 and 24 years of age. But if the use of coca is truly disappearing little by little, this should be demonstrated by a clear differential in level of use between young adults (25-34, for example) and their elders. As can be seen from Table 57, this we did not find. Although there are differences among the various age groups, they are not pronounced. Furthermore, if we compare levels of use by age with the ages at which present acullicadores started to practice the aculli (see Table 59), we see that, if the pattern which affected those older than fifty persists, young people in the two age groups who do not practice at present, may well acquire the habit in the future.

TABLE 57 PEASANTS/WORKERS - TOTAL SAMPLE
USE OF COCA, BY AGE GROUP

$X^2=51.07>X^2_{.005}(12)=28.3$ Significant

	15-24 n=304	25-34 n=609	35-44 n=650	45-54 n=556	55-64 n=311	65-74 n=189	75-+ n=93	X n=2712
Acullicadores n = 2.151	67 %	77 %	80 %	83 %	84 %	83 %	85 %	79
Users but non acullicadores n = 330	19 %	12 %	12 %	11 %	10 %	9 %	12 %	12
Non-users n = 231	14 %	11 %	8 %	6 %	6 %	8 %	3 %	9
Total n = 2,712	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100

The correlation between level of education and incidence of use is more instructive. Here we see a definite pattern: use of coca diminishes with increase in level of education. The largest percentage of acullicadores is illiterate, followed by those who have had some schooling, but have not gone beyond the elementary level.
The decrease in incidence of use is inversely proportional to level of education except for the case of university students. Because there were only two individuals at the university level among those interviewed, these figures lack statistical validity. It should be noted, however, that 88 per cent of the people interviewed had never been beyond primary school. We feel that this is a true representation of the actual situation in rural Bolivia, despite the enormous efforts of the government to stimulate rural education. Those groups with little or no education are the very ones which tend to remain in rural areas and maintain Amerindian traditions. A minority of each generation reach higher educational levels, become discontent in the countryside, and migrate to the nation's cities. The majority, however, stay, maintain the traditions, and reproduce. Those who leave for the cities seldom return. Instead, they become a part of the growing proletariate and urban middle class of Bolivia. It is evident, therefore, that formal education is having its effect on the practice of the aculli. It is not evident, however, that education is eradicating the custom.

TABLE 58 PEASANTS/WORKERS - TOTAL SAMPLE
CONSUMPTION OF COCA, BY LEVEL OF EDUCATION
$X^2=163.21>X^2_{.005}(10)=25.188$ Significant

	0 n=1056	1 - 5 n=1328	6 - 8 n=258	9-12 n=60	RNS a/ n=8	U. n=2	X n= 2712
Acullicadores n = 2151	88 %	77 %	59 %	47 %	25 %	50 %	79 %
Users but non acullicadores n = 330	6 %	13 %	27 %	33 %	75 %	50 %	12 %
Non-users n = 231	6 %	10 %	14 %	20 %	-	-	9 %
Totals n = 2,712	100 %	100 %	100 %	100 %	100 %	100 %	100 %

C. Socialization to coca use

As we administered the questionnaire in different communities, we were able to discover how, why, and at what age people had started using coca. Those living on the Altiplano emphasized four situations:

1. When I became an orphan.
2. Immediately after marrying.
3. Upon leaving the armed services.
4. In the armed services.

It should be noted that three of these four situations clearly obligate the individual to work in a way never experienced previously. "For working", as we shall see, is the purpose most often mentioned when users try to explain why they employ coca.

a / Rural Normal School.

Even if they are only eleven or twelve years of age, orphans have to assume the work of an adult. When they do, they generally begin the practice of the aculli. Without their bolus or jach'u, they could not conceive plowing, planting, weeding, or harvesting. Upon losing his parents, the orphan not only has to provide his own clothing and food, but also that of any younger brothers or sisters. Because coca is thought of as an energizer or accelerator for any human activity, it is indispensible for young people who find themselves in this difficult situation. They have to compete with adults as an adult, and they turn to the aculli according to the demands of work and custom. Traditionally, those who own land make a special effort to supply their workers with abundant coca, in order both to attract and keep them, regardless of their age.
When an orphan enters into this type of group activity, he takes to the aculli at an early age because of, once again, the demands of custom and work.

Marriage can also be an important point for initiating the traditional use of coca. This is due to the fact that, for the majority, it represents assuming the full responsibilities and privileges of the adult world. Within each man's life cycle, there are certain stages of transition. On the Altiplano, an unmarried youth is still considered to be outside the society of his elders; he lives in a juvenile world with limited responsibilities. From his marriage day forward, however, he becomes a full member of the community and, only then, is considered a "person". He shares full obligations and rights with other adults. He also enters the world of traditionalism. He begins to work as a man, or in the case of a female, as a woman.

From their wedding day forward, the young couple have to act as do their elders, even if they are young. If they do not, they will have difficulty being accepted in the society of "persons". They must participate in many social or festive activities where coca is omnipresent. They find themselves in a world of continuous reciprocity; if they do not offer or if they refuse to receive, they become ostrascized by other members of their small society.

Something similar happens when one leaves the armed services and returns to his community. Having served his country, the youth is considered by the members of the community to be civilized, to be able to aspire to being a policeman, to be ready and able to obtain any type of work in the cities, to be ready to leave the community looking for better opportunities. With all these merits, a former soldier has considerable prestige within his community. His family is proud, and therefore he is feted. His homecoming celebration is considered as important as a presterío (hosting a fiesta), and it even approaches marriage in esteem. The occasion rarely is solely a family affair; the neighborhood or even the entire community can be involved. There is abundant coca and alcohol, and the youth is expected to partake generously of both. Given the fact that such a return is considered to be a passage rite, it is understandable that many say that they began the practice of the aculli upon leaving the armed services.

Most of those who stated that they took to the aculli while in the armed services were veterans of the Chaco War. They said that they had used coca in order to combat hunger while serving on the Paraguayan front. Some who were ex-policemen began the practice while on the force. When on night shift, they would use coca to combat the cold during their solitary vigil. A number of situations, in addition to the four principal ones described above, were also mentioned. Some simply said they had begun the practice of the aculli while working, without specifying age, and considering their act to be quite normal, for them, to work meant to acullicar. Among women, the majority said they had begun to acullicar on their wedding day, but that the custom had really taken root when they had begun to hold positions of responsibility

within the community. A small number of women said they had used coca against hunger or because of grief.

Answers given by those living in the valleys, when refering to their initiation to the aculli, were quite similar to those given by Altiplano users. In one way or another, their initiation was related to work:

1. When I became an orphan.
2. After getting married.
3. When I started to work.

In the valleys, just as on the Altiplano, becoming an orphan is connected with active participation in agricultural work at an early age. A 65 year old man described his own experience as follows: "I started working when very small; I also learned to acullicar coca because I was an orphan". 1/ Many recall how, in the time of the hacienda (large landholdings employing bound laborers), in order to use a piece of land, each man had to work for the landowner. If the father died, it was the oldest son who had to replace him in this work, and thus represent his family. It was an hacienda custom to provide a considerable amount of coca with the idea of accelerating the work. The coca provided by the owner was distributed in equal amounts to each worker without regard to age or sex. Anyone who worked had to acullicar.

Hunger and sorrow are reasons frequently mentioned for turning to coca by both widows and orphans. Many valley women who practice the aculli several times a day said that they had rarely done so until becoming widows. Some simply stated: "I turned to coca because of grief".

As on the Altiplano, marriage for the valley couple means initiation to the responsibilities and privileges of the adult world. With these responsibilities comes hard work and, with the work, coca. Again we note that work and coca are practically inseparable for peasants living in the highland departments of Bolivia.

Among miners opinions are similar. For the majority, working without coca is inconceiveable. The most adamant are those who labor in the mine shafts themselves. "Without coca", they say, "the dust and foul odor would be unbearable".

Inside the mines, social pressure to participate in the aculli is enormous. In many (e.g., Chojlla in the province of Sud Yungas in the department of La Paz). there persists a custom called "awichu" (grandfather). This consists in taking up a collection of coca for anyone who appears at work without his own supply. Tradition dictates that an aculli be observed sometime between the beginning and the end of work, whatever the shift. All rest for a brief period of time and fill their mouths with boli of coca. If some young person does not participate in the acullico, a fellow worker will yell, "Awichu!" The miners will then form a line and each will contribute approximately 100 leaves. In this way an abstainer is forced to participate with the rest. The novice is expected to have his own coca on the following day; thus, he too becomes an acullicador.

In some of the tropical zones surveyed, we found initiation to coca use to be almost identical to that described for the Altiplano and valleys. This was particulary true for production areas such as those of Yungas and Apolo. Acullicadores in these areas indicated that they had taken to the aculli when they had started to work, when they had married, become orphans, or left the armed forces. On the other hand, in non-coca producing tropical areas, the reasons given tended to be different. One was simple curiosity, another to relieve fatigue, hunger, and thirst while hunting, and still another simply imitation.

1/ Interview with Simon Sapa, 65, Huariscallo, Arque, Cochabamba.

An analysis of the relationship between the age at which acullicadores began their habit and the ecological region in which they live shows some variations, but they are not marked. As might be expected, acullicadores from the Altiplano and valleys show almost identical patterns. The crucial age would appear to be between 15 and 24, when the majority of individuals are assuming the responsibilities of the adult world. Acullicadores from the tropical areas show a slight contrast in that a higher percentage of them began their habit before the age of 15.

It is noteworthy that between 14 and 23 per cent of those acullicadores interviewed did not initiate their habit until after age 25. When one takes into consideration that 30 per cent of all acullicadores interviewed were under 25 at the time of the interviews, the percentage of acullicadores who began after 25 becomes more significant, i.e. 28 per cent of all acullicadores over 25 took to the habit after they were 25 years of age. The fact that only 67 per cent of peasants/workers interviewed in the 15-24 age group were acullicadores at the time of the interview cannot be accepted therefore as evidence that incidence of the habit in the general population will drop to that level any time soon. Many of these young people will probably follow the patterns established by their elders and begin to practice the aculli when they are a few years older.

TABLE 59 PEASANTS/WORKERS - ACULLICADORES
AGE AT WHICH HABIT BEGAN BY ECOLOGICAL REGION

$X^2=129.503>X^2_{.005}(10)=25.188$ Significant

Ecological region	5-14 %	15-24 %	25-34 %	35-44 %	45-54 %	55-64 %	No response
Altiplano n = 1,082	6	69	19	2	1	-	3
Valley n = 696	7	73	13	1	-	-	6
Tropics n = 373	13	53	18	4	1	-	11
$n^{x} = 2,151$	7	66	17	3	1	-	6

Since education seems to be a crucial variable in determining whether an individual will become an acullicador, one might expect it to have a strong influence on the age of initiation as well. As can be seen from the following table, this is not true. Some differences can be correlated with level of education, but they are slight. Apparently, completing one's schooling at the junior high level slightly retards initiation to the aculli, even among those who end up as acullicadores. Among those who continue through high school (grades 9-12) one notes the opposite effect. Could this be their precocity and curiosity, which lead them not only to try the aculli earlier, but also propels them to a level of education attained by few in rural Bolivia? Until it is looked into more thoroughly, one can only speculate on this matter.

TABLE 60 PEASANTS/WORKERS - ACULLICADORES
AGE OF INITIATION TO THE ACULLI, BY LEVEL C EDUCATION
$X^2=44.652>X^2_{.01}(25)=44.317$ Significant

	5-14 %	15-24 %	25-34 %	35-44 %	45-54 %	No Response	Totals
0 n = 929	9	69	13	3	1	5	100
1 - 5 n = 1035	7	63	20	3	1	6	100
6 - 8 n = 155	5	64	17	2	1	11	100
9 - 12 n = 29	21	73	3	-	-	3	100
Rural normal school n=2	-	100	-	-	-	-	100
University n = 1	-	-	-	100	-	-	100
$\bar{X}$ n = 2, 151	7	66	17	3	1	6	100

D. Reasons for Using coca

Because our research was the first on the use of coca to be carried out on a national level, not only for Bolivia but for the world as a whole, we consider it to have been largely exploratory. For this reason, we used a series of totally open ended questions in our survey instrument. This caused serious problems in the processing of data, but, at the same time, provided us with information much closer to the thinking of the people interviewed than that which would have come from a closed questionnaire. Thus, when dealing with the reasons for using coca, we simply asked, "For what do you use coca?" A majority of users gave several responses. Based on these, we were able to establish a minimum variety of functions for which coca is employed. We can say nothing in terms of the maximum. When an individual answered, for example, that he used coca for working and for medicine, we could be reasonably certain he did use it for these purposes. He might have used it, occasionally, for divination, or for combating the cold, or for a fiesta, or to gather with relatives at a funeral, and not have mentioned it. We can say nothing about those uses which may not have occurred to an individual when he responded to the question.

The use of this interviewing technique, therefore, has its limitations. If we had presented a prepared list, and asked, item by item, whether the person used coca for reason x, we probably would have obtained a greater number of positive responses for specific uses. However, we would not have been able to discover the priorities given by each respondent to the various uses of the leaf.

If 90 per cent of those interviewed mentioned a certain use for coca, we can say, with considerable certainty, that this use is important for consumers. If, on the other hand, only 2 per cent mentioned it, we can conclude that this use is not perceived as very important, regardless of the number of articles or books that have been written on the subject. Through use of an open ended question, we have been able to compile a list of functions spontaneously mentioned by those users surveyed, and to order this list according to the priorities selected by the users themselves.

The list does not include all uses mentioned in the literature. Because it lacks certain internal consistency, it would not satisfy a specialist in componential analysis. But it does show how users perceive their own priorities in terms of coca use. If we were to present a complete list of functions and ask, item by item, whether the respondent uses coca for that purpose, percentages of individuals mentioning any given function would quite probably increase. The list of priorities, however, permits us to perceive how the minds of those surveyed function when faced with the subject, and, therefore, the true importance that coca has in their own thinking.

TABLE 61

PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA?
n = 2,481

	Yes %	No %	Totals %
For working	81	19	100
For medicine	78	22	100
For combating the cold	68	32	100
For asuaging hunger	63	37	100
For traveling	61	39	100
For fiestas	55	45	100
For conversing	55	45	100
For staying awake	50	50	100
For receiving visitors	49	51	100
For family ritual	46	54	100
For divination	44	56	100
For resting	36	64	100
For after meals	32	68	100
For going to sleep	16	84	100
For drinking	2	98	100
For sorrow	1	99	100

When faced with the same question, miners responded in a similar fashion. They first mentioned work, then medicinal uses, then hunger, and finally cold. Percentages obtained underline the fact that, in using our technique of open questions, we did not obtain data on all uses. It would seem evident, for instance, that all miners use coca as they work, at least once in a while. However, only 93 per cent of them mentioned this use.

TABLE 62

MINERS - USERS
FOR WHAT DO YOU USE COCA?
n = 237

	Yes %	No %	Totals %
For working	93	7	100
For medicine	85	15	100
For asuaging hunger	72	28	100
For combating the cold	69	31	100
For family ritual	53	47	100
For traveling	50	50	100
For fiestas	50	50	100
For divination	41	59	100
For after meals	31	69	100
For receiving guests	39	61	100
For conversing	39	61	100
For resting	36	64	100
For going to sleep	31	69	100
For keeping awake	22	78	100
For sorrow	3	97	100
For drinking	2	98	100

The similarity of priorities between peasants/workers and miners is understandable. Both groups chose work, medicine, cold, and hunger as the four principal reasons for using coca. Percentages for these and for the remaining reasons are similar for both sectors, with two exceptions: the use of coca for going to sleep and for keeping awake. In these two areas percentages differ substantially. Miners would appear to use coca more than peasants/workers for going to sleep, and less for keeping awake.

Among peasants of the Altiplano and valleys, many use coca in order to stay awake during rituals lasting throughout the night, such as offerings to spirits, curing of illness, betrothal parties, wakes, and house roofings. During planting, irrigating, and harvesting, peasants often work until daybreak. Rarely do individuals involved in these activities recuperate lost sleep the following day, and hardly ever do they take naps the day before. Our field researchers, having spent years in rural communities, observe that coca is never lacking for these nocturnal activities.

Although any miner has to work the night shift occasionally, it appears that the relationship between his nighttime and his daytime activities differs substantially from that described for the peasants/workers. A miner's schedule seems to correspond more to that of the urban factory worker. If he should have to work at night, a miner sleeps during the day. The demands of his work are also more similar to those faced by the factory worker. In the mine, work is heavy, agitated, and exhausting. One leaves the shift not only tired, but often also nervous. Under such circumstances, coca may be used as a tranquilizer and to induce sleep.

The specific manner in which the miner might use coca to induce sleep will be discussed in detail in the section corresponding to this function. For the time being, it may suffice to point out that, in our interviews with miners, nearly one third stated that they used coca for this purpose.

Despite the fact that the reasons respondents gave us for coca use are similar to those described through the centuries, there are a number of indications that the ritual which accompanies its use is changing rapidly. Traditionally, on the Altiplano as well as in the valleys, acullicadores carried their coca in specially woven cloth. Among men, this cloth was sewn into a small bag called a ch'uspa, wallqipu, or kapachu. Women carried a small weaving called inkuña, tari, or istalla. Lately, with the introduction of industrially produced objects and garments, these weavings are being replaced with plastic bags. Few want to carry their coca in the traditional manner. They say that the plastic bags keep the coca fresher and softer; men stuff the bags into their pockets, women into their backpacks.

1. Use of Coca for Working

In the section on initiation to coca use, we have already emphasized its importance for work, especially among miners and peasants/workers living on the Altiplano and in the valleys.

Some comments from peasant interviews will help clarify the importance of coca in this regard:

> "Coca gives us more valor, more strength. We have more strength to work. Chewing, we feel almost nothing. Without coca one cannot work". 1/

1/ Interview with Alberto Guerra, 34, Apolo, Franz Tamayo, La Paz.

"Coca is important. Without coca we can do nothing. Coca is always necessary. Without it we cannot do any work. In the fields and with construction work we always chew coca". 1/

"Coca is important. It is always needed in order to work. We all know how to work and know how to acullicar. That is where we use it". 2/

"I feel like working responsibly only when I have my jach'u". 3/

Peasants use coca most in times of greatest agricultural activity, i.e. planting and harvesting. Due to the fact that it represents an extra expense, they are able to specify quantities bought for these occasions. On the Altiplano as well as in the valleys, it is customary to recruit groups of helpers for these activities and to work as a team. The expectation is that the owner of the land provide coca for all workers on such occasions. A man of Tiraque A. in the department of Cochabamba described the custom in the following manner: 4/

Question: "With what frecuency do you buy coca, for fiestas, for example?".

Answer: "I do not buy coca for fiestas. The only time we buy coca is for planting".

Question: "For planting time, how much coca do you buy?"

Answer: "We use more or less four to five pounds during planting".

Question: "Do you also buy for harvest?"

Answer: "We also use up to five pounds during harvest. Harvest and planting are the times that we buy the most coca".

Coca is used for all kinds of work. In many parts of the Altiplano a group of workers, paid either with money or in kind, is know as a "mink'a". Coca is very important for such work groups, not only during the work itself but also in the process of recruitment.

"Coca is important in order to get workers or mink'as. For this reason, we have to start out by giving a little coca. Now, those who do not usually practice the aculli, out of good manners and respect for their elders, receive the coca and and put a few leaves in their mouth. Those who do not, take the coca to their parents". 5/

1/ Interview with a peasant group of Tacopampa, Luquisani, Muñecas, La Paz.

2/ Interview with Epifanio Blez Coroca, 46, Camacho, Arce Province, Tarija.

3/ Interview with Carlos Miranda Mamani, 53, Larecaja Province, La Paz.

4/ Interview with Luis Torres, 35, Incayani, Tiraque A. Cochabamba.

5/ Interview with a peasant group of Sampaya, Manco Kapac, La Paz.

Coca is also important for communal work, for example, for improving public property. The most common example is construction and maintenance of schools. Use of coca for this purpose was described by one group of respondents as follows:

> "There are four or five of us mayors. We always handle coca and acullicar; we also give coca to workers during rests, to initiate work, to finish work, and in the construction and inauguration of the school.
> On Teacher's Day the teacher is feted. With much respect, we first give the teacher coca and only then start to talk." 1/

In the opinion of these respondents, coca should be respected. They commented:

> "Many people say that to use coca and alcohol is a crime. We, however, consider it a sin to comment against coca that way." 2/

To be without coca would be unbearable for those who use it as a source of energy for working.

> "I couldn't do anything without my coca. I would want to eat, as would a baby. This is the truth. This is evident because sometimes there is food and others there is not. But with coca work goes right ahead. On the other hand, without food, babies couldn't stand it, right?" 3/

> "It would be impossible for some to work without coca, because those who are accustomed to it cannot work." 4/

> "Workers would go to pieces without coca. They would have little desire to work. If something were to do away with coca bit by bit, workers would pay double for it until it disappeared." 5/

> "Laziness would dominate without coca. People would no longer be motivated to work." 6/

Table 63 indicates that the coca leaf is very important for this purpose, not only on the Altiplano and in the valleys, but also in the tropics. However, it should be noted once more that this table, as well as others on reasons for use, is based on answers to open questions. Yes indicates that a certain quantity of people have mentioned this motive; no simply means that they have not mentioned it. In no case do the figures represent a negation of use.

1/ Interview with a group of peasants, Sampaya, Manco Kapac, La Paz.

2/ Interview with a group of peasants, Sampaya, Manco Kapac, La Paz.

3/ Interview with Gumercindo Gutierrez, 43, Realenga, Viconte Ascarrunz.

4/ Interview with Gregorio Camacho, 47, Tuturuyu, Tiraque A. Cochabamba.

5/ Interview with Benigno Valdez, 37, Boicobo, Luis Calvo, Chuquisaca.

6/ Interview with Rosa Murillo de V., 41, Consata, Larecaja, La Paz.

TABLE 63 PEASANTS/WORKERS - USERS

FOR WHAT DO YOU USE COCA? TO WORK, BY ECOLOGICAL REGION

$X^2 = 81.648 > X^2_{.005}(2) = 10.597$ Significant

	Altiplano n = 1248	Valleys n = 745	Tropics n = 488	$\bar{X}$ n = 2481
Yes %	83	88	68	81
No %	17	12	32	19
Totals %	100	100	100	100

Tropical zones included in our sample can be divided into three categories: areas of coca production, corresponding to the Chapare, Nor and Sud Yungas, parts of Inquisivi, Larecaja, and Franz Tamayo; areas of directed or spontaneous colonization in the border areas of the departments of Cochabamba and La Paz; and the Chaco region, in other words, southeastern Bolivia. Acullico patterns vary from one of these areas to the other.

In coca production areas, in general, both women and men consume coca. All have coca fields of some size or other, and all harvest three or four times a year. In these areas coca is considered as necessary for work as it is among miners. Natives of Yungas, for example, grow coca not only for commercial use, but also for their own family and laborers. The practice of the aculli is part of their agricultural activity. They turn to it in the morning before starting the day's work and again at about 10:30, toward the middle of the morning's work Around noon they eat lunch and use coca again. Around four o'clock they again rest and take an acullico.

In the production areas of the department of La Paz, the work week runs from Monday through Friday; Saturday and Sunday are days of rest. In the Chapare, the days of rest tend to be Monday and Tuesday. In both of these areas, peasants practice the acullico on rest days as well as work days. The few exceptions tend to be Evangelicals who abstain from the habit but who continue to produce coca.

Preparation of the soil for planting coca is generally done by fixed contract, especially in the Yungas where terraces must be built. Germination and care of small plants is all handled by individuals. In contrast, transplanting is done with the participation of the entire nuclear family. The "mitas" or harvests also require considerable manual labor. To obtain it, an interchange of services, known as "ayni", is often used.

It is customary to pay such workers with coca. In many cases an agreement is reached whereby coca harvested in the morning goes to the owner, and that harvested during the afternoon to the helper. For all such activities, laborers turn to coca as a source of energy, to ward off fatigue, and to combat weariness.

Those who have migrated from the Altiplano to tropical colonization areas have taken with them most of their traditions and customs. Their use of coca, however, appears to have changed. Many migrant families consume far less coca than those on the Altiplano. Individuals interviewed stated for example, the following:

> "We use coca only for hard agricultural activities such as clearing the land of trees and underbrush; once in a while at planting time; and very little during harvest".

We were able to observe, in the Alto Beni of La Paz, during the cacao harvest, that workers were sucking cacao seeds. In harvesting other products, many preferred to eat bananas or oranges rather than turn to coca during their rest periods. To avoid the expense of buying coca, some families have their own small coca patches exclusively for family consumption. They use the leaf in agricultural activities and as gifts to relatives looking after ancestral lands on the Altiplano. According to custom, colonizers retain land in their communities of origin. Family solidarity enables them to practice reciprocity and to inter - change products every year. In each area, households are thus supplied with products from the other.

Before entering the Chaco, our research team had thought that there was very little coca used in this area. Upon arrival to the cattle ranches, however, we learned quickly that the consumption of coca was quite common. Owners as well as workers practice the aculli (although the former do not carry out the practice in public).

In the Chaco there are different types of laborers. Some move about freely and receive wages while others are bound sharecroppers Although not all owners practice the aculli, those who do prefer coca from La Paz, considering it to be of better quality. In general, their consumption is lower than that of their laborers. In the provinces of Hernando Siles and Luis Calvo, in the Department of Chuquisaca, preferring its lower cost, owners buy Chapare coca for their "cambitas" (Guaranis who are their day laborers). These "cambita" workers, although widely dispersed throughout the region, maintain their traditional culture and are deeply loyal to coca. Commenting on this fact, owners state: "Our cambitas want to do absolutely nothing if there is no coca. Coca is, for them, the incentive and the desire to work". Such owners think that production would decline substantially if there were no coca; they fear that, without the leaf, they would be unable to find camba labor. Their fear is based on historical reality. In the past, relative scarcity or abundance of coca has been the open cause of conflicts among owners. Laborers prefer to work on ranches where there are large coca stores, and they avoid any owner who limits or refuses the leaf. The daily coca ration means more to them than better salaries.

Since, in all ecological zones, men tend to do heavier work than do women, they also more frequently use coca as an energizer. However, within the survey sample, a surprisingly high percentage of women voluntarily admitted to using coca as an energizer for work. Only 15 per cent of the men and 32 per cent of the women surveyed did not mention such use.

TABLE 64 PEASANTS/WORKERS - UCEPS
FOR WHAT DO YOU USE COCA? FOR WORK, BY SEX

$X^2=71.81>X^2_{.005}(1)=7.879$ Significanc

Sex	Yes %	No %	Totals %
Female n = 472	68	32	100
Male n = 2,009	85	15	100
$\bar{X}$ n = 2,481	81	19	100

A relatively high percentage of young people would appear to use coca for this purpose as well. Among users, 72 per cent of those within the 15-24 age group said they employed coca as an energizer. For older groups percentages rise to around 80 per cent. The average for all male users surveyed is 81 per cent. These figures are in total accord with what we have already noted concerning the importance of coca for work, especially when we consider that a strong minority of those users surveyed were female.

TABLE 65 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR WORK, BY AGE GROUP

$X^2=25.82>X^2_{.005}(6)=18.548$ Significant

	15-24 n=260	25-34 n=545	-35-44 n=598	45-54 n=522	55-64 n=293	65-74 n=173	75-+ n=90	X n=2481
Yes %	72	79	81	84	86	85	84	81
No %	28	21	19	16	14	15	16	19
Totals %	100	100	100	100	100	100	100	100

As to the influence of level of education on the use of coca as an energizer, one notes the same type of relationship discussed previously. As level of education increases, fewer people use coca for all purposes ex - cept, perhaps, medicine, as we shall see a few pages hence. Since "as an energizer for work" would appear to be the principal purpose for using coca, here we find a strong inverse relationship to level of education. This might be explained not only by the Westernization which accompanies education and by the fact that, in Bolivia's schools, teachers often speak out against coca, but also by the different types of work which those at different educational levels tend to do. People with little or no education would tend to have hard, physically demanding jobs. Those of higher levels would tend to have less demanding, even sedentary jobs.

TABLE 66 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR WORK, BY LEVEL OF EDUCATION

$X^2=125.05>X^2_{.005}(5)=16.75$ Significant

	0 n=991	1-5 n=1203	6-8 n=225	9-12 n=49	R.N.S. n=8	U. n=2	X n=2481
Yes %	90	80	60	51	12	50	81
No %	10	20	40	49	88	50	19
Totals %	100	100	100	100	100	100	100

Table 67 clearly shows that the percentage of users who employ coca as an energizer is directly related to the type of work they do. We can see how intimately related are lower levels of coca use among the more educated with the work their preparation enables them to obtain. Those who speak most frequently of using coca during work are those individuals who have rough, physically demanding jobs: agricultural workers, herders, factory laborers, and miners. Of those who have relatively light or sedentary jobs, fewer report using coca as a work stimulant. Examples are truckers, craftsmen, merchants, office workers, and students. It should be noted, however, that a high percentage of housewives reported using coca during their work. Among the peasantry, women also participate in agricultural work and flock tending, often exerting themselves as much as the men.

TABLE 67 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR WORK,
BY TYPE OF WORK

$X^2=241.4>X^2_{.005}(13)=29.819$ Significant

	Agriculture	Herding	Transport	Crafts	Factory Worker	Construction	Merchant	Housewife	Student	Office Worker	Surface Miner	Shaft Miner	Teaching	Unspecified	$\bar{X}$
	n = 1803	n = 148	n = 24	n = 57	n = 13	n = 38	n = 115	n = 220	n = 14	n = 21	n = 3	n = 6	n = 6	n = 13	n = 2481
Yes%	86	86	54	61	85	87	63	81	21	43	100	100	50	69	81
No %	14	14	46	39	15	13	37	19	79	57	-	-	50	31	19
Totals%	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

If the aculli is important for peasants/workers, it is even more so for miners. In mining centers, the pijchada or aculli is described by some as an incentive to work, and by others as a way of protecting one's health.

In our research on coca use during work and rest, we were given almost identical responses from workers from both outside and inside the mines. Coca and work were considered to be inseparable. A miner from the Chojlla mine (South Yungas) said, for example, "The miner does not practice the aculli as a vice, but as a service to himself". In general, except for some who are over 50, miners do not practice the aculli on their days off.

Shaft miners consume more coca than do those who work on the surface. A few young miners in the shafts have not begun to use coca; however, they tend to be heavy smokers. Such young people are strongly critized by their coca using elders, who say that they do not produce well, and that, if they do not become ill, it is only because they have lighter jobs.

There are two special occasions on which coca is indispensible among miners. The first is during the offering of coca to the "tio", the spiritual owner of the vein, on the last Friday of every month. The "tio" can make mineral miraculously appear or disappear, and must be appeased if the miners are to avoid serious calamities.

The second occasion is the wilancha, an offering made to the mine that is similar to the cha'alla among the peasants. 1/
The wilancha consists of decapitating a llama at the entrance to the mine on Friday of carnival every year. It is by nature a religious ceremony, with the participation of specialists such as the yatiri 2/, and with the attendance of the entire mining community including families. On the day of the wilancha, "mesas dulces"(offerings of white magic) are prepared for the "tio". The llama's blood is scattered at both the inside and outside doorway leading into the mine. The meat is butchered, roasted, and shared by everyone present. Care must be taken not to break the bones, for these must be wrapped in the hide of the llama and burned along with a "mesa dulce" at the end of the ceremony. During all this activity, coca flows freely. Although its origins are obscure, the wilancha is an ancient custom. It is no longer practiced in the nationalized mines of the country (COMIBOL), but is still common among "pirquineros" or independent miners.

1/ A libation to the mother earth. 2/ Native ritual leader.

Within miners' families, the difference between the acullico by women and that by men is quite marked. Among men, the coca leaf is indispensible as a source of energy for working and as protection against the dust and gases of the mine. In the mine shafts, even Protestants practice the aculli, especially if they are drillers. Few, however, use coca during rest hours.

There is a clear differentiation among technical personnel, administrative personnel, and those laborers working inside or outside of the mine. Their functions and shifts vary significantly. The first two groups rarely practice the aculli, nor do they feel the need for it as they work. Their use of coca is limited to medicinal purposes or to ritual occasions such as wakes. Among laborers, on the other hand, coca accompanies all work. Those interviewed said that they would not work without their aculli. In addition to the reasons already discussed, they claim that it keeps them alert and, therefore, protects them from accidents. As we shall see subsequently in the section dealing with levels of use, the functions attributed by our respondents to coca would appear to be fully justified by the results of laboratory studies on the acute effect of the aculli.

In terms of using coca as a work incentive, a number of independent studies have shown that the aculli markedly increases both basal metabolism and blood glucose levels. At the same time, it slightly increases heart rhythm and muscle power 1/ and reduces the perception of fatigue. 2/ Some research indicates that the aculli shortens the time required to complete a certain task and reduces the incidence of errors. 3/ Only one properly controlled study contradicts such conclusions. This study, not yet published, describes the relationship between working and the burning of calories among a group of Machiguenga Indians in Perú, focusing on two typical work situations, with and without coca. The authors conclude that the quantity of time per unit of work invariably increases with the acullico of coca, whereas the index of energy consumed tends to decrease. If this be so, continuous coca use could significantly reduce energy expenditure. 4/

Although the specific relationship between the aculli and work efficiency will not be known until more studies have been completed, most of the conclusions of research completed in the past seem to indicate that, when acullicadores attribute energizing qualities to coca, they are describing actual physiological processes. If, as we suggest above, the aculli markedly increases basal metabolism and blood glucose levels, slightly increases heart rate, and raises muscle power, then it is completely understandable why so many users consider the leaf a source of energy for working.

1/ Chanochumbi 1949; Gutierrez Noriega y Zapata Ortiz 1948, 1950; Hanna 1974, 1976; Risemberg Mendizabal 1944.

2/ Hanna 1971.

3/ Zapata Ortiz 1944.

4/ Montgomery y Johnson 1977.

2. Medicinal Uses of the Coca leaf

On the Altiplano, coca plays an important part in the traditional Andean pharmacopoeia. People we interviewed answered questions about the medicinal uses of coca with the utmost of seriousness. The coca leaf constitutes a first aid remedy for almost every home, rich or poor. Treatment with coca can be carried out without specialized curers; traditionally, any member of the family can prepare and apply coca leaves for any of a sizeable number of common ailments.
In most rural communities, there are no hospitals, clinics, or pharmacies. When illness appears, a peasant has to go to a local curer, who, according to the region in which he lives, may be called a yatiri, qulliri, paku, or ch'amakani. All are specialists in the treatment of illness, and all use herbs classified by the ancient bipolar system of hot and cold. Their treatments vary from simple reading of coca leaves to spiritism and sophisticated psychosomatic procedures. Not all curers have the same capacity and role; yet each aspires to increase his status and be known as a great sage.

For household medicine, coca is used in five basic ways, each corresponding to a specific type of illness:

a. As an infusion (tea).

b. In simple acullico.

c. In a plaster of moistened coca leaves.

d. In a poultice made from a coca quid (coca briefly acullicado).

e. In combination with other herbs.

Coca tea is commonly used for stomachaches, to avoid catching cold when one has chills, to induce labor, or for toothaches. Of this practice, T. Sillo Vega, the principal authority in the canton of Amarete, says, "When we have chills, we use coca tea so as not to come down also with stomachache. In other words, coca is good for colds; this is why it is important."

To prepare coca tea is so simple that even children do it when they feel ill. It consists of putting about 20 coca leaves and a little sugar into a cup, and then filling it with hot water. After covering the cup with a saucer and waiting about five minutes, the tea is ready to be used.

The simple acullico of coca is a true home remedy. People turn to it when they have an upset stomach because of excessive food or drink, or when their stomach swells due to a cold. Some practice the aculli after each of the three principal meals of the day, using from 30 to 60 leaves at a time. The leaves may be either fresh or lightly toasted and warm. "Coca is good for a swollen stomach because when we use it toasted it soothes the pain." 1/ Coca is also used in the form of the aculli for internal wounds. Everything about the aculli is normal, except that it is begun just before retiring. The coca bolus remains in the mouth until the next morning when it is thrown away.

On the Altiplano, it is common for women to stick a few moistened leaves on either temple to soothe a headache. A plaster of moistened leaves can also used to cure rheumatism. In this case, one sticks about 40 moistened leaves on the bottom of each foot.

To avoid swelling and to soothe the pain of a slight injury, one can apply the jach'u, or bolus, directly and rapidly to the injured area. For more serious injuries, such as bad bruises, hematomas, sprains, or fractures, coca may be soaked, ground a little, and mixed with other matter. This mixture is then applied to the injured area. One respondent described such a procedure as follows:

1/ Interview with Gumercindo Gutierres, 45, Realenga, Vicente Ascarrunz, Oruro.

"Coca is used for injuries. It is ground along with sugar and flour, and is applied to the injured area. The swelling then quickly disappears. When a person is injured, we use coca, because we peasants do not have doctors. Besides, a doctor cures with ointments and that takes too long. But with coca it is quick."

We see then that even with a physician and pharmacy close at hand, the peasant would not necessarily trust either. He might prefer to use home remedies, such as coca and other traditional herbs.

Some remedies are prepared by mixing coca with alcohol, urine, and with other herbs, some of which are well known and some of which require a specialist These combinations are used especially when the maladies cannot be handled by a member of the family. A curer-specialist will be called in, will diagnose the problem, will assess the physical constitution of the patient, and will prepare the medicine and prescribe the necessary dosage.

Our brief discussion of coca as a remedy is in no way complete. It should be considered simply as a series of examples as to how an individual might use coca for either illness or pain. In most of rural Bolivia, there are no pharmacies from which to buy something to cure a headache or a stomachache. Understandably, then, Dominga Choque answered the question: "What would you do if there were no coca?", with the words. "Well, I would die of a stomachache. I cannot survive without coca". 1/

Many maladies can be taken care of within the family itself. Major illness or pain, however, requires a specialist. It is he who prepares the remedies, using coca and other items, as his knowledge may dictate.

The medicinal use of coca in valley communities is almost as widespread as on the Altiplano. Coca is used for stomachaches, headaches, cuts, bruises, hematomas, etc. Light injuries are handled by members of one's family. More serious matters may require a specialist, and a yatiri, curandero, qulliri, or spiritist (cha'amakani) may be called. Valley dwellers prefer to consult curers from the Altiplano, if they are available. Such curers travel regularly to the valleys as reciprocal laborers, or to exchange produce, especially at harvest time.

In our research, we observed the medicinal use of coca countless times, and many echoed the words of Catalina Flores. "For lack of coca we could fall ill" 2/ In visiting homes in Amarete, of the Province of Muñecas, in the department of La Paz, we observed small bundles containing different herbal medicines. Their owners explained that such bundles constitute general custom in the area. They are the traditional first aid kit of the peasant family.

Because the miner's way of life is so different from that of the peasant, we did not know to what extent we would find, among miners, the coca remedies so common among peasants. In the first place, not all miners are alike. They are clearly stratified as to position and specialty. Companies provide social benefits, including medical care, for the miners they contract. Independent miners (palliris, rolaveros, chasquiris, and pirquineros) work alone, and luck decides their fate. Each group could be expected to use coca according to its particular situation.

1/ Interview with Dominga Choque, Huaripaca, Sud Chichas, Potosi.

2/ Interview with Catalina Flores, 43, Huariscalla Community, Arque Province, Cochabamba.

As an example, we can compare the perception of a contract laborer with that of a palliri. One of the former stated that "Coca is good for stomachaches because we miners have stomachaches, maybe because we work at night". 1/ One of the latter said, "Coca is medicine because it is hot. It is good for rheumatism, for pneumonia. Coca is very important to us". 2/ These two statements clearly reflect the situation of each of the two respondents. In the first case, coca use appears to be more limited and is directly attributed to the miner's nocturnal work. In the second case, the nocturnal factor does not enter the picture because palliris work only by day. The first miner may have mentioned only one illness because his sector has free medical care. The second mentioned more including pneumonia and rheumatism, because he lacks such social benefits. If he falls ill he must recur to either home remedies or to a traditional curer. Thus the first of these workers represents cultural transition, while the second is a traditionalist.

In nearly all the mining centers of the country, home remedies have been replaced by or are giving way to Western medicine. The majority of miners are contracted by companies and enjoy access to modern clinics and their respective pharmacies. The native curer - diviner takes on a different function in such places - a magico - religious function. He does not cure illness, for the insured worker, along with his family, has no need for such services. Contracted workers tend to use coca medicinally only as tea to calm upset stomachs. But among the dispossessed classes, for example, among pirquiñeros, the curer tradition persists. Due to their marginal situation such workers lack the security of a regular salary; they must use coca to cure simple maladies and injuries. And when their illness is serious, they have no alternative but to resort to native curers, herbal specialists, and Andean religious leaders.

Within the tropical areas surveyed, coca is used quite often as a home remedy. Its application is quite similar to that customary on the Altiplano and in the valleys. One person interviewed in the Chaco region had this to say on the subject:

> "In order to cure sick animals, such as cattle and horses, one prepares coca in four or five liters of water, and gives the infusion to the animals through the nose. The effects can be noticed immediately. I have saved my animals from death in this manner a number of times. Coca is medicine for people as well. When the earth (the pachamama) grabs them, their feet swell. This can be cured with the coca bolus It is good for stomachaches, to cure cuts, colds, for fits, and even eye infections".

Such opinion is quite common in these tropical regions. Coca tea may be prepared in various ways for remedies, just as on the Altiplano and in the valleys. It should be noted, however, that due to the popularity of drinking Paraguayan tea (mate), coca tea is referred to not as mate, but as simply "té de coca".

In general, the use of coca as a remedy is the most widely diffused in Altiplano and valley peasant communities. Due to the isolation in which people in these areas live, it is a necessity, in case of illness, to preserve tradition and use remedies available to everyone. The fact that city dwellers have access to pharmacies, however, does not mean that they no longer use coca as a remedy. Even the most educated of Bolivians resort to coca for certain health problems.

1/ Interview with Valentin Tamanto, 36, Pacuari Community, Mina San Jose, Camacho Province, La Paz.

2/ Interview with Carlos Miranda, 49, Mina Chojlla, Sud Yungas Province, La Paz.

The tables which follow, based on open questions about reasons for using coca, should be studied with caution. They show the minimum percentage of people who, we can say with assuredness, use coca as a remedy, but they reflect neither averages nor maximums. This is because individuals who use coca for purposes other than medicine may not have mentioned using coca for medicinal purposes. For example, interpreting Table 68, we cannot say, with any degree of certainly, that people on the Altiplano and in the valleys use coca as a remedy less than those living in the tropics. The lower percentage can probably be attributed to the fact that a larger portion of Altiplano and valley peasants use coca for working, and because this use was foremost in their minds, they failed to mention medicinal use when faced with an open ended question. What is clear, however, is that a large majority of those surveyed, regardless of ecological zone, continue to use coca as a remedy.

TABLE 68 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR MEDICINE
BY ECOLOGICAL REGION

$X^2=43.43>X^2_{.005}(2)=10.597$ Significant

	Altiplano n = 1248	Valley n= 745	Tropics n = 488	$\bar{X}$ n =2481
Yes %	76	76	89	78
No %	24	24	11	22
Totals %	100	100	100	100

Table 69 indicates that a greater percentage of women than of men mention coca as a remedy. This could probably be related to the division of labor by sex within homes of peasants/workers; when it comes to home remedies, women tend to be more actively involved than men. The differential may also reflect the fact that women use coca to induce labor, after child birth, and to control uterine hemorrhages.

TABLE 69 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR MEDICINE,
BY SEX

$X^2=29.93>X^2_{.005}(1)=7.879$ Significant

Sex	Yes %	No %	Totals %
Female n = 472	87.7	12.3	100
Male n = 2,009	76.2	23.8	100
$\bar{X}$ n =2,481	78	22	100

In terms of relationship between the medicinal use of coca and age group, we see that, apparently, tradition remains strong, and will remain so for many years. There is no indication that, as age increases, coca use for medicinal purposes experiences any considerable rise. The youngest age group surveyed, those between 15 and 24, show a greater percentage of reported use than any other group.

TABLE 70 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR MEDICINE, BY AGE GROUP

$X^2=10.351<X^2_{.05}(6)=12.592$ Not Significant

	15-24 n=260	25-34 n=545	35-44 n=598	45-54 n=522	55-64 n=293	65-74 n=173	75-+ n=90	X n=2481
Yes %	83.8	76.9	80.2	78.5	77.1	72.8	76.7	78
No %	16.2	23.1	19.8	21.5	22.9	27.2	23.3	22
Totals %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Something very similar occurs when we relate the use of coca for medicinal purposes to level of education. Illiterates mention this use the least, while those with the highest levels of education mention it the most. There is a consistent correspondence as we go along the educational scale. It should again be noted that this does not necessarily mean that those at lower educational levels use coca any less for this purpose. Because they use it for other purposes some may simply have failed to mention this particular one. What is impressive is the high percentage of individuals of rather high educational levels (in terms of Bolivian peasants and workers) who voluntarily talk of using coca for this purpose. There does not appear to be any evidence that formal education may be doing away with the custom; to the contrary, given these statistics, one would almost be tempted to argue that education is encouraging such use.

TABLE 71 PEASANTS/ WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR MEDICINE, BY LEVEL OF EDUCATION

$X^2=37.836>X^2_{.005}(5)=16.75$ Significant

	0 n=991	1-5 n=1206	6-8 n=225	9-12 n=49	R.N.S. n=8	U. n=2	X n=2481
Yes %	73	80	88	90	100	100	78
No %	27	20	12	10	-	.	22
Totals %	100	100	100	100	100	100	100

If we analyse the correlation between type of work and the medicinal use of coca, patterns appear which reaffirm what has already been said in terms of level of education. People who hold more specialized jobs, requiring a higher degree of education, are precisely those who most frequently speak of using coca as a remedy. A high percentage of housewives also mention this use. This is understandable in light of what has already been said about the differential in the medicinal use of coca by sex.

TABLE 72 PEASANTS / WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR MEDICINE, BY TYPE OF WORK

$X^2=44.247>X^2_{.005}(12)=28.3$ Significant

	Agriculture	Herding	Transport	Crafts	Factory Worker	Construction	Merchant	Housewife	Student	Office worker	Surface Miner	Shaft miner	Teaching	Unspecified	$\bar{X}$
	n = 1803	n = 148	n = 24	n = 57	n = 13	n = 38	n = 115	n = 220	n = 14	n = 21	n = 3	n = 6	n = 6	n = 13	n = 2481
Yes %	76	73	83	93	69	84	91	89	100	90	100	67	100	x	78
No %	24	27	17	7	31	16	9	11	-	10	-	33	-	x	22
Totals %	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

It is also instructive to note what specific medicinal uses these individuals make of coca. Table 73 shows clearly that it is most commonly used for stomach ailments, followed by respiratory problems. It should be noted that the smallest percentage of users surveyed who fail to use coca for medicinal purposes live in the tropics. This would appear to indicate that, as a medicinal element, coca is used all over Bolivia.

Although figures for ailments other than the two mentioned above are very small, they do indicate that the variety of ailments for which coca is used is greater on the Altiplano and in the vallyes than in the tropics. Given the greater importance of Amerindian medical traditions in Aymara and Quechua speaking regions of the country, this would appear to be logical.

TABLE 73 PEASANTS/WORKERS - USERS
AILMENTS FOR WHICH COCA IS USED,
BY ECOLOGICAL REGION

	Altiplano n = 1248	Valley n = 745	Tropics n = 488
Stomach ailments	63 %	66 %	81 %
Swelling	4 %	3 %	3 %
Sprains	2 %	2 %	1 %
Fractures	1 %	0.2 %	0.4 %
Childbirth	1 %	0.1 %	0.2 %
Headaches	7 %	6 %	9 %
Colds	18 %	15 %	24 %
Muscle aches and pains	4 %	2 %	1 %
Wounds and bruises	4 %	4 %	4 %
None	24 %	25 %	10 %

3. Use of Coca for combating the cold

The most careful research on the effects of the aculli on cold has been that of Joel Hanna. Based on experiments with natives of the locality of Nuñoa in the department of Puno, Perú, his observations show that the aculli helps slightly in the conservation of heat within the body core. In his experiments, fourteen Quechua males, acullicando coca, were exposed to temperatures of 1,5°C during two hours. Then their reactions were compared with those of the same group exposed to the same temperature, but without coca. It was concluded that, with coca, temperatures of the extremities, i.e. fingers and toes, slightly declined, whereas the temperature of the body core was maintained relatively stable. This was attributed to slight vasoconstriction induced by the acullico of coca. During the second hour of being exposed to cold, coca users showed a more gradual decline in temperature, indicating a greater conservation of core body heat. On the basis of these observations, Hanna suggests that the acullico of coca may be slightly adaptive for peasants living in regions such as the six highland departments of Bolivia, i.e. in regions characterized by limited caloric availabilty and conditions that expose the individual to low temperatures for hours at a time. 1/ Hanna's conclusions had their precursors, but in work which did not aproximate Hanna's in terms of scientific controls. 2/ All these reports agree that the acullico of coca helps maintain core body temperature.

The fact that, in our research, cold was the third most commonly mentioned purpose for coca use among peasants/workers, and the fourth among miners, indicates that traditional coca users empirically discovered this quality independently from modern research. Peasants from the Island of the Sun and Sampaya, for example, use coca for combating cold when fishing on Lake Titicaca.

> "Our occupation is fishing. We fish during the night. Therefore, we always need coca for these occasions because it is cold". 3/

From responses collected during our survey, it can be seen that the use of coca for this purpose has wideacceptance. Percentages of individuals who mentioned using coca to combat the cold are identical for the Altiplano and valleys. Surprisingly, even 50 per cent of those respondents living in the tropics mentioned the benefits of coca when it came to warding off cold. It should be noted that, in tropical regions where we worked, there are marked variations in temperature from one season to another. This is especially true for the southeastern part of the country, the Chaco region. Surazos (winds from the south) arrive, and neither housing nor clothing provide adequate protection. Those living in the tropics, therefore, are familiar with cold, and have indicated by their responses that they use coca when dealing with it.

TABLE 74 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR COMBATING COLD,
BY ECOLOGICAL REGION

$X^2=71.376>X^2_{.005}(2)=10.597$ Significant

	Altiplano n=1248	Valley n=745	Tropics n=488	X n=2481
Yes %	72	72	52	68
No %	28	28	48	32
Totals %	100	100	100	100

1/ Hanna 1971, 1974, 1976.
2/ Cf. Gutierrez Noriega y Zapata Ortiz 1948; Gutierrez Noriega y Zapata Ortiz 1950; Chamochumbi 1949.
3/ Interview with Gregorio Paye, 54, Sampaya, Manco Kapac, La Paz.

In considering these responses, which refer to cold as a reason for turning to coca, one should remember that our respondents almost unanimously believe that consumer articles can and should be divided into two principal groups: hot and cold. Coca is considered hot by nature, and therefore, according to this system, coca should be used to fight anything cold; as a hot element, it produces heat.

But that the use of coca for this purpose has a much the more empirical base can be seen by the way it relates to the two sexes. Table 75 shows that only 54.4 per cent of women respondents indicated that they use coca for fighting the cold, whereas 71.1 per cent of the men did so. This surely reflects the traditional division of work. Men spend more time working in the open, in the fields, and traveling, especially during the night, when the cold of the Andes is at its harshest.

TABLE 75 PEASANTS/WORKERS - USERS FOR WHAT DO YOU USE COCA? FOR COMBATING THE COLD, BY SEX

$X^2=49.239>X^2_{.005}(1)=7.879$ Significant

SEX	Yes %	No %	Totals %
Female n = 472	54.5	45.5	100
Male n = 2,009	71.1	28.9	100
$\bar{X}$ n = 2,481	68	32	100

Using coca for combating the cold is, in general, related to some specific task which exposes the individual to the elements. Most common is agricultural work or herding, where the individual has to remain outside until late at night or even until daybreak, a common practice in times of planting, irrigating, and harvesting. In other words, coca is used to combat the cold, but only in connection with some specific activity. This is clearly demonstrated in Table 76, which correlates the use of coca for this purpose with type of work. With this table, we see that those peasants/workers who mention this purpose frequently are those who hold jobs requiring them to spend long hours in unprotected places: i.e. agriculture, herding, and construction. The few peasants/workers who labor in mines are unanimous in mentioning this purpose for coca use. Because they are so few, however, their responses are not statistically significant. The survey carried out among professional miners shows that only 69 per cent mention using coca for this purpose. While this percentage is not low, neither is it among the highest.

Additional analysis of the responses given offers even more evidence that coca must help, albeit slightly, in reacting to the cold. A worldwide phenomenon is deterioration of the circulatory system with age. Older people complain of being cold in situations in which younger people are perfectly comfortable. If we correlate the use of coca for combating cold with age group, we see that, as we rise in the age scale, we witness a consistent increase in the use of coca for this purpose. Among the oldest, almost 80 per cent of those surveyed spoke of the protection coca had given them against cold. Many times, during our field work, we encountered older people sitting alone with their aculli. When we asked why they had the bolus in their mouth, they would reply, "To warm up a bit".

TABLE 76

PEASANT/WORKERS - CONSUMERS

FOR WHAT DO YOU USE COCA? FOR COMBATING THE COLD, ACCORDING TO TYPE OF WORK.

$X^2=142.091, X^2_{.005}(12)=28.3$ Significant

	Agriculture n = 1803	Herding n = 148	Transport n = 24	Crafts n = 57	Factory Worker n=13	Construction n = 38	Merchant n = 115	House-wife n = 220	Student n = 14	Office Worker n=21	Surface Miner n = 3	Shaft Miner n = 6	Teaching n = 6	Unspecified n = 13	$\bar{X}$ n = 2481
Yes %	73	78	33	51	54	68	51	47	7	19	100	100	17	x	68
No %	27	22	67	49	46	32	49	53	93	81	-	-	83	x	32
Totals	100	100	100	100	100	100	100	100	100	100	100	100	100	x	100

TABLE 77 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR COMBATING COLD,
BY AGE GROUP

$X^2=35.949>X^2_{.005}(6)=18.548$ Significant

	15-24 n=260	25-34 n=545	35-44 n=598	45-54 n=522	55-64 n=293	65-74 n=173	75 + n=90	X n=2481
Yes %	58	62	67	71	75	72	78	68
NO %	42	38	33	29	25	28	22	32
Totals %	100	100	100	100	100	100	100	100

The correlation between the use of coca for combating the cold and level of education seems to reflect more the type of work carried out by different groups than any direct influence on individual metabolism or the belief as to whether coca is useful for this purpose. Those who have the roughest and most exposed jobs are, in general, the illiterate, followed by those who have never finished primary school. Our statistics show a marked differential between those who had no education and those who had completed the first grade. Another marked change appears between grades 4 and 5. Those who have completed the fifth grade, the last year of primary school in Bolivia, have more of a chance to choose the life they will live. Those who have not completed primary school, in general, are forced to follow patterns established by their parents. Among those who had finished only fourth grade, 60 per cent spoke of using coca for fighting the cold; among those who had completed all of primary school, in other words fifth grade, only 50 per cent mentioned such use; and among those who had finished sixth grade, only 40 per cent talked of it. For men, lack of education would appear to imply hard work and being frequently exposed to the elements. For the vast majority it would therefore imply turning to the coca leaf for whatever protection it might offer.

TABLE 78 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR COMBATING COLD,
BY LEVEL OF EDUCATION

$X^2=171.555>X^2_{.005}(5)=16.75$ Significant

	0 n=991	1-5 n=1206	6-8 n=225	9-12 n=49	RNS n=8	U. n=2	X n=2481
Yes %	80	64	45	31	13	-	68
No %	20	36	55	69	87	100	32
Totals %	100	100	100	100	100	100	100

4. Use of Coca for Satisfying Hunger

Coca use, according to many intellectuals and politicians who have never practiced the aculli, is due principally to the lack of food among the poor, especially the rural poor, of Perú and Bolivia. Many popular writings have stated that, because this is so, the best way to eliminate the habit would be through general improvement in the diet of the masses. Following this point of view, when food is not available, coca acts as a substitute.

It is easy to understand how this idea has won such wide acceptance. If one were to ask a coca user why he consumes the leaf, one of the most common answers would be that coca "satisfies hunger". In our research we gathered a variety of this type of response:

> "Without coca, we would always be hungry". 1/

> "Coca is not harmful. Coca is a necessity. With coca we are able to work and do something. When we are hungry we chew our coca and hold our hunger a bit in check. On the other hand, drinking makes us do stupid things". 2/

> "With coca we have to kill our hunger and our weariness and continue walking, either by day or by night, without tasting anything but coca. An old man, if he does not have coca, might suffer from stomach ailments on his trips, because in some places they offer food; in others nothing". 3/

> "From the beginning of work, the main thing is that coca has to be given. If their food is not brought on time, they do not feel it if they have coca. They say that coca causes numbness in the stomach, which causes even hunger to go away". 4/

> "During the Chaco War, it was the custom for one's relatives to send a little coca. When this arrived to the front, each soldier had his coca, and this numbed his stomach; many times hunger and thirst were great. One might be days without eating". 5/

Considerable scientific literature also refers to the use of coca as a substitute for food. One of the earliest articles written on the subject was published in England in 1814. The author was so impressed by the qualities of coca that he suggested that Britishers take up the habit in order to reduce their consumption of meat. 6/

1/ Interview with Francisco Rocha, 53, San Pedro, Azurduy, Chuquisaca.
2/ Interview with Pablo Solís Rodriguez, 37, Vieja Cancha, Otuyo, Cornelio Saavedra, Potosí.
3/ Interview with Gumercindo Gutierrez, 45, Realenga, Vicente Ascarrunz, Oruro.
4/ Interview with N. N. Choquepoco, 46, San Pedro de las Peñas, Mendoza, Tarija.
5/ Interview with Marcelo Mendoza, 37, Zantalla, Consata, Larecaja, La Paz.
6/ "Academicus" 1814: 217-221.

During the twentieth century, those who have most attributed coca use to lack of food have been followers of the school of Gutierrez-Noriega. This Peruvian pharmacist convinced the United Nations to form a study Commission, and struggled fervently to eliminate coca use in Perú. Comparing levels of nutrition on the Peruvian coast with those in the mountains, Gutierrez-Noriega attributed the difference almost exclusively to the use of coca in the latter region. 1/

There has not yet been an adequately controlled nutritional study which could indicate whether acullicadores are more poorly nourished than are abstainers of the same sex, socio-economic level education, and marital status. From some studies made of users and non-users, we know that people from both groups tend to put on weight as the years go by. 2/ We also know that there is no hard evidence to indicate that coca use reduces the life expectancy of an individual. In other words, we lack data based on carefully controlled samples to support the argument that coca use leads to malnutrition. Coca users are both fat and thin, strong and weak. Anthropologists who have lived among them have repeatedly testified as to their enormous appetites and the large quantities of food they can consume when given the oportunity. 3/

We will have to await carefully controlled research before we can approach a satisfactory answer to this question as to the relationship between food and coca. Much of the material published during the first great wave of enthusiasm to eradicate coca in Perú (1945-1960) contained descriptions of coca users as sickly individuals, malnurtured, incapable of sustaining great efforts for extended periods. and even psychopathic. What seems to have escaped the authors of these polemic papers was the fact that, in enormous extensions of the mountainous regions of Perú, almost all adult men and the majority of adult women were dedicated coca users. Would all of them fit the descriptions set forth by these papers? Is it true that nearly 80 per cent of peasants living in the six highland departments of Bolivia today suffer from malnutrition, and that this malnutrition is due principally to their using coca?

Complicating the situation even further is the fact that the Aymara and Quechua words for "hunger" have a much wider semantic field than does the English word. Besides the desire to eat, the word can mean general physical weakness and yawning. To yawn, for example, means. to the Aymara and Quechua, to be hungry. When one says he uses coca to satisfy hunger, therefore, just what does he mean?

Yet another complicating factor is that recent studies have demonstrated that coca is in itself an important source of vitamins and minerals. A nutritional analyses of Chapare coca has revealed that, when compared with an average of 50 other Latin American vegetable products, coca leaves were higher in calories, proteins, carbohydrates, fiber, ash, calcium, phosphorus, iron, Vitamin A, Vitamin B_2, Vitamin E, and riboflavin. They were lower in oil, moisture, niacin, and ascorbic acid. The authors, from the Harvard botanical museum, conclude that ingestion of 100 grams of Chapare coca would more than satisfy, for the average man or woman, the minimum daily requirement of calcium, iron, phosphorus, Vitamin A, Vitamin B_2, and Vitamin E. 4/

1/ Gutierrez-Noriega, Carlos 1948: 3-92.

2/ Gitierrez-Noriega and Zapata Ortiz 1948.

3/ Burchard, Roderick E. 1976.

4/ Duke, Aulik, and Plowman 1975.

Yet another consideration is that llujta, the ash which is used with the acullico, is an important source of calcium. 1/ The nutritional value of coca has been recognized, although not in such specific ways, for many years. But coca has been discounted as a legitimate source of nutrients because it contains cocaine as well. Other alkaloids in coca are now beginning to receive more attention. We are beginning to realize that we do not know the true effects of the acullico, and that cocaine liberated by this process well may be minimum, most being converted into ecgonine, a substance that has basically different effects. 2/ According to some researchers, these are similar to those of atropine. 3/ If so, ecgonine could help convert carbohydrates to glucose, a fact that would explain why many accept coca as an energizer and why they say that coca satisfies hunger.

At the University of Manitoba, a laboratory group is, at present, studying the hypothesized conversion of cocaine, first into benzol ecgonine, and then into ecgonine, when it is subjected to the same type of hydrolisis as that produced by the saliva and gastric juices of an acullicador. It is expected that, in the near future, they will begin work directly with the coca leaf itself. With the results of these experiments, and especially if they can be complemented with pharmacokinetic studies, we will have a much better idea as to how coca affects appetite and hunger. In the meantime, more controlled studies on nutrition should be initiated.

Given these uncertainties which still surround the question as to the relationship between coca and nutrition, one of the few things which can be done for the moment is to indicate perceptions of acullicadores themselves. When analyzing the percentages of people mentioning the use of coca for satisfying hunger, we see marked variations associated with the different basic variables used in this study. For example, in terms of ecology, we see that hunger is of more importance to those on the Altiplano than to those in the valleys. We have been unable to find a satisfactory explanation for these differences. From what our researchers have observed, we cannot believe that coca is a substitute for food; many acullicadores have animals as well as abundant storehouses of grain and tubers. What we have been able to observe, however, is that many acullicadores would rather use coca than eat while doing active work. They say that if they eat too much while they work they feel lethargic and sleepy. This may be what users are referring to when they say that they use coca to satisfy hunger. They may not, in fact, be speaking of hunger itself.

1/ Baker and Mazess 1963.

2/ Montesinos 1965; Cárdenas 1952; Nieschulz 1971.

3/ Gray 1973.

TABLE 79 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR SATISFYING HUNGER,
BY ECOLOGICAL REGION

$X^2=55.667>X^2_{.005}(2)=10.597$ Significant

	Altiplano n = 1248	Valley n =745	Tropics n =488	$\bar{X}$ n = 2481
Yes %	63	70	49	62
No %	37	30	51	38
Totals %	100	100	100	100

A clearer pattern emerges when we correlate this purpose for the aculli-co with sex. A considerably greater percentage of men use coca for this reason than do women. This can be explained by the fact that it is the man who does the harder outside work and who takes more and longer trips. It is quite common to use coca for such trips, and, when asked why they use it in this way, the answer often is "to satisfy hunger".

TABLE 80 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR SATISFYING HUNGER,
BY ECOLOGICAL REGION

$X^2=53.276>X^2_{.005}(1)=7.879$ Significant

Sex	Yes %	No %	Totals %
Female n = 472	48.1	51.9	100
Male n = 2,009	66.2	33.8	100
$\bar{X}$ n = 2481	62	38	100

That use of coca for this purpose is related to the type of work one does, perhaps even more than to hunger per se, can be appreciated from the figures contained in Table 81; "Use of coca for satisfying hunger, by type of work". Here we see a relationship similar to that observed in the use of coca for combating cold. The three groups which most attribute hunger satisfying qualities to coca are those most involved in physical labor and most exposed to the elements: agriculturists, herders, and construction workers. The few peasants/workers who labor in the mines also rank high in this regard. And among professional miners, use of coca for satisfying hunger looms as more important than its use for combating the cold (see Table 61).

TABLE 81 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR SATISFYING HUNGER,
BY TYPE OF WORK

$X^2=160.756 > X^2_{.005}(12)=28.3$ Significant

	Agriculture n = 1803	Herding n = 148	Transport n= 24	Crafts n = 57	Factory Worker n= 13	Construction n= 38	Merchant n = 115	House-wife n = 220	Stulent n = 14	Office Worker n = 21	Surface Miner n= 3	Shaft Miner n = 6	Teaching n= 6	Unspecified n = 13	X n = 2481
Yes %	68	71	25	42	31	63	39	44	7	24	100	100	17	x	62
No %	32	29	75	58	69	37	61	56	93	76	-	-	83	x	38
Totals %	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

When we correlate age with the use of coca for satisfying hunger, we see that the incidence of respondents reporting that they use the leaf for this purpose increases with age. However, older people are precisely those who have the most land and the most productive land, while the young are often dispossessed. In any Quechua or Aymara speaking community, one quickly learns how jealous young people are of the old "ricachos" (money bags); one also comes to realize how much food older people have in their storehouses, and how abundant their flocks tend to be. The same type of differentiation would hold for level of education. Those who have finished primary school or more are almost invariably younger people and, therefore, individuals with decidedly less access to food than their elders.

TABLE 82 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR SATISFYING HUNGER,
BY AGE GROUP

$X^2=40.578 > X^2_{.005}(6)=18.548$ Significant

	15-24 n=260	25-34 n=545	35-44 n=598	45-54 n=522	55-64 n=293	65-74 n=173	75-+ n=90	X n=2481
Yes %	50	60	61	66	71	71	74	62
No %	50	40	39	34	29	29	26	38
Totals %	100	100	100	100	100	100	100	100

One final point reaffirms the complexity of this relationship between the aculli and hunger. Among other things, we wanted to know reactions people might have to a possible disappearance of coca on the market, and specifically, whether it could be replaced with some other product. It is worth noting that barely 11 percent of the 2,481 acullicadores surveyed said they could replace coca with food. It would appear logical that, if one of the main functions of the aculli is to satisfy hunger, coca could be replaced by food. The data, however, do not indicate that this would happen. We conclude, therefore, with as much of a question as we had when we started.

TABLE 83 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR SATISFYING HUNGER,
BY LEVEL OF EDUCATION

$X^2=196.062 > X^2_{.005}(5)=16.75$ Significant

	0 n=991	1-5 n=1206	6-8 n=225	9-12 n =49	R.N.S. n =8	U. n =2	$\bar{X}$ n=2481
Yes %	76	58	35	30	-	-	62
No %	24	42	65	70	100	100	38
Totals %	100	100	100	100	100	100	100

5. Use of Coca for Traveling

Coca is very important to the vast majority of peasants/workers who travel widely during the course of each year. Among seasoned travelers of this social class, almost none fail to take along their "chuspa" of coca. The aculli has a number of uses for the traveler: he employs it to avoid weariness and fatigue; he uses it as a remedy for indigestion; and if on foot, he presents his quid to the spirits of the road at each "apacheta" (Amerindian roadside shrine). If he were to neglect the offering, things would go badly for him in strange places.

People who live on the Altiplano maintain the tradition of descending into the valleys, immediately after harvest, to exchange their produce. Some continue their descent until they arrive to the tropics, where they stock up on fruit and coca. If they lack products such a charque (dried beef), chuño (dehydrated potatoes), or quinua (an Andean cereal) to exchange for coca, they work as laborers harvesting coca or other crops. In many valley areas and particularly in the Yungas, there is a chronic scarcity of agricultural labor.

People living in the valleys not only receive visitors from the Altiplano, but themselves climb up to the high plateau. They find weekly ferias and regional fiestas particularly attractive as outlets for their products. They also travel to the tropics to visit relatives in frontier areas, to engage in seasonal work, and to pursue commercial activities.

People living in tropical regions also engage in extensive travel. Markets and fiestas in the valleys and the Altiplano offer them constant outlets for fruit and other tropical produce. Movement in this direction, however, is less than in the previous two. In general, tropical dwellers await the arrival of Altiplano and valley peasants to replenish their supplies of highland products.

In general, then, we see that there is a constant interchange of products, much of which is outside the money economy. This interchange is especially important for coca, to the extent that many Yungas dwellers state that, if it were not for coca, they would be unable to obtain certain products which they receive only through barter.

This type of movement dates from pre-Columbian times, just as does the habit of using coca while traveling. It would appear that valley dwellers travel the most , in part because their land produces abundantly without constant care, and in part because of their direct access to two sharply contrasting ecological zones, the Altiplano and the tropics.

The importance of coca for these journeys has been clearly described by a man from Arco Pongo, an extremely isolated valley area:

> "We use coca for traveling. Sometimes we have to spend the night and sleep on the road. The only things we have under these circumstances are coca and tobacco. Coca gives us courage during the night."

Question: "And if there were no coca, with what could you replace it?"

Answer: "There is nothing equal to coca, nothing".

Analyzing percentages of respondents who mentioned using coca as they travel, we find that those from the valleys talk of this use the most, followed by people from the Altiplano, and finally by those who live in the tropics. This would seem to correspond to what we already know in general about the incidence of travel in each of these three populations.

TABLE 84 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR TRAVELING,
BY ECOLOGICAL REGION

$X^2=18.35>X^2_{.005}(2)=10.597$ Significant

	Altiplano n = 1248	Valley n=745	Tropics n=488	$\bar{X}$ n=2481
Yes %	61	70	47	61
No %	39	30	53	39
Totals %	100	100	100	100

No studies exist comparing the number of women traveling, especially over long distances, with the number of men. It would appear from our responses, however, that men travel much more than women. Previous ethnographic studies have indicated that women tend to travel to nearby markets, and do it fairly often. In terms of interdepartmental travel, however, men traditionally tend to dominate. This pattern corresponds to much that we know of Inca custom, and probably reflects even more ancient traditions. The differential percentages of men and women who, during the survey, mentioned this purpose for using coca, would appear to confirm the survival of this tradition.

TABLE 85 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR TRAVELING, BY SEX

$X^2=69.21>X^2_{.005}(1)=7.879$ Significant

Sex	Yes %	No %	Totals %
Female n = 472	44.6	55.4	100
Male n = 2009	64.8	35.2	100
$\bar{x}$ n = 2481	61	39	100

Following our basic system of analysis, we now classify respondents who mentioned using coca for traveling by the type of work in which they engage. Those with the largest percentages turn out to be agriculturists and herders. The latter have been long known as inveterate travelers, especially those herders from the Altiplano of La Paz, Oruro, and Potosí. They have traditionally descended to the valleys with great llama herds carrying salt to exchange for corn and fruit.

It should be noted that between 40 and 55 per cent of surveyed miners (see Table 61), construction workers, craftsmen, merchants, and housewives also said that they use coca for traveling. During vacation, miners like to return to their communities of origin or to populated centers where they have relatives; construction workers travel from job to job as well as to their communities of origin; craftsmen travel offering their wares; merchants take merchandise from feria to feria or from town to town; and housewives travel to local and regional ferias to buy and sell. Surprisingly, few of those in transportation work said that they use coca for traveling. This might indicate that those we surveyed were not among the truckers who regularly travel long distances, with each trip spanning several days.

From many in depth interviews, we have consistent reports that truckers specializing in long distance transport practice the aculli to stay awake.

TABLE 86 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR TRAVELING, BY
TYPE OF WORK

$X^2=148.2>X^2_{.005}(12)=28.3$ Significant

	Agriculture	Herding	Transport	Crafts	Factory Worker	Construction	Merchant	House-wife	Student	Office Worker	Surface Miner	Shaft Miner	Teaching	Unspecified	X
	n = 1803	n = 148	n = 24	n = 57	n = 13	n = 38	n = 115	n = 220	n = 14	n = 21	n = 3	n = 6	n= 6	n = 13	n = 2481
Yes %	67	67	25	42	38	53	47	40	7	10	100	83	17	-	61
No %	33	33	75	58	62	47	53	60	93	90	-	17	83	-	39
Totals	%100	100	100	100	100	100	100	100	100	100	100	100	100	-	100

Through an analysis by age group of coca use for traveling we see that this custom, just as others already discussed, is apparently being maintained. There is a slight increase in percentages as we go up the age scale, with an inexplicable decline for the 65-74 age group. In general, this increase corresponds to that already noted for coca use per se with increase in age. But percentage differences between younger and older age groups is relatively small. As the individual accepts responsibilities and participates more actively in the economy, local as well as regional and national, it would appear that he travels more, and therefore, is more likely to use coca for this purpose. In other words, these slight differences probably reflect variance in the incidence of travel among the various age groups more than variance in the use of coca itself.

TABLE 87 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR TRAVELING, BY AGE GROUP

$X^2=33.654 > X^2_{.005}(6)=18.548$ Significant

	15-24 n=260	25-34 n=545	35-44 n=598	45-54 n=522	55-64 n=293	65-74 n=173	75-+ n=90	X n=2481
Yes %	53	55	62	66	69	61	71	61
No %	47	45	38	34	31	39	29	39
Totals %	100	100	100	100	100	100	100	100

In terms of the relationship between the use of coca for traveling and level of education, we see that it is the illiterate population which generates the highest percentage. This is precisely the population that most respects traditional culture and that has to travel repeatedly in order to fulfill family and community obligations. As level of education rises, it would appear that peasants/workers tend to abandon the custom. This is understandable, since those with higher levels of education tend to travel under more comfortable circumstances. Rarely do they walk for a period of several days, for example. Another consideration is that because one is exposed to urban or Hispanic observers on trips, many of those who practice the aculli in the privacy of the home or during public community occasions are ashamed to do so as they travel. Finally, the distribution reflects, in large measure, global differences as to use by level of education. People of higher educational levels use coca less for nearly all purposes.

TABLE 88 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR TRAVELING,
BY LEVEL OF EDUCATION

$X^2=145.44 > X^2_{.005}(5)=16.75$ Significant

	0 n=991	1-5 n=1206	6-8 n=225	9-12 n=49	R.N.S. n=8	U. n=2	X n=2481
Yes %	72	59	35	31	13	-	61
No %	28	41	65	69	87	100	39
Totals %	100	100	100	100	100	100	100

6. Use of Coca for Fiestas

In both rural communities and larger population centers, coca is customarily used for special occasions such a fiestas. The prestige enjoyed by coca on these occasions is second only to that of alcohol.

Coca is important for the entire peasant life cycle; it is considered a certificate of manners and good conduct in traditional circles. It plays an important role for those assuming regional or communal leadership, whether this be simply the organizer of a dance group, or the principal community or regional authority. When one is generous with coca on

these occasions, his potential for reaching a still higher position increases.

Within communities and working class neighborhoods of major cities, there are always at least some abstainers who, because of religious beliefs or simply because of personal preference, do not normally use coca. On occasions such as fiestas, however, they are obligated to supply coca if they want to be given the honor of leadership. Even if they themselves do not consume, they must see that others are well provided for. There are, of course, occasional exceptions. In some places, Evangelicals have won enough acceptance to be able to substitute pasankalla, candy, and cookies for coca. They use these items in an analogous manner to that in which coca is traditionally consumed. In general, however, coca is indispensible for fiestas and leadership in both Altiplano and valleys, and quantities must be substantial.

> "One arroba (25 pounds) lasts only four days during fiestas. A large number of people come together." 1/

A full arroba might be consumed during a single religious or civic feast in the valley of Cochabamba; by a group working on a road, constructing a house, or doing some other collective work; or during a single wake.

People from the valleys, in an effort to economize, have been the first to mix two qualities of coca for special occasions, i.e. high quality coca from La Paz with low quality coca from Cochabamba. By doing so, and by purchasing both at the best possible price, they can offer an abundance of coca at their fiestas, a symbol of prestige.

The quantity of coca which is offered for special occasions varies considerably from region to region, reflecting both the abundance of the product in the local market and the economic resources of the host. In the provinces of Muñecas and Franz Tamayo, for example, it is normal for a preste (fiesta host) to provide a cesto (25-30 pounds) of coca for two or three days of festivities. On the other hand, in the valley provinces of Murillo and Loayza, the amount provided rarely reaches half a cesto.

In the mining centers, coca consumption during feast days is completely different from that in peasant communities. Here there are no school officials, camanas, or other leaders of the traditional Amerindian type. There are only civic and religious fiestas, and although coca is used for these occasions, it is on a smaller scale than in peasant communities. Because mining companies provide housing and roads, no voluntary work groups are organized for building them, and so coca distribution for this purpose is unnecessary.

Customs vary in the Chaco region as well. Just as in the mines, the use of coca for special occasions is minimal. Coca is considered basically a source of energy for work or a fundamental element for home remedies.

In the tropical production areas of Yungas, coca is used for both civic and religious fiestas. These are similar to fiestas on the Altiplano; they are characterized by prestes, dance groups, and musicians. In the following table, detailing the relationship between mention of this use for coca and ecological region, we can appreciate the impact of some of these differences. It should be noted that 50 per cent of the miners we interviewed also said that they used coca for this purpose (see Table 61).

1/ Interview with Zacarías Toledo, 30, Changolla, Arque, Cochabamba.

TABLE 89 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR FIESTAS,
BY ECOLOGICAL REGION

$X^2=162.143 > X^2_{.005}(2)=10.597$ Significant

		Altiplano n = 1248	Valleys n= 745	Tropics n = 488	$\bar{X}$ n=2481
Yes	%	61	63	30	55
No	%	39	37	70	45
Totals	%	100	100	100	100

In analyzing this type of use by sex, we encounter response distributions which reflect the greater responsibility of men as hosts for fiestas and leaders of communal work. The contrast between the two sexes is relatively small, however, indicating, as is known from ethnographic studies, that women also assume a good deal of this type of responsibility.

TABLE 90 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR FIESTAS, BY SEX

$X^2=22.378 > X^2_{.005}(1)=7.879$ Significant

Sex	Yes %	No %	Totals %
Female n = 472	45.4	54.6	100
Male n = 2.009	57.5	42.5	100
$\bar{X}$ n = 2481	55	45	100

In the case of work typology, once again we see that the most conservative groups are agriculturalists and herders, followed, interestingly, by miners.

TABLE 91 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR FIESTAS, BY TYPE OF WORK

$X^2=103.028 > X^2_{.005}(12)=28.3$ Significant

		Agriculture n = 1803	Herding n = 148	Transport n = 24	Crafts n = 57	Factory Worker n = 13	Construction n = 38	Merchant n = 115	House-wife n = 220	Student n = 14	Office Worker n = 21	Surface Miner n = 3	Shaft Miner n = 6	Teaching n = 6	Unspecified n = 13	$\bar{X}$ n = 2481
Yes	%	60	62	29	2	46	39	42	37	-	29	100	67	17	x	55
No	%	40	38	71	98	54	61	58	63	100	71	-	33	83	x	45
Totals	%	100	100	100	100	100	100	100	100	100	100	100	100	100	x	100

There appears to be a more marked relationship between this type use and age than is the case with other uses for coca. We cannot interpret this to mean that the young have ceased using coca during fiestas, but rather that most fiesta sponsership and community leadership comes only after one is economically well established within the community, i.e. generally after age 30 to 35.

TABLE 92 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR FIESTAS
BY AGE GROUP

$X^2=31.053>X^2_{.005}(6)=18.548$ Significant

		15-24 n=260	25-34 n=545	35-44 n=598	45-54 n=522	55-64 n=293	65-74 n=173	75-+ n=90	X n=2481
Yes	%	45	50	57	61	61	60	58	55
No	%	55	50	43	39	39	40	42	45
Totals	%	100	100	100	100	100	100	100	100

Finally, Table 93 indicates that it is apparently the illliterate population that most maintain traditional customs. In part, this may reflect the fact that formal education tends to separate people from traditional customs, and, in part, the fact that better educated people tend to be younger, and therefore, have not yet started to assume ritual responsibilities within their communities.

TABLE 93 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR FIESTAS
BY LEVEL OF EDUCATION

$X^2=78.913>X^2_{.005}(5)=16.75$ Significant

		0 n=991	1-5 n=1206	6-8 n=225	9-12 n=49	R.N.S. n=8	U. n=2	X n=2481
Yes	%	63	53	39	22	13	-	55
No	%	37	47	61	78	87	100	45
Totals	%	100	100	100	100	100	100	100

7. Use of Coca for Conversation

In Andean social relationships, coca is important for breaking down social barriers and constitutes a sort of calling card. Sergio Quijada explains this quite well by saying:

> "Coca, acullicada or chakchada in small quantities, is the nexus and effective tie for weaving the fabric of sociability and fraternity among countrymen." 1/

1/ Quijada Jara, Sergio, Runa 4, Lima, Revista del Instituto Nacional de Cultura, July 1977.

According to the traditional norms of Andean culture, young people, having been incorporated into the community immediately after marriage, acquire specific rights and obligations and begin to relate as adults with people, both inside and outside their families. A peasant's ties run from his land to his community, from his community to the town, from Altiplano to valley and from valley to tropics, thus successively enlarging his territory and "weaving his network of sociability". In all of his relationships the handful of coca must come first.

According to the traditional pattern, if one family would ask a favor of another, coca must immediately follow the greeting. Only then can reasons for coming be explained. One respondent described the custom as follows:

> "In order to ask to rent silver vases to prepare the arc for the fiesta one necessarily uses coca. If we do not, they will not accept. And to those who visit us we aways have to offer the acullico; this is done out of respect". 1/

Such courtesies are so important that, on the Altiplano, generalized opinion holds that, without coca, intra-community respect would totally disappear.

In conflicts between families, when community authorities are trying to reconcile those involved, coca is first offered by the interested parties and then by the authorities themselves. Those in conflict, having recognized their faults and accepted their punishment, secure peace with a last acullico in the presence of the authorities. A favor is requested with coca, and it is returned with the same.

In the valleys, coca also plays an important role in intra-community social interaction - somewhat similar to the role of cigarettes within Western culture. People tend to start any conversation, be it for business or for mere social interchange, with coca. Not to offer coca is considered a lack of courtesy

The following opinion in widely shared:

> "Here in the country nothing can be done without coca - not even making friends. In order to find someone to help you with your work or in order to borrow something, a yoke, a donkey, a mule, or any animal, first we have to offer coca, even if it is broken coca or if it is the last few leaves shaken from our chuspa. If we did not do this, nothing could be borrowed; one could not even converse." 2/

In the valleys, just as on the Altiplano, coca is used for happy occasions as well as sad, in business as well as in friendship. Even social problems or inter-family conflicts are solved by the sharing of the aculli. Giving and receiving of coca by people in conflict signals the beginning of reconciliation. Coca is accepted as a symbol for conflict resolution.

1/ Interview with Pedro Sulcani, 43, Aroma province, La Paz.

2/ Interview with the leader of the ex-hacienda Oveja Cancha, Otuyo, Cornelio Saavedra, Potosi.

Almost any type of reciprocity may demand coca. One can ask a favor without coca only at great risk. As a general rule, if one looks for help, seeks a godfather, nominates a communal leader, or accepts communal responsibilities, it must always be with a handful of coca. Some appraisals as to the importance of coca in this respect were given by Altiplano people as follows:

> "Coca is important because we start any agricultural work with it; we are accustomed to it. In order to get laborers coca is important. The petition starts by giving coca. Now, those who do not practice the aculli should chew a few leaves out of respect and good manners. The rest they should take to their parents." 1/

> "We school mayors are four to five people. We always carry coca to give to those working on the school, to start their work as well as to finish it. We also spend coca on the inauguration of the building, on civic holidays, on Teacher's Day, and for any community work. Just as we give coca to those who work on community projects, each brings some when he works in a group." 2/

In the mining centers, coca use in social relationships is less important than among peasants/workers. It tends to be a tradition kept only by some of the older miners. The majority of both shaft and surface workers have substituted coca with beer, cigarettes, and alcohol.

Table 94 clearly shows that this type of use is concentrated in areas of Aymara or Quechua speaking traditional communities. There would appear to be some use of coca for reciprocity in the tropics, but considerably less than in these other two regions.

TABLE 94 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR CONVERSATION,
BY ECOLOGICAL REGION

$X^2=126.459>X^2_{.005}(2)=10.597$ Significant

	Altiplano n = 1248	Valley n = 745	Tropics n = 488	X n= 2481
Yes %	61	60	32	55
No %	39	40	68	45
Totals %	100	100	100	100

1/ Interview with Tomás Sillo, 49, peasant leader of the canton of Amarete, Bautista Saavedra, La Paz.

2/ Interview with R.P. and H.R., school mayors, Sampaya, Manco Kapac, La Paz.

When looking at the sex variable, we see that, just as with other purposes, men use it more for this one than do women. This would seem to reflect the fact that men take more initiative with regard to social relationships. Men more frequently recruit help, resolve conflicts and, in general, initiate social relationships between families.

TABLE 95 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR CONVERSATION,
BY SEX

$X^2=17.776>X^2_{.005}(1)=7.879$ Significant

Sex	Yes %	No %	Totals %
Female n = 472	46.5	53.5	100
Male n = 2,009	57.1	42.9	100
$\bar{X}$ n = 2481	55	45	100

In terms of work typology, we again see the conservativism of the two most traditional activities, agricultural work and herding, followed by construction and mining (see Table 61). It should be emphasized, however, that 79 per cent of the people we surveyed were involved in either agricultural work or herding. Among the population surveyed these two occupations are of prime importance. Therefore the use of coca within the occupations is of basic significance.

TABLE 96 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR CONVERSATION,
BY TYPE OF WORK

$X^2=85.856>X^2_{.005}(12)=28.3$ Significant

	Agriculture n = 1803	Herding n = 148	Transport n = 24	Crafts n = 57	Factory worker n = 13	Construction n = 38	Merchant n = 115	House-wife n = 220	Student n = 14	Office Worker n = 21	Surface Miner n = 3	Shaft Miner n = 6	Teaching n = 6	Unspecified n = 13	$\bar{X}$ n = 2481
Yes %	59	53	29	39	46	50	41	39	7	14	33	67	33	x	55
No %	41	47	71	61	54	50	59	61	93	86	67	33	67	x	45
Totals %	100	100	100	100	100	100	100	100	100	100	100	100	100	x	100

In terms of age groups and levels of education, it would appear that the young are beginning to use coca for this purpose, except in the case of the best educated who, because of their education, seem not to be taking to the traditional pattern. The illiterate population again emerges as the most conservative group.

TABLE 97 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR CONVERSATION,
BY AGE GROUP

$X^2=48.24>X^2_{.005}(6)=18.548$ Significant

	15-24 n=260	25-34 n=545	35-44 n=598	45-54 n=522	55-64 n=293	65-74 n=173	75-+ n=90	$\bar{X}$ n=2481
Yes %	42.4	48.4	54.3	62.5	59.4	63.6	65.6	55
No %	57.6	51.6	45.7	37.5	40.6	36.4	34.4	45
Totals %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

TABLE 98 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR CONVERSATION,
BY LEVEL OF EDUCATION

$X^2=107.045>X^2_{.005}(5)=16.75$ Significant

	0 n=991	1-5 n=1206	6-8 n=225	9-12 n=49	R.N.S. n=8	U. n=2	$\bar{X}$ n=2481
Yes %	65	52	36	22	-	-	55
No %	35	48	64	78	100	100	45
Totals %	100	100	100	100	100	100	100

8. Use of Coca for Staying Awake

Among peasants, the use of coca to stay awake would occur on only a few occasions throughout the year, and always in connection with some traditional custom or with some agricultural or herding duty. Thus it is that, when we correlate the reported use of coca for staying awake with ecological zones, we see that it was mentioned by peasants/workers in the valleys more than by those in either the tropics or the Altiplano. This could be explained by the demands of valley agriculture. Due to the shortage of water, a peasant living in valleys often must wait for his neighbor to finish irrigating before he can direct water to his own crops. This often has to be done at night. During the first months after planting, this commonly is a recurrent situation.

The other principal reasons for using coca to keep awake are related basically to the cycle of traditional religious acts, all of which tend to last all night. A classic example would be the wake, where the quantity of coca used can be impressive:

"During wakes we chew (acullicamos) coca all night. The family of the deceased has to provide about three kilos to pass the night with relatives and friends. For the whole funeral, they have to have about twelve kilos. You chew a lot on these occasions." 1/

TABLE 99 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR STAYING AWAKE,
BY ECOLOGICAL REGION

$X^2=42.135 > X^2_{.005}(2)=10.597$ Significant

	Altiplano n = 1248	Valleys n= 745	Tropics n = 488	X n=2481
Yes %	46	60	45	50
No %	54	40	55	50
Totals %	100	100	100	100

Given the fact that coca is a stimulant, its use to ward off sleep is, although based only on practical experience, totally logical. Table 100 indicates that a somewhat higher percentage of men mention using coca for this purpose than do women. Although both participate in the nocturnal rituals so characteristic of rural life, it is generally men who have to engage in nocturnal agricultural work.

TABLE 100 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR STAYING AWAKE,
BY SEX

$X^2=13.563 > X^2_{.005}(1)=7.879$ Significant

Sex	Yes %	No %	Totals %
Female n = 472	42.5	57.5	100
Male n = 2.009	52.0	48.0	100
X n = 2481	50	50	100

The following table, relating use of coca for staying awake with work typology, shows clearly that agricultural workers and herders are those who most feel the need of coca for this purpose. The nine cases of peasants/workers who labor in mines are not, as we have repeatedly emphasized, representative of that activity in general. Among professional miners, we see that only 11 per cent reported using coca for this purpose. Much higher are the percentages representing responses of craftsmen, factory workers, construction workers, merchants, and even housewives and office workers.

1/ Interview with Máximo Rizo, San Vicente, Sud Chichas, Potosí.

TABLE 101 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR STAYING AWAKE, BY TYPE OF WORK

$X^2=38.303>X^2_{.005}(12)=28.3$ Significant

	Agriculture n = 1803	Herding n = 148	Transport n = 24	Crafts n = 57	Factory Worker n = 13	Construction n = 38	Merchant n = 115	House-wife n = 220	Student n = 14	Office Worker n = 21	Surface Miner n = 3	Shaft Miner n = 6	Teaching n = 6	Unspecified n = 13	X n = 2481
Yes %	53	50	29	42	54	45	43	42	21	38	67	67	-	x	50
No %	47	50	71	58	46	55	57	58	79	62	33	33	100	x	50
Totals %	100	100	100	100	100	100	100	100	100	100	100	100	100	x	100

When correlating age groups with this purpose for coca use, we find little contrast. All groups approximate an arithmetic average of 50 per cent.

TABLE 102 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR STAYING AWAKE,
BY AGE GROUP

$X^2=24.109>X^2_{.005}(6)=18.548$ Significant

	15-24 n=260	25-34 n=545	35-44 n=598	45-54 n=522	55-64 n=293	65-74 n=173	75-+ n=90	X n=2481
Yes %	42	45	52	56	51	51	59	50
No %	58	55	48	44	49	49	41	50
Totals %	100	100	100	100	100	100	100	100

In terms of level of education, the basic clue would seem to be work typology. People with less formal education tend to engage in that type of work characterized by nocturnal vigils, such as agriculture and herding; those with higher levels of education tend to have strictly diurnal occupations. The contrast in the percentages found in Tables 102 and 103 indicates that education is affecting traditional patterns more than age per se. It is not that the young are abstaining from certain uses of coca, but that the educated are. As long as one remains in his community, he is forced to participate in customary work and ritual, much of which must be carried out at night. But with higher levels of education, many leave their communities and, in leaving, are relieved of such customs and responsibilities.

TABLE 103 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR STAYING AWAKE,
BY LEVEL OF EDUCATION
$X^2=80.118>X^2_{.005}(5)=16.75$ Significant

	0 n=991	1-5 n=1206	6-8 n=225	9-12 n=49	N.R. n=8	U n=2	X n=2481
Yes %	60	46	33	43	13	-	50
No %	40	54	67	57	87	100	50
Totals %	100	100	100	100	100	100	100

9. Use of Coca for Receiving Visits

Among the most important elements for social interaction on the Altiplano and in the valleys is the coca leaf. In terms of traditional patterns, it is indispensible for both courtesy and good conduct.

Coca is used to receive visitors as well as to visit. Immediately after the greeting, coca must be reciprocally exchanged.Only then does conversation begin and are the reasons for the visit given. Traditionally, a person who goes visiting and does not take coca is treated with indifference; by the same taken, one who does not offer coca to a visitor is considered to be dishonest. Even people who do not regularly practice the aculli keep coca in their homes in order not to lose face.

Almost 50 per cent of the individuals surveyed reported using coca for receiving guests. This fact in itself demonstrates the vitality still enjoyed by the custom. It is most strongly rooted, naturally in those places where Aymara and Quechua traditions remain the most entrenched, i. e. on the Altiplano and in the valleys.

TABLE 104 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR RECEIVING VISITORS,
BY ECOLOGICAL REGION
$X^2=95.101>X^2_{.005}(2)=10.597$ Significant

	Altiplano n = 1248	Valley n = 745	Tropics n = 488	X n =2481
Yes %	55	51	29	49
No %	45	49	71	51
Totals %	100	100	100	100

Both men and women perpetuate the custom. Table 105 shows that 41 4 per cent of all women surveyed reported using coca for this purpose, and 50.5 per cent of the men did so. The difference is easily explained by the fact that, by tradition, men communicate more than do women with the world outside the home.

TABLE 105 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR RECEIVING VISITORS, BY SEX

$X^2=12.828>X^2_{.005}(1)=7.879$ Significant

Sex	Yes %	No %	Totals %
Female n = 472	41.4	58.6	100
Male n = 2009	50.5	49.5	100
$\underline{X}$ n = 2481	49	51	100

In terms of work typology, we see a pattern very similar to others having to do with traditionalism. Peasants involved in agriculture and herding, the two most traditional occupations, are those who follow this custom with the most dedication.

TABLE 106 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR RECEIVING VISITORS,
BY TYPE OF WORK

$X^2=83,8>X^2_{.005}(12)=28.3$ Significant

	Agriculture n = 1803	Herding n = 148	Transport n = 24	Crafts n = 57	Factory Worker n = 13	Construction n = 38	Merchant n = 115	House-wife n = 220	Student n = 14	Office Worker n = 21	Surface Miner n = 3	Shaft Miner n = 6	Teaching n = 6	Unspecified n = 13	$\underline{X}$ n = 2481
Yes %	53	55	17	44	31	42	36	33	-	14	33	67	17	x	49
No %	47	45	83	56	69	58	64	67	100	86	67	33	83	x	51
Totals %	100	100	100	100	100	100	100	100	100	100	100	100	100	x	100

Percentages obtained in terms of age group and level of education confirm this relationship between traditionalism and the use of coca for receiving visitors. It is evident that people who have more traditional responsibilities are those who most maintain the custom.

TABLE 107 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR RECEIVING VISITORS, BY AGE GROUP

$X^2=20.73>X^2_{.005}(6)=18.548$ Significant

	15-24 n=260	25-34 n=545	35-44 n=598	45-54 n=522	55-64 n=293	65-74 n=173	75-+ n-90	$\underline{x}$ n=2481
Yes %	41	45	47	55	48	57	58	49
No %	59	55	53	45	52	43	42	51
Totals %	100	100	100	100	100	100	100	100

TABLE 108 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR RECEIVING VISITORS,
BY LEVEL OF EDUCATION

$X^2=110.37>X^2_{.005}(5)=16.75$ Significant

	0 n=991	1-5 n=1206	6-8 n=225	9-12 n=49	R.N.S. n=8	U. n=2	X n=2481
Yes %	59	45	30	16	-	-	48
No %	41	55	70	84	100	100	52
Totals %	100	100	100	100	100	100	100

10. Use of Coca for Family Ritual

Many people alien to traditional culture suffer from the erroneous belief that superstition has been overcome through the creation of rural schools throughout the country. However, in rural communities of the Altiplano, valleys, and to a lesser degree the tropics, practically all traditional religious rituals persist today with only small variations, and are quite seriously practiced. What has happened is that, because many of the ceremonies that were carried out in public a number of years ago were criticized as uncivilized actions of ignorant and illiterate people, little by little they have changed in character from public acts to acts of a strictly family nature. What was once done in plain sight is now executed within the home and under the cover of night. Many of the rituals, of course, have always been private and nocturnal, and these continue to be so.

No traditional Andean ritual or ceremony can be conducted without abundant coca. First of all, those who attend have to engage in the aculli under the direction of the yatiri, i.e. the ritual leader. Second, coca is indispensible in the preparation of the diverse offerings or masses directed to tutelary spirits, place spirits, spirits of the ancestors, the pachamama or goddess of the earth, and/or offered as thanksgiving for good crops, good health, and abundant herds and flocks. Third, without coca, the future cannot be foretold nor maledictions removed. Coca is "chewed" (acullicada) by all present, burned generously as a part of the spirit offerings, or fed to animals in the case of fertility rites. Abundance of coca, alcohol, and food must be present on these occasions because it symbolizes the well being of the people raising the petition. Without coca, rituals and ceremonies would be invalid.

Use of coca for these purposes is so common that many of those we surveyed did not even mention it. The following comment is typical. After mentioning a series of uses for coca, Francisco Rocha, from Chuquisaca, simply added:

> "Coca is also needed as offering to the virgins" (in reference to the pachamama). 1/

Coca also characterizes the ritual of miners, whether they work in the shafts or on the surface. In the words of one miner:

1/ Interview with Francisco Rocha, 46, San Pedro, Azurduy, Chuquisaca.

> "We always enter the mine with coca and alcohol. Before we start working we have to offer a libation (ch'allar) to the 'tios' especially on Fridays. We scatter a preparation of alcohol and coca, and then give some to the serenos (echoes). When we do this, luck accompanies us. If we do not, the vein disappears. When one does not treat the tios well, it goes poorly for him in the mine. Rocks crush him and sometimes there are bad landslides." 1/

The tables which follow demonstrate that a large proportion of the peasant/worker population still hold to these beliefs. Again we see the repetition of common patterns. Traditionalists have traditional occupations. Men mention such use more than do women. The Altiplano and valleys show identical patterns, and people in the tropics follow the tradition least of all. Finally, weakening in the tradition relates more to level of education than to age.

TABLE 109 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR FAMILY RITUAL,
BY ECOLOGICAL REGION

$X^2=40.78>X^2_{.005}(2)=10.597$ Significant

	Altiplano n = 1248	Valley n = 745	Tropics n = 488	X n = 2481
Yes %	49	49	33	46
No %	51	51	67	54
Totals %	100	100	100	100

TABLE 110 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR FAMILY RITUAL,
BY SEX

$X^2=16.84>X^2_{.005}(1)=7.879$ Significant

Sex	Yes %	No %	Totals %
Female n = 472	37.6	62.4	100
Male n = 2.009	48.0	52.0	100
X n = 2481	46	54	100

1/ Interview with Justo Massi Tapalluni, 38, Aucapata, Mina San José, Ayata, Muñecas, La Paz.

TABLE 111

PEASANTS/WORKERS - USERS

FOR WHAT DO YOU USE COCA? FOR FAMILY RITUAL, BY TYPE OF WORK.

$X^2=57.3>X^2_{.005}(12)=28.3$ Significant

	Agriculture n = 1803	Herding n = 148	Transport. n = 24	Crafts n = 57	Factory Worker n = 13	Construction n = 38	Merchant n = 115	Housewife n = 220	Student n = 14	Office worker n = 21	Surface Miner n = 3	Shaft Miner n = 6	Teaching n = 6	Unspecified n = 13	X n = 2481
Yes %	49	52	29	40	39	42	40	29	7	19	67	50	17	x	46
No %	51	48	71	60	61	58	60	71	93	81	33	50	83	x	54
Totals %	100	100	100	100	100	100	100	100	100	100	100	100	100	x	100

TABLE 112

PEASANT/WORKERS - USERS

FOR WHAT DO YOU USE COCA? FOR FAMILY RITUAL, BY AGE GROUP.

$X^2=52.88>X^2_{.005}(6)=18.548$ Significant

	15-24 n=260	25-34 n=545	35-44 n=598	45-54 n=522	55-64 n=293	65-74 n=173	75-+ n= 90	X n= 2481
Yes %	29	41	48	49	52	53	61	46
No %	71	59	52	51	48	47	39	54
Totals %	100	100	100	100	100	100	100	100

TABLE 113

PEASANTS/WORKERS - USERS

FOR WHAT DO YOU USE COCA? FOR FAMILY RITUAL, BY LEVEL OF EDUCATION

$X^2=66.09>X^2_{.005}(5)=16.75$ Significant

	0 n=991	1-5 n=1206	6-8 n=225	9-12 n=49	N.R. n=8	U. n=2	X n=2481
Yes %	55	42	34	22	25	-	46
No %	45	58	66	78	75	100	54
Totals %	100	100	100	100	100	100	100

Qualitative anthropological work would probably indicate that percentages appearing in these tables are too low. One rarely finds a peasant or miner family that does not resort to traditional rituals in times of illness, to avoid bad luck, or for protection in the future. The actual percentage of the population which still uses coca for such purposes will probably be clarified by future research. In the meantime, we shall have to content ourselves with the responses herein reported. At the same time, we should remember that if coca is an indispensible element for obtaining and maintaining protection of spirits and gods, the lack of coca might prove to be deeply traumatic for most of the Bolivian population whose faith stems from pre-Columbian Andean traditions.

11. Use of Coca for Divination

For yatiris (wise men) in every traditional region of Bolivia, life without coca would be unthinkable. Without coca it would be impossible for the yatiri to predict the future for clients and community. It would be impossible to tell what illness his client had or how to cure it. It would be impossible to interpret the punishment of the pachamama, of tutelary spirits, or of other protective gods. Without coca, the great majority of peasants would have nothing to resort to when accosted by the many types of calamity that befall them.

There are two ways of using coca in divination. The first is for relatively unimportant things, or for the immediate needs of family members. For this, some member of the family, not necessarily an expert, can consult the leaves.

The second involves consulting an expert for formal and/or very important affairs, such as the identification of a thief, the lifting of a hex, or the diagnosis of a serious illness. The leaves can be read either formally or informally. If formal, a special format is prepared, on the basis of which cast leaves are then interpreted. If informal, at any time and under any circumstance the specialist may take a few leaves in his hand and predict the fortune of anyone present.

Divination can take a variety of forms. Even the flavor of the bolus can have meaning. If coca is sweet, luck will be good; if it is bitter, it will be the contrary.

The technique for reading leaves, as practiced by yatiris, is exceedingly complex; it is a system of complete internal logic. Altough the details are quite fascinating, we cannot here, for lack of space and time, describe them. Suffice it to note that a considerable percentage of our surveyed population reported the use of coca for divination, and, when they did so, they probably did not include their consultation with specialists. Among peasants, the person who does not resort to coca to confront at least some of his problems is very rare.

This custom is, of course, much more developed among Aymara and Quechua speakers than among Hispanics living in the tropics. Even here, however, there would appear to be quite a number of people who believe in this form of problem solving.. This can be appreciated from the following table:

TABLE 114 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR DIVINATION
BY ECOLOGICAL REGION

$X^2=95.8>X^2_{.005}(2)=10.597$ Significant

	Altiplano n = 1248	Valley n=745	Tropics n= 488	X n=2481
Yes %	46	54	26	44
No %	54	46	74	56
Totals %	100	100	100	100

Men again would appear to be more active than women in this use of coca. This may be related to the fact that they are generally more responsible for the welfare of the family, especially in affairs having to do with relationships to the outside world.

TABLE 115 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR DIVINATION,
BY SEX

$X^2=26.4>X^2_{.005}(1)=7.879$ Significant

Sex	Yes %	No %	Totals %
Female n = 472	33.8	66.2	100
Male n = 2.009	46.9	53.1	100
X n = 2481	44	56	100

In terms of type of work and level of education, we see patterns very similar to others which have emerged in connection with the maintenance of Andean culture. People who have more traditional occupations are more conservative; they also have the least amount of formal education.
The percentage of people between 25 and 34 who reported the use of coca for divination-in other words of the first age group in which nearly all members have assumed adult roles - is nearly as nigh as that among their elders. It would appear, then, that there is almost no evidence of a disappearance of coca use for divination among the young.

TABLE 116

PEASANTS/WORKERS - USERS

FOR WHAT DO YOU USE COCA? FOR DIVINATION, BY TYPE OF WORK

$X^2=42.15>X^2_{.005}(12)=28.3$ Significant

	Agriculture n = 1803	Herding n = 148	Transport n = 24	Craft n = 57	Factory Worker n = 13	Construction n = 38	Merchant n = 115	Housewife n = 220	Student n = 14	Office Worker n = 21	Surface Miner n = 3	Shaft Miner n = 6	Teaching n = 6	Unspecified n = 13	$\bar{X}$ n = 2481
Yes %	49	41	25	33	23	32	30	30	-	24	67	83	17	x	44
No %	51	59	75	67	77	68	70	70	100	76	33	17	83	x	56
Totals %	100	100	100	100	100	100	100	100	100	100	100	100	100	x	100

TABLE 117

PEASANTS/WORKERS - USERS.

FOR WHAT DO YOU USE COCA? FOR DIVINATION, BY LEVEL OF EDUCATION

$X^2=108.94>X^2_{.005}(5)=16.75$ Significant

	0 n=991	1-5 n=1206	6-8 n=225	9-12 n=49	N.R. n=8	U. n=2	$\bar{X}$ n=2481
Yes %	54	42	21	16	13	-	44
No %	46	58	79	84	87	100	56
Totals %	100	100	100	100	100	100	100

TABLE 118

PEASANTS/WORKERS - USERS.

FOR WHAT DO YOU USE COCA? FOR DIVINATION, BY AGE GROUP

$X^2=27.43>X^2_{.005}(6)=18.548$ Significant

	15-24 n=260	25-34 n=545	35-44 n=598	45-54 n=522	55-64 n=293	65-74 n=173	75-+ n=90	$\bar{X}$ n=2481
Yes %	31	43	45	49	49	49	46	44
No %	69	57	55	51	51	51	54	56
Totals %	100	100	100	100	100	100	100	100

12. Use of Coca for Resting

The fact that a small percentage of our respondents spoke of using coca for resting probably means that they associate it with the aculli break. As discussed in previous sections, it is customary to take a short mid-morning and mid-afternoon break to rest and to renew one's bolus.

Anyone making a long trip on foot takes periodic rest breaks. He also takes advantage of this break to discard his old bolus and form a new one. Resting may simply mean sitting down, changing one's bolus, and practicing the aculli. It may mean practicing the aculli alone, or in conversation with others. Coca may also be used as something of a stimulant for meditation, in the ways that certain Westerners turn to their pipe.

The following five tables correlate reported use of coca for resting with each of the five variables upon which we have based our analysis The percentages are, in general, lower than those presented previously for other uses; they do, however, follow already established patterns.

TABLE 119 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR RESTING,
BY ECOLOGICAL REGION

$X^2=75.41, X^2_{.005}(2)=10.597$ Significant

	Altiplano n = 1248	Valley n= 745	Tropics n = 488	X n=2481
Yes %	35	47	23	36
No %	65	53	77	64
Totals %	100	100	100	100

TABLE 120

PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR RESTING, BY SEX

$X^2=35.39, X^2_{.005}(1)=7.879$ Significant

Sex	Yes %	No %	Totals %
Female n = 472	24.3	75.7	100
Male n = 2009	39.0	61.0	100
$\bar{X}$ n = 2481	36	64	100

TABLE 121 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR RESTING,
BY TYPE OF WORK

$X^2=87.7 > X^2_{.005}(12)=28.3$ Significant

		Agriculture n= 1803	Harding n= 148	Transport n= 24	Crafts n= 57	Factory Worker n= 13	Construction n= 38	Merchant n= 115	House-wife n= 220	Student n= 14	Office Worker n= 21	Surface Miner n= 3	Shaft Miner n= 6	Teaching n= 6	Unspecified n= 13	$\bar{X}$ n= 2481
Yes	%	41	31	12	19	15	40	17	25	-	-	33	33	-	x	36
No	%	59	69	88	81	85	60	83	75	100	100	67	67	100	x	64
Totals	%	100	100	100	100	100	100	100	100	100	100	100	100	100	x	100

TABLE 122

PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR RESTING, BY AGE GROUP

$X^2=18.768 > X^2_{.005}(6)=18.540$ Significant

		15-24 n=260	25-34 n=545	35-44 n=598	45-54 n=522	55-64 n=293	65-74 n=173	75-+ n=90	$\bar{x}$ n=2481
Yes	%	30	33	34	39	35	46	42	36
No	%	70	67	66	61	65	54	58	64
Totals	%	100	100	100	100	100	100	100	100

TABLE 123 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR RESTING,
BY LEVEL OF EDUCATION

$X^2=106.52>X^2_{.005}(5)=16.75$ Significant

	0 n=991	1-5 n=1206	6-8 n=225	9-12 n=49	R.N.S. n=8	U. n=2	X n=2481
Yes %	47	32	20	10	-	-	36
No %	53	68	80	90	100	100	64
Totals %	100	100	100	100	100	100	100

13. Use of Coca as a Digestive aid

On the Altiplano, in the valleys, and, to a lesser degree, in the tropics, use of the aculli following meals has two simple explanations:

a. People who habitually practice the aculli sometimes turn to coca as a slight digestive aid after eating. Users of both sexes indicate that they employ coca for this purpose.

b. People who do not habitually practice the aculli but who do consume coca in other ways, may turn to the aculli after eating if they have "sonake" (gastro-intestinal disorders). This type of disorder is normally attributed to having eaten boiled potatoes and quinua outside regular meal times and without the usual digestive aid for non-acullicadores, i.e. chuño.

Reported distribution patterns for this use of coca again seem to be closely related to respondents' degree of traditionalism (see following tables).

TABLE 124 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? TO AID DIGESTION
AFTER EATING, BY ECOLOGICAL REGION

$X^2=60.67>X^2_{.005}(2)=10.597$ Significant

	Altiplano n =1248	Valley n= 745	Tropica n= 488	X n= 2481
Yes %	31	41	20	32
No %	69	59	80	68
Totals %	100	100	100	100

TABLE 125

PEASANTS/WORKERS - USERS

FOR WHAT DO YOU USE COCA? TO AID DIGESTION AFTER EATING, BY SEX.

$X^2=21.21>X^2_{.005}(1)=7.879$ Significant

SEX	Yes %	No %	Totals %
Female n = 472	23,4	76,6	100
Male n = 2009	34,3	65,7	100
$\bar{X}$ n = 2481	32	68	100

TABLE 126

PEASANTS/WORKERS - USERS

FOR WHAT DO YOU USE COCA? TO AID DIGESTION AFTER EATING, BY TYPE OF WORK.

$X^2=87.2>X^2_{.005}(12)=28.3$ Significant

	Agriculture n = 1803	Herding n = 148	Transport n = 24	Crafts n = 57	Factory Worker n = 13	Construction n = 38	Merchant n = 115	Housewife n = 220	Student n = 14	OfficeWorker n = 21	Surface Miner n = 3	Shaft Miner n = 6	Teaching n = 6	Unspecified n = 13	$\bar{X}$ n = 2481
Yes %	36	38	4	19	31	18	11	19	-	5	-	67	-	x	32
No %	64	62	96	81	69	82	89	81	100	95	100	33	100	x	68
Totals %	100	100	100	100	100	100	100	100	100	100	100	100	100	x	100

TABLE 127

PEASANTS/WORKERS - USERS

FOR WHAT DO YOU USE COCA? TO AID DIGESTION AFTER EATING, BY AGE GROUP

$X^2=65.13>X^2_{.005}(6)=18.548$ Significant

	15-24 n=260	25-34 n=545	35-44 n=598	45-54 n=522	55-64 n=293	65-74 n=173	75-+ n=90	$\bar{X}$ n=2481
Yes %	22.0	25.9	28.6	36.1	41.6	46.2	46.7	32
No %	70.0	74.1	71.4	63.9	58.4	53.8	53.3	68
Totals %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

TABLE 128 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? TO AID DIGESTION AFTER EATING, BY LEVEL OF EDUCATION
$X^2=159.28>X^2_{.005}(5)=16.75$ Significant

	0 n=991	1-5 n=1206	6-8 n=225	9-12 n=49	R.N.S. n=8	U. n=2	$\bar{X}$ n=2481
Yes %	45	26	12	8	-	-	32
No %	55	74	88	92	100	100	68
Totals %	100	100	100	100	100	100	100

14. Use of Coca for Sleeping

Use of the aculli for sleeping is so common among miners that one might conclude that they use it as a relaxant after a hard day's work in the mine. Such use is much rarer among peasants. Not even the most dedicated peasant coca user normally retires with a bolus in his cheek. The only reason he might use it in conjunction with sleep is as a remedy for illness. Victims of internal injuries, for example, or of severe blows suffered in a drunken brawl, have found in the aculli easy solace for their aches and pains. Those with internal injuries tell, for example, that after sleeping with the bolus in the mouth they have discarded it the following morning and discovered that it had an exceedingly foul odor. This being so, they have known that their injuries "have been absorbed by the bolus", and immediately begin to feel better.

Despite the low percentages of respondents reporting this use of coca, it should be seen as important because it can represent a variant on the medicinal use of the leaf. Among miners, of whom 31 per cent reported using coca for this purpose, the incidence seems to be considerably greater.

TABLE 129 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR SLEEPING, BY ECOLOGICAL REGION
$X^2=17.87>X^2_{.005}(2)=10.597$ Significant

	Altiplano n = 1248	Valley n =745	Tropics n= 488	$\bar{X}$ n= 2481
Yes %	18	18	10	16
No %	82	82	90	84
Totals %	100	100	100	100

TABLE 130

PEASANTS/WORKERS - USERS

FOR WHAT DO YOU USE COCA? FOR SLEEPING, BY SEX.

$X^2=10.13>X^2_{.005}(1)=7.879$ Significant

SEX	Yes %	No %	Totals %
Female n = 472	11.5	88.5	100
Male n = 2009	17.5	82.5	100
$\bar{X}$ n = 2481	16	84	100

TABLE 131

PEASANTS/WORKERS - USERS

FOR WHAT DO YOU USE COCA? FOR SLEEPING, BY TYPE OF WORK.

$X^2=41.64>X^2_{.005}(12)=28.3$ Significant

	Agriculture n = 1803	Herding n = 148	Transportation n = 24	Crafts n = 57	Factory Worker n = 13	Construction n = 38	Merchant n = 115	Housewife n = 220	Student n = 14	Office Worker n = 21	Surface Miner n = 3	Shaft Miner n = 6	Teaching n = 6	Unspecified n = 13	$\bar{X}$ n = 2481
Yes %	19	20	8	14	-	12	6	9	-	-	33	50	-	x	16
No %	81	80	92	86	100	88	94	91	100	100	67	50	100	x	84
Totals %	100	100	100	100	100	100	100	100	100	100	100	100	100	x	100

TABLE 132

PEASANTS/WORKERS - USERS

FOR WHAT DO YOU USE COCA? FOR SLEEPING, BY AGE GROUP.

$X^2=58.38>X^2_{.005}(6)=18.548$ Significant

	15-24 n=260	25-34 n=545	35-44 n=598	45-54 n=522	55-64 n=293	65-74 n=173	75-+ n=90	$\bar{X}$ n=2481
Yes %	10.8	10.0	13.9	20.5	20.5	28.3	28.9	16
No %	89.2	90.0	86.1	79.5	79.5	71.7	71.1	84
Totals %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

TABLE 133 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR SLEEPING,
BY LEVEL OF EDUCATION

$X^2=143>X^2_{.005}(5)=16.75$ Significant

	0 n=991	1-5 n=1206	6-8 n=225	9-12 n=49	R.N.S. n=8	U. n=2	$\bar{X}$ n=2481
Yes %	27	10	5	8	-	-	16
No %	73	90	95	92	100	100	84
Totals %	100	100	100	100	100	100	100

15. Use of Coca for Drinking

Very few of our respondents mentioned the remaining reported uses for coca: drinking and sorrow. The only reason we present the corresponding data is that these purposes appear to be valid, at least for the few who mentioned them. The data, however, should be interpreted with caution. In the first place, we never encountered a single individual who purposely began the aculli as a prelude to drink.

The relationship between the two substances would rather appear to be their use on the same occasions; this simultaneity can be seen in both rituals and religious and civic fiestas. In the valleys and the tropics, the combination can be seen in addition on purely social occasions.

TABLE 134 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR DRINKING,
BY ECOLOGICAL REGION

$X^2=2.31<X^2_{.05}(2)=5.991$ Not Significant

	Altiplano n = 1248	Valley n =745	Tropics n= 488	$\bar{X}$ n=2481
Yes %	2	2	1	2
No %	98	98	99	98
Totals %	100	100	100	100

TABLE 135

PEASANTS/WORKERS - USERS

FOR WHAT DO YOU USE COCA? FOR DRINKING, BY SEX.
$X^2=9.95>X^2_{.005}(1)=7.879$ Significant

Sex	Yes %	No %	Totals %
Female	-	100	100
n = 472	-	100	100
Male			
n = 2009	2.2	97.8	100
$\bar{X}$ n = 2481	2	98	100

TABLE 136

PEASANTS/WORKERS - USERS

FOR WHAT DO YOU USE COCA? FOR DRINKING, BY TYPE OF WORK.
$X^2=11.19<X^2_{.05}(12)=21.026$ Not Significant

		Agriculture n = 1803	Herding n = 148	Transportation n = 24	Crafts[illegible] n = 57	Factory Worker n = 13	Construction n = 38	Merchant n = 115	Housewife n = 220	Student n = 14	Office Worker n = 21	Surface Miner n = 3	Shaft Miner n = 6	Teaching n = 6	Unspecified n = 13	$\bar{X}$ n = 2481
Yes	%	2	2	-	-	-	-	-	-	-	-	-	17	-	x	2
No	%	98	98	100	100	100	100	100	100	100	100	100	83	100	x	98
Totals	%	100	100	100	100	100	100	100	100	100	100	100	100	100	x	100

TABLE 137

PEASANTS/WORKERS - USERS

FOR WHAT DO YOU USE COCA? FOR DRINKING, BY AGE GROUP.

$X^2=36.62>X^2_{.005}(6)=18.548$ Significant

		15-24 n=260	25-34 n=545	35-44 n=598	45-54 n=522	55-64 n=293	65-74 n=173	75+ n=90	$\bar{X}$ n=2481
Yes	%	1	1	1	1	1	6	6	2
No	%	99	99	99	99	99	94	94	98
Totals	%	100	100	100	100	100	100	100	100

TABLE 138 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR DRINKING, BY LEVEL OF EDUCATION

$X^2=14.37>X^2_{.025}(5)=12.832$ Significant

	0 n=991	1-5 n=1206	6-8 n=225	9-12 n=49	R.N.S. n=8	U. n=2	X n=2481
Yes %	3	1	0.5	2	-	-	2
No %	97	99	99.5	98	100	100	98
Totals %	100	100	100	100	100	100	100

16. Use of Coca for Sorrow

We were surprised at the small number of respondents who mentioned using coca for sorrow. In our qualitative interviews with users, we were told repeatedly of how individuals sought solace in the aculli. This was especially true of widows who talked of their grief upon losing their husbands, and of how they resorted to coca in order to cope with their situation. For some reason this type of information did not emerge in our formal survey. It should be remembered that we never asked individuals whether they used coca for X purpose. The purposes given were chosen by the respondents themselves, with no suggestions from us. All that we can conclude is that, although we know from other sources that users employ coca for this purpose, it evidently is not among the more important ones in their own minds.

TABLE 139 PEASANTS/WORKERS - USERS
FOR WHAT DO YOU USE COCA? FOR SORROW, BY ECOLOGICAL REGION

$X^2=3.99<X^2_{.05}(2)=5.991$ Not Significant

	Altiplano n = 1248	Valley n =745	Tropics n = 488	X n = 2481
Yes %	1	2	1	1
No %	99	98	99	99
Totals %	100	100	100	100

TABLE 140

PEASANTS/WORKERS - USERS

FOR WHAT DO YOU USE COCA? FOR SORROW, BY SEX

$X^2=2.38<X^2_{.05}(1)=3.841$ Not Significant

SEX	YES %	NO %	Totals
Female n = 472	0.6	99.4	100
Male n = 2009	0.8	99.2	100
$\bar{X}$ n = 2481	1	99	100

TABLE 141

PEASANTS/WORKERS - USERS

FOR WHAT DO YOU USE COCA? FOR SORROW, BY TYPE OF WORK.

$X^2=4.27<X^2_{.05}(12)=21.026$ Not Significant

	Agriculture n = 1803	Herding n = 148	Transport n = 24	Crafts n = 57	Factory Worker n = 13	Construction n = 38	Merchant n = 115	Housewife n = 220	Student n = 14	Office Worker n 21	Surface Miner n = 3	Shaft miner n = 6	Teaching n = 6	Unspecified n = 13	$\bar{X}$ n = 2481
Yes %	1	1	-	4	-	-	-	-	-	-	-	17	-	x	1
No %	99	99	100	96	100	100	100	100	100	100	100	83	100	x	99
Totals %	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

TABLE 142

PEASANTS/WORKERS - USERS

FOR WHAT DO YOU USE COCA? FOR SORROW, BY AGE GROUP.

$X^2=4.79<X^2_{.05}(6)=12.592$ Not Significant

	15-24 n=260	25-34 n=545	35-44 n=598	45-54 n=522	55-64 n=293	65-74 n=173	75-+ n=90	$\bar{X}$ n=2481
Yes %	-	1	1	1	1	1	-	1
No %	100	99	99	99	99	99	100	99
Totals %	100	100	100	100	100	100	100	100

TABLE 143 PEASANTS/WORKERS - CONSUMERS
FOR WHAT DO YOU USE COCA? FOR SORROW, BY
LEVEL OF EDUCATION

$X^2=1.02<X^2_{.05}(5)=11.07$ Not Significant

	0 n=991	1-5 n=1206	6-8 n=225	9-12 n=49	R.N.S. n=8	U. n=2	X n=2481
Yes %	1	1	0.5	2	-	-	1
No %	99	99	99.5	98	100	100	99
Totals %	100	100	100	100	100	100	100

In summary we can say that, among users, who constitute the large majority of both peasants/workers and miners in the six departments surveyed, coca is an inseparable part of life itself. It is used for working, as protection against the elements, for diagnosing illnesses, as a remedy, for predicting the future, for keeping in tune with the supernatural, for both individual and communal activities, for rites of passage such as births, weddings, and deaths, for happiness, for sorrow, for laughing and for crying. Such a diversity of uses and cultural inter-penetration has no parallel in the Western world. To compare coca use with the use of tobacco, coffee, tea or alcohol in Europe or the United States is to fail to realize the manner in which coca is, and has been, a symbol of cultural identification, of proper conduct, and of human life itself. Among traditional Andean peoples, one is born, is married, weathers the storms of life, and dies with coca. And the tradition persists, despite all the changes and all the campaigns that have accosted it.

E. Levels of Use

Considering the multiple uses for coca, one can understand how volumes consumed by the peasant/worker and miner populations of the six highland departments of Bolivia would be substantial. We found that each of the 2,989 individuals we surveyed could quite precisely estimate the frequency with which they bought coca as well as amounts purchased. Most made their purchases on a weekly basis; those who lived in relatively isolated areas tended to buy only once or twice a month; and some, under special circumstances, bought coca only once or twice a year. Table 44 shows that 75 per cent of our surveyed users bought coca on a weekly basis, 21 per cent on a monthly basis, and only 4 per cent on an annual basis. Provinces where purchases were made much less often were precisely those most isolated.

TABLE 144 PEASANTS/WORKERS - USERS
FREQUENCY WITH WHICH COCA IS PURCHASED

	n= 2484	Provinces in which the various systems of purchase predominate.	z
Annually	4 %	Pacajes O'Connor	
Monthly	21 %	Tomina Murillo Inquisivi Arani Litoral	North Chichas South Chichas General Bilbao Daniel Campos South Lipez
Weekly		Remainder	

In evaluating average consumption of coca in the different localities surveyed, we included figures from both abstaining households and those that consume, and among the latter those that practice the aculli as well as those that do not. In others words, we calculated the average weekly consumption of coca per household unit for all households surveyed, be they consumers or not. Due to the fact that most of the buying was done either in ounces or in pounds, the unit of measure selected was the ounce. Despite the fact that most figures as to production and marketing are calculated in kilograms, the consumer who buys by this unit is quite rare. The interval of a week was also selected because it is the measure most consumers use. In cases where we were given consumption on a monthly basis, we have simply divided that amount by four.

Emphasizing again that Table 145 was compiled on the basis of the entire survey, we see that, among peasants/workers, average weekly consumption per household unit comes to 9.41 ounces which, on a yearly basis, would be 30.58 pounds. The reported average consumption among miners is considerably higher: 17.16 ounces per week, or 55.77 pounds per year. These figures lie within the range of many estimates made for consumption of coca in Perú. They likewise agree with the general impression that, by comparison with peasants, miners are much heavier coca users.

TABLE 145 GLOBAL SAMPLE
AVERAGE WEEKLY CONSUMPTION OF COCA PER HOUSEHOLD UNIT
(in ounces)

Peasants/workers n = 2712	Miners n = 277	Total sample n = 2989
9.41	17.16	10.13

* Data points for tests of significance not provided by CENACO.

When analyzing level of consumption by ecological region, we find some surprising data. Despite all that has been said about coca as an aid in adaptation to high altitude, it is not the Altiplano peasant who consumes the most coca per household unit. Rather, it is the peasant who lives in the valleys. And in the case of miners, it turns out to be those who live in tropical areas.

Carlos Monge, director of the Instituto de Biología Andina in Lima. 1/, was, for a long time, the principal advocate of the adaptive advantages of coca for people living at high altitudes. His point of view was strongly opposed by Gutierrez-Noriega, Ricketts, and the Coca Study Commission of the United Nations. 2/ More recently, Hanna's research has indicated that the acullico of coca might help protect Andean man from cold. 3/ and work by Burchard is suggesting that coca might be an important factor in combating the serious high attitude problem of hypoglycemia. 4/

Our consumption data do not support these hypotheses as to the adaptive role of coca use. We are not denying that coca could have some positive effects for individuals living in places like the Bolivian Altiplano, given the fact that proven acute effects would provide energy for working and a certain degree of protection from the cold. But such effects could benefit persons living at lower altitudes as well. The fact is that our data on consumption, the first to be carefully controlled and based on a large population in the entire history of coca studies, do not agree with any published reports that directly correlate altitude with level of coca consumption. Almost all Peruvian researchers have assumed a direct relationship without, however, having been able to base their conclusions on hard data. Our data, the best gathered thus far, indicate simply that previous observations as to the relationship between altitude and coca consumption have been mistaken. Undoubtedly coca provides some benefits, due to its acute effects, for people doing hard work on limited, albeit carbohydrate rich, diets. Our overall conclusion, however, must be that, in terms of adaptation to altitude, the acullico of coca is a cultural habit, very well established, but a mere habit nonetheless.

TABLE 146 GLOBAL SAMPLE
AVERAGE WEEKLY CONSUMPTION OF COCA PER HOUSEHOLD UNIT, BY ECOLOGICAL REGION
(in ounces)

Ecological Region	Peasants/workers	Miners	Total Sample
Altiplano	7.52 n= 1367	16.12 n= 154	8.39 n = 1521
Valley	11.75 n= 798	18.28 n= 77	12.32 n= 875
Tropics	9.58 n= 547	18.88 n= 46	10.30 n = 593

* Data points for tests of significance not provided by CENACO.

1/ Monge 1946, 1963.

2/ Gutierrez-Noriega 1949; Ricketts 1954; United Nations 1950.

3/ Hanna 1976.

4/ Burchard 1976.

That tradition and ethnic identification are important in determining levels of use can be seen clearly in Table 147, which relates level of consumption to accessibility. We divided those cantons surveyed into three groups: those located within 50 kilometers of a major city; those more distant than 50 kilometers, but located on a major highway, and those more distant than 50 kilometers and served by only seasonal roads or foot trails. It is worth noting that, due to the fact that cantons were selected completely at random, some were so isolated that our field researchers had to walk up to three days in order to arrive there and another three to return.

Table 147 shows that there is a clear distinction between cantons readily accessible to currents of modernization and those more isolated. There is little difference between communities within 50 kilometers of a major city and those more distant but serviced by principal highways. In truly isolated cantons, however, there would appear to be a marked maintenance of traditions, of which a high level of coca consumption is a sign. It is interesting that distance and isolation appear to have little effect on availability of the leaf. In one way or another, coca arrives to meet the demand.

Figures for miners do not conform to this pattern however. The only explanation we can give is that mines, even when distant and removed from major highways, are in constant contact with the outside world and, therefore, with currents of modernization. Mineral has to be taken out and clothes, food, and equipment brought in.

TABLE 147

GLOBAL SAMPLE
AVERAGE WEEKLY CONSUMPTION PER HOUSEHOLD UNIT, BY ACCESSIBILITY
(in ounces)

Accessibility	Peasants/workers	Miners	Total Sample
Within 50 kilometers of a major city.	7.07 n = 781	-.-	7.07 n = 781
Farther than 50 km. from a city, but on a principal highway.	7.27 n = 571	17.50 n = 144	15.14 n = 715
Farther than 50 km. from a city and served by seasonal roads or foot trails.	11.66 n = 1360	16.82 n = 133	12.12 n = 1493

* Data points for tests of significance not provided by CENACO.

One of the principal factors leading to the reduction of coca use has been the growth of Evangelical sects. For the majority of these sects, the ideal is total abstention from both coca and alcohol. That Evangelicals have had a relatively high degree of success in this regard can be seen from the following table. While Catholics reported an average weekly consumption per household unit of 10.84 ounces, Evangelicals reported one of only 2.69 ounces. Evangelicals constituted less than 10 per cent of the total sample. Despite this fact, they accounted for the majority of abstainers, especially among men.

TABLE 148 PEASANTS/WORKERS - GLOBAL SAMPLE
AVERAGE WEEKLY CONSUMPTION PER HOUSEHOLD UNIT,
BY RELIGION
(in ounces)

Catholic n = 2,462	Evangelical n = 230
10.84	2.69

* Data points for tests of significance not provided by CENACO.

One of the most frequent statements made as to the actual state of coca consumption in Bolivia is that young people are no longer adopting the custom. We have already seen (Table 57) that among peasants/workers, i.e. the largest population grouping within the country, there is little evidence that this is oocuring. An analysis of level of consumption by age group also fails to confirm the hypothesis. The youngest age group surveyed appears to be consuming almost as much coca as the average for the entire sample population. It is important to note that these figures include the zero consumption of abstainers. They take into account the entire surveyed population - Evangelicals as well as Catholics, women as well as men, young as well as old.

TABLE 149 PEASANTS/WORKERS - GLOBAL SAMPLE
AVERAGE WEEKLY CONSUMPTION PER HOUSEHOLD UNIT,
BY AGE GROUP

15-24 n=304	25-34 n=609	35-44 n=650	45-54 n=556	55-64 n=311	65-74 n=189	75-+ n=93
9.11	9.17	9.33	9.80	9.36	9.15	10.21

* Data points for tests of significance not provided by CENACO.

Where we do find a variance in consumption is with regard to level of education. Comparing Table 149 with Table 150, it appears clear that the key factor accounting for a drop in consumption is education, not age. Young people who have achieved only a minimal level of education undoubtedly seem to be maintaining the tradition, just as did their grandparents before them.

TABLE 150 PEASANTS/WORKERS - GLOBAL SAMPLE
AVERAGE CONSUMPTION PER HOUSEHOLD UNIT, BY
LEVEL OF EDUCATION

0 n = 1056	1-5 n = 1328	6-8 n = 258	9-12 n = 60	R.N.S. n = 8	U. n = 2
10.15	9.74	5.31	11.91	0.19	8.00

* Data points for tests of significance not provided by CENACO.

Patterns are somewhat different among miners. Although the lowest age group reported an already high level of consumption, it was notably lower than that of older miners. Except for an anomaly in the group between 35 and 44, we find a consistent increase in level of consumption from youngest to oldest. The difference existing between the consumption patterns of this population and those of peasants/workers is probably due to the fact that, as a group, miners attain a higher level of education than do peasants/workers. It is precisely because they have become literate that such individuals look for new horizons and opportunities to increase their income - two things they can find in the mines.

TABLE 151 MINERS - GLOBAL SAMPLE
AVERAGE WEEKLY CONSUMPTION PER HOUSEHOLD UNIT, BY AGE GROUP
(in ounces)

15-24 n =33	25-34 n =96	35-44 n =75	45-54 n =57	55-66 n =16
12.45	13.62	20.61	16.63	18.69

* Data points for tests of significance not provided by CENACO.

Table 152 indicates that among miners, variations in consumption by age group follow the same general patterns as do such variations by level of education. Contrasts, however are greater with the latter. Only 17 per cent of surveyed miners were illiterate as opposed to 39 per cent of peasants/workers. With higher levels of education we find the reverse. Among miners, 23 per cent had six or more years of education, whereas only 12 per cent of peasants/workers surveyed had attained this same level. It becomes ever more evident then, that differences in consumption levels of coca are due more to differences in level of education than to a simple matter of age.

TABLE 152 MINERS - GLOBAL SAMPLE
AVERAGE WEEKLY CONSUMPTION PER HOUSEHOLD UNIT, BY LEVEL OF EDUCATION (in ounces)

	0 n=47	1-5 n=165	6-8 n=57	9-12 n=7	R.N.S. n=1
Average weekly consumption	21.0	17.32	15.98	5.50	0

* Data points for tests of significance not provided by CENACO.

When talking of coca use, miners often comment that, due to divergent work demands, surface workers consume much less than do shaft workers. According to responses given by the miners we surveyed, however, the difference in level of use is very small. This could be due, in part to the fact that shaft miners tend to be younger; older, exhausted miners look for lighter surface jobs and take their aculli custom with them.

TABLE 153 MINERS - GLOBAL SAMPLE
AVERAGE WEEKLY CONSUMPTION PER HOUSEHOLD UNIT,
BY TYPE OF WORK IN THE MINE (in ounces)

Shaft work n = 157	Surface work n = 120	Totals n = 277
17.38	16.98	17.21

That there is a strong relationship between the time a laborer has worked in the mine and the amount of coca he consumes is shown by table 154. Beginners consume an average of about 14 ounces a week. The level of consumption jumps from this to 20 ounces a week for miners who have worked 15 or more years. The five cases of miners who had worked between 35 and 39 years would have to be accepted as an anomaly; their consumption figure bears no relation to others in the table. We have no explanation for this situation.

TABLE 154 MINERS - GLOBAL SAMPLE
AVERAGE WEEKLY CONSUMPTION PER HOUSEHOLD UNIT,
BY TIME WORKED IN THE MINE (in ounces)

Less than one year n = 8	1-4 n=67	5-9 n=57	10-14 n=53	15-19 n=40	20-24 n=21	25-29 n=15	30-34 n=5	35-39 n=5	No response n=6
14.06	14.48	15.14	16.30	21.60	19.76	18.93	24.40	2.20	22.67

It should again be emphasized that these figures are derived from abstainers as well as light, medium, and heavy consumers of coca. On the basis of these survey figures, the overall mean weekly consumption per household, averaging data from both miners and peasants/workers, is 10.13 ounces, i.e. 0.63 pounds.

F. Requirements for Traditional and Legal Use.

The above data on mean weekly consumption per household unit in the six highland departments of Bolivia provide us with a solid base upon which to estimate the amount of coca consumed by the total population of said departments, excluding capital cities. According to the recent precensus (the only contemporary census data available at this time) the number of households in these six departments, excluding the capital cities, is 690,762. Because these data were published approximately two years ago, this figure should be considered minimal. As is the case in almost the entire world, the Bolivian population is constantly growing. Therefore, any extrapolations we make on this base would have to be accepted as possibly under-rather than overestimations.

Average consumption per household unit has been calculated at 10.13 ounces per week, or 32.92 pounds per year. Using a conversion factor of 2.2046 pounds per kilogram, this would mean that each unit would consume, on the average, 14.93 kilograms per year. Multiplying this

figure by the 690,762 family units mentioned above, we find that global consumption in these six departments, excluding the capital cities, would be 10,313,076.66 kilograms per year.

Unfortunately, due to lack of time and funds, we were unable to make the same type of survey in either departmental capitals or the three lowland departments of Bolivia. In planning this study, these areas had been set aside principally because it was known that, in general, traditional coca use is concentrated in the six highland departments, and outside of major cities. However, some coca is consumed in the traditional fashion almost all over Bolivia. We cannot say how much is used in this way in cities such as La Paz. Nor can we say, with any degree of certainty, whether the level of consumption in La Paz is significantly different from that of the city of Potosi, although we may suspect as much. Even in La Paz, the majority of households keep some coca on hand for either medicinal purposes or simply for use as tea. Coca is always available for the indisposed tourist, even in the best hotels. In the poorer sections of the city a goodly number of people still practice the aculli in the privacy of their homes. We know, then, that undoubtedly coca is used in the principal cities of Bolivia. But since we have no data as to mean levels of household consumption, we can consider only the effect of various alternatives on the global consumption requirements of said cities.

In the case of Bolivia's lowland departments, our situation is somewhat similar. Data collected in these departments indicate that there might be heavy consumption, especially among Aymara and Quechua speaking migrants. We have noted, for example, that the Santa Cruz area, especially around Montero, figures as the shipping destination for large quantities of coca every year. Because of a complete lack of criteria upon which to evaluate consumption, however, we cannot even speculate as to how much of this coca may be used for traditional purposes and how much for others.

Under these circumstances the best that we can do is to estimate hypothetical needs of these two markets on the basis of alternative levels of consumption per household unit. Our first estimate is that levels of household consumption in the capital cities range between one half pound and three pounds a year - very little when compared to levels already demonstrated for people living outside these cities. Although, for lack of an adequate survey, we cannot say for sure, we believe, based on personal experience, that the average would be at least one pound per year.

In the case of Bolivia's lowland departments, we have even less to guide us. Arbitrarily we have estimated requirements based on consumption levels that oscillate between one half and ten pounds per household per year. We purposely chose these higher values because of the relatively heavy levels of consumption we found in the areas we actually surveyed. Yet we would not be fair if we were not to share our belief that the tropical areas surveyed were somewhat exceptional. They were either coca producing areas, such as the Yungas, or Chaco areas, bordering on Paraguay and Argentina, through which a good deal of coca flows. The most populous tropical area we studied was that in and around Yacuiba. This is quite different than, for example, the area around Trinidad. Coca use in the two places would also be radically different. In the end we may discover that mean coca consumption per household is greater than ten pounds throughout the lowlands. But we would prefer to underestimate than to overestimate.

Be this as it may, the requirements for traditional use in Bolivia's capital cities and among the rural population of the lowlands would be relatively small when compared to such requirements among the population represented by our survey. Most traditional use is found among the rural and mining populations of Bolivia's six highland departments.

TABLE 155 ANNUAL GLOBAL CONSUMPTION
SIX HIGHLAND DEPARTMENTS, EXCLUDING CAPITAL CITIES

10.13 ounces weekly per family unit X 52 weeks a year= 526.76 ounces + 16 = 32.92 pounds per year + 2.2046 = 14.93 kilograms per year X 690,762 household units = 10,313,076 kilograms per year.

GLOBAL CONSUMPTION = 10,313,076 KILOGRAMS PER YEAR

TABLE 156 CAPITAL CITIES
ESTIMATED ANNUAL CONSUMPTION

City	No. of household units	A Half pound per household unit	B One pound per household unit	C Two pounds per household unit	D Three pounds per household unit
La Paz	115,174	26,121 Kg.	52,243 Kg.	104,486 Kg.	156,729 Kg.
Oruro	25,304	5,739 Kg.	11,478 Kg.	22,956 Kg.	34,434 Kg.
Cochabamba	38,017	8,622 Kg.	17,245 Kg.	34,489 Kg.	51,734 Kg.
Sucre	12,186	2,764 Kg.	5,528 Kg.	11,055 Kg.	16,583 Kg.
Tarija	7,785	1,766 Kg.	3,531 Kg.	7,063 Kg.	10,594 Kg.
Potosi	16,407	3,721 Kg.	7,442 Kg.	14,884 Kg.	22,327 Kg.
Santa Cruz	37,106	8,416 Kg.	16,831 Kg.	33,663 Kg.	50,494 Kg.
Trinidad	5,387	1,222 Kg.	2,444 Kg.	4,887 kg.	7,331 Kg.
Cobija	818	186	371 kg.	742 kg.	1,113 Kg.
Totals	258,184	58,557 Kg.	117,113 Kg.	234,225 Kg.	351,339 Kg.

TABLE 157
LOWLAND DEPARTMENTS EXCLUDING CAPITAL CITIES
ESTIMATED ANNUAL CONSUMPTION

Department	No. of household units	Half a pound per household unit	One pound per household unit	Five pounds per household unit	Ten pounds per household unit
Sta. Cruz	79,194	17,961	35,922	179,612	359,224
Beni	26,805	6,079	12,159	60,794	121,587
Pando	4,245	963	1,926	9,628	19,255
Total	110,244	25,003	50,007	250,034	500,066

TABLE 158 BOLIVIA - GLOBAL POPULATION
ESTIMATED ANNUAL CONSUMPTION FOR TRADITIONAL USES

A.	Six highland departments excluding capital cities	10,313,077 Kg.
	Capital cities, based on 1/2 pound per household unit per year	58,557 Kg. 83,560
	Eastern areas, excluding capital cities, based on 1/2 pound per household unit per year	25,003 Kg.
	Total	10,396,637 Kg.
B.	Six highland departments, excluding capital cities	10,313,077 Kg.
	Capital cities, based on 1 pound per household unit per year	117,112 Kg.
	Eastern areas, excluding capital cities, based on 1 pound per household unit per year	50,006 Kg.
	Total	10,480,196 Kg.
C.	Six highland departments, excluding capital cities	10,313,077 Kg.
	Capital cities, based on 2 pounds per household unit per year	234,228 Kg.
	Eastern areas, excluding capital cities, based on 5 pounds per household unit per year	250,033 Kg.
	Total	10,797,338 Kg.
D.	Six highland departments, excluding capital cities	10,313,077 Kg.
	Capital cities, based on 3 pounds per household unit per year	351,077 Kg. 451,144
	Eastern areas, excluding capital cities, based on 10 pounds per household unit per year	500,067 Kg.-
	Total	11,164,221 Kg.

G. Relationship between Requirements for Traditional Use and Marketable Supply

We have a good bit of confidence in the validity of our data because of the way in which they were gathered. Our surveyors were all native Aymara or Quechua speakers; all of them had had years of experience as interviewers in rural situations. They entered the homes of people interviewed, made friends with them, and only then did they start asking about use of coca. Respondents were generally quite open, and many were surprised that anyone would take the trouble to ask about such a common and harmless habit. Our level of consumption data have an impressive internal consistence, and agree with observations made time after time in qualitative anthropological or sociological studies of a rural nature. They indicate that, in Bolivia, coca is a huge industry.

In the Chapter on the economy of coca, estimates as to coca production were made based on secondary sources such as economic studies, agricultural studies, and registries of the National Directorate for the Control of Dangerous Substances (see Appendix 1). At the time we presented the estimates, we indicated our belief that they were unrealistically low. We now see the degree to which they may be in error, for those on marketable supply are smaller than what would be needed to cover only the demand of traditional users living in the six departments surveyed. Added to this would be the demand of inhabitants in departmental capitals and in Bolivia's three eastern departments.

There has never been a national survey on production similar to the one we have just concluded on consumption. The secondary materials we used are based on a series of studies carried out by a variety of institutions. Yet they are so deficient that, when we compare them with consumption data gathered through our survey, we are faced with the enormous anomaly whereby reported marketable supply fails to meet the demand of only traditional consumers among peasants/workers and miners in only six of Bolivia' nine departments. Were this a true reflection of reality, not only would it be impossible for a single coca leaf to go into illegal uses, but there would have to be a moderate import program just to meet the demands of the internal legal market.

Table 159 clearly demonstrates the urgency of obtaining reliable data on production. It also suggests that, very possibly, legal consumption absorbs most of Bolivia's production. Coca used for other purposes may constitute only a small fraction of the marketable supply.

The figures also demonstrate that agricultural customshouses and transit permits register barely 50 per cent or less of that coca which is legally marketed (see Table 6). This is in accord with observations made by Henkel, some years ago, in a study of the agricultural Customshouse of the Chapare. He calculated that only 25 to 50 per cent of coca removed from the region was being registered. 1/

H. Qualities and Preferences of Coca

When considering the relationship between consumption and marketable supply, it is important to know of any preferences which consumers might have. A number of studies have indicated that Chapare coca is richer in cocaine than is Yungas coca. 2/ If the presence of this alkaloid were the principal determinant as to popularity among traditional consumers, then Chapare coca would be preferred by all. The truth, however, would appear to be the opposite. Because it is considered sweeter and softer, Yungas coca is much preferred. The bitter taste characteristic of high cocaine content does not encourage the purchase of Chapare coca.

The coca each family buys is directly related with its economic status. Basically, there are three classes: Apolo coca, Paceña coca, and Chapare coca. The first is very esteemed because it is soft and sweet. But it is scarce. It reaches principally only four provinces: Franz Tamayo, Muñecas, Camacho, and Bautista Saavedra. The little which goes beyond tends to be identified through ignorance as simply Paceña coca.

As can be seen from Table 160, Paceña coca is the most esteemed. It is the most traditional and the least rich in cocaine. It is considered the best for the aculli. Despite these facts, 27 per cent of those individuals surveyed expressed preference for Chapare coca. The reasons for this preference were that it is cheap and available, and not that it is superior. If Paceña coca were available at a competitive price in any market, undoubtedly there would be very little demand for that from the Chapare.

1/ Henkel

2/ Cárdenas 1952; Granado 1931.

TABLE 159

DEFICIT OF MARKETABLE SUPPLY

Marketable Supply		Demand, six highland departments, excluding capital cities	Demand, capital cities and lowlands	Demand, legal exportation	Deficit
Year 1977 1/	9,638.810 kg.	10,313.077 kg.	Base A 2/ 83,560 kg.	867,632 kg.(1976) 3/	1,625,459 kg.
"	"	"	Base B 167,120 kg.	"	1,709,019 kg.
"	"	"	Base C 484,259 kg.	"	2,026,158 kg.
"	"	"	Base D 851,405 kg.	"	2,393,304 kg.

1/ Table 4

2/ Table 156

3/ Appendix 11

TABLE 160 PEASANTS/WORKERS - CHEWERS #
PREFERRED COCA, BY REASONS OF PREFERENCE
n = 2151
$X^2=3,390.25 > X^2_{.005}(12)=28.3$ Significant

Reasons	Apolo	Chapare	La Paz (Yungas)	No Preference	Totals
Because it is sweet	1 %	2 %	14 %	-	17 %
Because it is soft	1 %	3 %	29 %	-	33 %
Because it is cheap	-	17 %	1 %	-	18 %
Because none other is available	2 %	5 %	5 %	-	12 %
No preference	-	-	-	20 %	20 %
Totals	4 %	27 %	49 %	20 %	100 %

Miners buy coca from the company store only when they are short of money. They say that these stores provide a very poor quality product, mixed with stems from the coca plant, of widely varying leaf size, and mainly from the Chapare. They would prefer to buy from the "cocanis", a type of traveling coca salesmen. These merchants still do a lot of business in the mines, visiting them regularly and offering better quality coca than that available in the stores. They appear on the scene nearly every payday.

It is also common, among peasants/workers, to hear Paceña and Chapare coca referred to as first and second class coca, or as good and bad coca. Because Paceña coca is first class, those who can purchase it. On social occasions it is common, for reasons of economy, for rich and poor alike to mix first class coca with second class, or to simply use Chapare coca. A number of people buy La Paz coca for their own consumption and Chapare coca for their workers. This being so, the quality of coca can symbolize a certain distinction between rich and poor within a community. Coca is also classified according to the way in which it has been processed. For example, it can be lluch'u (poorly harvested with stem residues etc.) hojeada (harvested leaf by leaf, and among the best), doble hojeada (similar to hojeada but of optimum quality), samba (blackened by humidity during processing), ch'uxta (ruined by the rain while drying), and t'oxra (sun burned).

The most renowned area as to production of good coca is Coripata, in the Yungas of La Paz. Other regions producing coca in the past were so famous that, although they no longer export the leaf, their names still persist. For example, coca produced in Inquisivi, Consata, and Apolo is commonly known as Zongo coca. Zongo was noted for a quality product from colonial times until about 1940. Today, because of tradition, it is still renowned in the minds of consumers, for whom the name continues to mean coca of optimum status.

Similarly, Chapare coca is often referred to as coca from Vandiola or from Totora. This is due to the same reasons described for Zongo. Neither area produces today, but due to tradition and to the fact that locations of many new producing areas are unknown, coca from the

Acullicadores

Chapare or La Paz is commonly purchased as coca from Vandiola, Totora, or Zongo.

The cases of Vandiola and Totora illustrate how production of a certain region can change drastically. Before the Agrarian Reform, coca from Vandiola and Totora regularly reached the market because hacendados (landowners) of the area, attracted by handsome financial returns, grew coca intensively. After the Reform, peasants from these areas initiated the respective procedures, through the National Agrarian Reform Council, to obtain their lands. After receiving their titles, (surprising colonization planners) almost all of these peasants left their land in order to colonize the Chapare, where they continued to grow coca. Many consumers, used to the traditional coca from Vandiola and Totora, continue using these names to now refer to much of the coca coming from newer producing areas of the Chapare. Reasons for preferring Paceña coca are varied: "Acullicando thick leaves (referring to Chapare coca) makes one's lips hurt. On the other hand, Paceña coca has soft and fragrant leaves and is quite pleasant".

Frequency with which the traditional consumer uses coca depends on the demands of his work and on his economic possibilities. Among the 2,151 peasant/worker acullicadores we interviewed, we found a minimum of one aculli per day and a maximum of nine. A large majority of both men and women appear to use from two to four acullis per day. As can be seen from the corresponding tables, the number of acullis does not vary greatly with age or level of education.

TABLE 161 PEASANTS/WORKERS - CHEWERS #
NUMBER OF ACULLIS PER DAY, BY SEX
$X^2=39.52>X^2_{.005}(9)=23.589$ Significant

No. of Acullis per day	Female n = 361	Male n= 1790	X n = 2151
1	9 %	6 %	6 %
2	17 %	14 %	15 %
3	21 %	18 %	19 %
4	20 %	30 %	28 %
5	4 %	6 %	6 %
6	5 %	3 %	3 %
7	-	-	-
8	-	1 %	1 %
9	1 %	-	-
No response	23 %	22 %	22 %
Totals	100 %	100 %	100 %

In order to maintain his habit, the acullicador must spend a substantial amount of money, at least in terms of his limited income. We again see that age has very little influence. The young spend as much or more for the purchase of coca as do their elders. Average annual expenditures reach some 600 Bolivian pesos.

Acullicadores.

TABLE 162

PEASANTS/WORKERS - CHEWERS #

NUMBER OF ACULLIS PER DAY, BY AGE GROUP.

$X^2=74.09>X^2_{.05}(54)=72.153$ Significant

Pijchus per day	15-24 n=203	25-34 n=470	35-44 n=518	45-54 n=464	55-64 n=260	65-74 n=157	75-+ n=79	X n=2151
1	9 %	8 %	6 %	6 %	4 %	3 %	5 %	6 %
2	12 %	17 %	15 %	14 %	16 %	12 %	11 %	15 %
3	23 %	19 %	19 %	17 %	19 %	15 %	22 %	19 %
4	33 %	27 %	31 %	29 %	28 %	25 %	23 %	28 %
5	4 %	5 %	6 %	8 %	6 %	6 %	6 %	6 %
6	2 %	3 %	3 %	3 %	2 %	4 %	6 %	3 %
7	-	-	-	-	-	1 %	-	-
8	1 %	1 %	-	-	-	-	-	1 %
9	-	-	1 %	-	1 %	-	-	-
No response	16 %	20 %	19 %	23 %	24 %	34 %	27 %	22 %
Totals	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %

TABLE 163

PEASANTS/WORKERS - CHEWERS #

NUMBER OF ACULLIS PER DAY, BY LEVEL OF EDUCATION.

$X^2=76.82>X^2_{.01}(46)=71.201$ Significant

Pijchus per day	0 n=929	1-5 n=1035	6-8 n=155	9-12 n=29	N.R. n=2	U. n=1	X n=2151
1	4 %	7 %	10 %	10 %	-	-	6 %
2	11 %	17 %	21 %	24 %	-	-	15 %
3	19 %	19 %	18 %	25 %	-	-	19 %
4	31 %	27 %	25 %	21 %	50 %	-	28 %
5	8 %	5 %	1 %	7 %	-	-	6 %
6	4 %	3 %	2 %	-	-	-	3 %
7	-	-	-	-	-	-	-
8	-	1 %	1 %	-	-	-	1 %
9	-	1 %	-	-	-	-	-
No response	23 %	20 %	22 %	13 %	50	100	22 %
Totals %	100 %	100 %	100 %	100 %	100 %	100%	100 %

Acullicadores

TABLE 164 PEASANTS/WORKERS - CHEWERS#
WEEKLY AVERAGE PER HOUSEHOLD UNIT SPENT FOR THE PURCHASE OF COCA, BY AGE GROUP ($b.)

15-24 n=203	25-34 n=470	35-44 n=518	45-54 n=464	55-64 n=260	65-74 n=157	75 - + n=79
13.10	12.80	12.86	15.20	11.95	12.78	10.30

* Data points for tests of significance not provided by CENACO.

As has already been noted, some individuals living in isolated locations purchase coca only once or twice a year. A good example would be those who live in North and South Lipez. For purchasing both coca and other commodities, they walk considerable distances from their communities to redistribution centers in Uyuni, Tupiza, and Atocha. In order to avoid continuous long journeys, they maintain the traditional system of the Iraya (Aymara) or Apachicuna (Quechua), a reciprocal arrangement whereby one or two people make a long trip with a caravan of pack animals. Before leaving, those who are making the trip receive orders for a variety of purchases from a number of families within their community. Those who benefit from the trip accept the commitment to reciprocate and, at some future date, make such a journey themselves.

In activating this system, a person may transport so much coca that he will appear to be a merchant, even though the entire shipment is destined for simple domestic consumption by him and his extended family. The purchase will have been made not by pounds or ounces, but by tambor or cesto. To a customs agent, such a large shipment may appear destined for illegal uses; in reality, however, it represents simply wholesale acquisition for family consumption, in order to avoid constant traveling over long distances. It goes without saying, of course, that such areas are inaccessible to motorized transportation.

I. Patterns of Change

A very common impression, upon which a number of contemporary political measures are being based, is that the use of coca for traditional purposes has diminished considerably in the last few years. It is our opinion that the people best equipped to judge the validity of this statement are those who live in areas of traditional consumption, peasants/workers, miners, consumers, and non-consumers. One of the key questions in our survey instrument, therefore, was how each respondent perceived changes in coca use by himself and his neighbors over the previous five years. We selected the five year interval as a time period for which memory would still be fresh, but that would also be sufficiently long to indicate the impact and direction of even gradual change.

If perceptions widely shared in cities such as La Paz were diagnostic of the general situation, then nearly all of those interviewed would have been of the opinion that consumption of coca has dropped dramatically during the last five years. But most of the people we surveyed did not share such perceptions. 58 per cent said that there has been no change in level of use, or even that more coca is consumed today than was being consumed five years ago. Only 37 per cent believed that level of use had dropped and, as we shall see, a large proportion of these were Evangelicals and thus were probably simply reflecting the official position of their church. Five per cent said they were in no position to provide an opinion.

#Acullicadores.

It is interesting that when these responses are analyzed by age group we find no real relationship between age and the opinion that coca use is declining rapidly. In other words, similar percentages of younger and of older, more experienced people believed similar things about trends in coca use . Some 48 per cent of all peasants/workers surveyed believed that there has been something of a decrease in consumption. But 52 per cent were of the opinion that the use of coca for traditional purposes has remained constant or even increased.

TABLE 165 PEASANTS/WORKERS - GLOBAL SAMPLE
ESTIMATES AS TO CHANGES IN COCA USE DURING THE LAST FIVE YEARS, BY AGE GROUP

$X^2=25.7<X^2_{.05}(18)=28.869$ Not Significant

	15-24 n=304	25-34 n=609	35-44 n=650	45-54 n=556	55-64 n=311	65-74 n=189	75-+ n=93	$\bar{X}$ n=2712
Less is used now %	32	35	40	35	42	40	46	37
More is used now %	14	15	17	16	15	11	13	15
Same is used now %	49	45	39	45	38	29	36	43
No response %	5	5	4	4	5	5	5	5
Either more or the same is used now %	63	60	56	61	53	55	49	58
Less is used now %	32	35	40	35	42	40	46	37
No response %	5	5	4	4	5	5	5	5

The following two tables give us an idea as to basic factors which might be affecting levels of consumption. In the first place, we find a direct and constant relationship between level of education and the opinion that less coca is being used now. In the second place, we see that most Evangelicals we surveyed thought that less coca is being used now. It should be emphasized, however, that barely 12 per cent of the sample had finished 6 or more years of school, and only 8 per cent were Evangelicals. Therefore, although these groups are interesting in terms of indices of cultural change, when it comes to overall numbers they are relatively insignificant.

TABLE 166 PEASANTS/WORKERS - GLOBAL SAMPLE
ESTIMATE AS TO CHANGES IN COCA USE DURING
THE LAST FIVE YEARS, BY LEVEL OF EDUCATION

$X^2=38.307>X^2_{.005}(15)=32.801$ Significant

	0 n=1056	1-5 n=1328	6-8 n=258	9-12 n=60	R.N.S. n=8	U. n=2	$\bar{X}$ n=2712
Less is used now %	32	40	41	42	75	50	37
Same is used now %	44	43	38	40	25	50	43
More is used now %	19	12	16	15	-o-	-o-	15
No opinion %	5	5	5	3	-o-	-o-	5
Totals %	100	100	100	100	100	100	100

TABLE 167 PEASANTS/WORKERS - GLOBAL SAMPLE
ESTIMATE AS TO CHANGES IN COCA USE DURING THE
LAST FIVE YEARS, BY RELIGION

$X^2=73.069>X^2_{.005}(3)=12.838$ Significant

	Catholic n=2482	Evangelical n=230	$\bar{X}$ n=2712
Less is used now	35 %	61 %	37 %
Same is used now	45 %	25 %	43 %
More is used now	16 %	7 %	15 %
No opinion	4 %	7 %	5 %
Totals %	100 %	100 %	100 %

Reasons given as to why there has been an increase or decrease in coca use provide an idea as to the role played by this leaf in the life of communities. The principal reasons suggested for maintenance of use would appear to be "tradition" and "work". These two are, in reality, only one. Tradition demands that coca be used as a work incentive or energetic. Therefore, when a person says that he continues to use coca because of tradition, he is including its use for work. Although there

would appear to be a correspondence between level of education and incidence and level of consumption, it is interesting that barely 3 per cent of peasants/workers surveyed attributed a decrease in coca use to the effect of schools. Thirteen per cent said simply that the young are losing the custom; this could also reflect the influence of formal education. But schools did not really figure as a conscious reason for decrease in consumption. Fifteen per cent of those surveyed thought that instead of disappearing or staying the same, consumption of coca is increasing. The principal reasons given for the increase were population growth and a rise in work demands.

TABLE 168 PEASANTS/WORKERS - GLOBAL SAMPLE
REASONS FOR CHANGES DURING THE LAST FIVE YEARS

		n=2712 %	
Less is used now	Because of the growth of evangelical sects %.	16	37
	Because young people are abandoning the custom %.	13	
	Because of cost %	4	
	Because there are fewer fiestas %	1	
	Because people are drinking more %	0	
	Because there are more schools %	3	
Same	Because tradition is being maintained %	27	43
	Because coca is needed for work %	16	
More is used now	Because of population growth %	5	15
	Because of migration %	1	
	Because of an increase in community meetings %	1	
	Because of increased work %	8	
	No response %	5	5
	Totals %		100 %

If we analyze the distribution of reasons for change by level of education and age group, we find that the marked contrast characteristic of other aspects of coca consumption are absent. The most important feature of the following tables is that not even the best educated of our respondents thought that schools have much influence on traditional coca consumption. Opinions as to reasons for changes in levels of consumption are quite varied, and these variations are more or less equally distributed among the entire population surveyed. The principal exception is religion (see Table 171). Sixty-one per cent of those Evangelicals surveyed believed that consumption is

TABLE 169

PEASANTS/WORKERS - GLOBAL SAMPLE

REASONS FOR CHANGES DURING THE LAST FIVE YEARS, BY LEVEL OF EDUCATION

$X^2=74.38<X^2_{.05}(60)=79.082$ Not Significant

		0 n=1056	1-5 n=1328	6-8 n=258	9-12 n=60	N.R. n=8	U n=2	X n=2712
LESS IS USED NOW	Because of the growth of evangelical sects %	13	18	14	19	38	-o-	16
	Because young people are abandoning the custom %	12	14	16	11	12	-o-	13
	Because of cost %	4	4	7	2	25	-o-	4
	Because there are fewer fiestas %	1	1	1	1	-o-	-o-	1
	Because people are drinking more %	-o-	-o-	-o-	-o-	-o-	-o-	-o-
	Because there are more schools %	2	3	3	9	-o-	50	3
SAME	Because tradition is being maintained %	27	27	27	30	12	50	27
	Because coca is needed for work %	17	16	11	10	13	-o-	16
MORE IS USED NOW	Because of population growth %	8	4	3	2	-o-	-o-	5
	Because of migration %	1	1	2	3	-o-	-o-	1
	Because of an increase in community meetings %	1	1	2	-o-	-o-	-o-	1
	Because of increased work %	9	6	9	10	-o-	-o-	8
	No response %	5	5	5	3	-o-	-o-	5
	Totals %	100	100	100	100	100	100	100

TABLE 170

PEASANTS/WORKERS - GLOBAL SAMPLE

REASONS FOR CHANGES DURING THE LAST FIVE YEARS, BY AGE GROUP

$X^2=73.68<X^2_{.05}(70)=90.531$ Not Significant

		15-24 n=304	25-34 n=609	35-44 n=650	45-54 n=556	55-64 n=311	65-74 n=189	75+ n=93	$\bar{X}$ n=2712
LESS IS USED NOW	Because of the growth of evangelical sects %	11	15	15	15	16	20	25	16
	Because people are abandoning the custom %	12	13	16	12	13	10	16	13
	Because of cost %	5	4	4	4	6	6	1	4
	Because there are fewer fiestas %	-0-	1	1	1	3	2	1	1
	Because people are drinking more %	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
	Because there are more schools %	4	2	3	3	4	2	3	3
SAME	Because tradition is being maintained %	29	29	26	31	23	23	21	27
	Because coca is needed for work %	20	16	14	14	15	16	15	16
MORE IS USED NOW	Because of population growth %	5	5	6	6	5	4	6	5
	Because of migration %	1	1	1	1	1	2	1	1
	Because of an increase in community meetings %	1	1	1	1	1	1	-0-	1
	Because of increased work %	7	8	9	8	8	9	6	8
	No response %	5	5	4	4	5	5	5	5
	Totals %	100	100	100	100	100	100	100	100

decreasing, and that the principal motivating force is the spread of the Evangelical religion. By way of contrast, only 35 per cent of Catholics think that use of coca is decreasing, and only 12 per cent of them attribute any change to the activity of Evangelical groups.

TABLE 171 PEASANTS/WORKERS - GLOBAL SAMPLE
REASONS FOR CHANGES DURING THE LAST FIVE YEARS, BY RELIGION

$X^2=205.46 > X^2_{.005}(12)=28.3$ Significant

	Reasons	Catholic n=2482	Evangelical n=230	$\bar{X}$ n=2712
Less is used now	Because of growth of evangelical sects %	12	43	16
	Because young people are abandoning the custom %	14	11	13
	Because of cost %	5	1	4
	Because there are fewer fiestas %	1	2	1
	Because people are drinking more %	-o-	-o-	-o-
	Because there are more schools %	3	4	3
Same	Because tradition is being maintained %	28	18	27
	Because coca is needed for work %	17	7	16
More is used now	Because of population growth %	6	1	5
	Because of migration %	1	1	1
	Because of an increase in community meetings %	1	2	1
	Because of increased work %	8	3	8
	No response %	4	7	5
	Totals %	100	100	100

To a considerable extent, miners shared the opinions of peasants/workers as to trends in coca consumption but they appeared to be less inclined to believe that use is decreasing. Seventy-nine per cent were of the opinion that coca is used as much or more today than it was five years ago; 35 per cent believed that this is because coca is needed for working and 17 per cent because tradition is being maintained. It should again be noted that maintaining tradition implies the use of coca for working. It should also be noted that, of the 27 per cent who believed more is being used now, the majority were of the opinion that this was due to an increase in work. Only 21 per cent of miners thought that coca use is decreasing, and none of them attributed this decrease to the activity of schools.

TABLE 172 MINERS - GLOBAL SAMPLE
REASONS FOR CHANGE DURING THE LAST FIVE YEARS

	Reasons	% n=277	
Less is used now	Because of the growth of evangelical sects %	5%	21
	Because young people are abandoning the custom %	7 %	
	Because of cost %	3 %	
	Because miners now have protective masks %	1 %	
	Because the work week is shorter now %	3 %	
	For no specific reason %	2 %	
Same	Because tradition is being maintained %	17 %	52
	Because coca is needed for work %	35 %	
More is used now	Because of increased population growth %	7 %	27
	Because of an increase in union meetings %	1 %	
	Because of increased work %	17 %	
	For no specific reason %	2 %	
Totals %			100%

I. Importance of Coca in the Lives of Users

Coca is so basic in the lives of our surveyed population that a large majority said that nothing can take its place. The following appraisal, by a man from Arco Pongo, coincides with this point of view:

> "Without coca we would not work. It is with coca that we work. At times we have to stay up all night taking care of our cattle and other animals. At these times it is coca that sees us through. It satisfies our hunger and quenches our thirst, so that we would rebel if there were no coca. Overabundant meals can ruin our stomach and cause us great harm, to such an extent that we couldn't work. To avoid this type of disorder, we prefer to obtain coca from our neighbors, even if it has to be borrowed, until we can travel, make a purchase, and cancel the loan itself with coca". 1/

1/ Interview with Ermógenes Arroyo, 27, Chaipi Choro, Arco Pongo, Inquisivi, La Paz.

Table 173 shows that 74 per cent of all peasants/workers surveyed were of the opinion that coca is irreplaceable. Eleven per cent said that it could be replaced with food, and 11 per cent with candy. It is interesting to note that the idea that coca could be replaced with candy seems to be directly related to altitude. Seventeen per cent of those respondents living on the Altiplano mentioned this possibility, 9 of those living in the valleys, and only 2 per cent of those living in the tropics. This could have an explanation in the fact that, as various studies have demonstrated, humans living at high altitudes tend to suffer from hypoglycemia. 1/ Since one of the acute effects of coca is to increase the blood glucose levels, the idea that coca could be replaced by candy would appear logical. What is surprising is that, on the basis of simple empirical experience, some peasants/workers may have come to see this relationship, without really understanding why it exists.

The following tables, detailing how different sectors of the population would perceive the possibility of coca eradication, indicate that the majority believe that nothing could take its place, not even food. On the basis of such figures we must conclude that, in the minds of peasants/workers, coca and food are neither the same thing, nor can the one be substituted for the other. To say that people resort to coca because they lack food would appear to be, therefore, quite absurd.

Given tha almost universal use of coca as an energetic among those peasants/workers and miners that we surveyed, and the insistence of most that coca is irreplaceable, one must ask whether these customs and convictions are somehow based on fundamental organic processes. Unfortunately, there have been very few duly controlled laboratory studies as to the effects of coca. The best of these have focused on immediate or acute effects. None focusing on chronic effects have been conclusive, due to lack of control of basic socio-cultural variables.

Many studies as to acute effects also suffer from great flaws. Instead of focusing on the aculli they measure the effects of oral or parenteral administration of a single alkaloid of the coca leaf - i.e. cocaine. Today we recognize that there are a number of unanswered questions about the other alkaloids of coca, and about interactions among themselves and with cocaine, as these affect the acullicador.

The alkaloids of Erythroxylon coca belong to six closely related groups: 1) cocaine and its variants, including cinnamilcocaine and truxilines; 2) methylecgonine and methylecgonidine; 3) benzoylecgonine; 4) tropeines, e.g. tropacocaine; 5) dihydroxytropane; 6) hygrines, including hygrine, beta-hygrine, cuscohygrine, and hygroline. From 50 to 90 per cent of the alkaloid content of the coca leaf is, however, cocaine. 2/ Our lack of understanding of the interactions among these various alkaloids means that there are enough questions as to the effects of the aculli (e.g. mixing with saliva and gastric juices) to challenge any easy attempt to associate observed effects of cocaine with those resulting from coca "chewing".

The debate continues as to the pharmacokinetic mechanisms from which the aculli derives its impact. The first laboratory studies on the subject were based on a working hypothesis that cocaine and the coca leaf were practically synonymous. Some recent, more sophisticated studies are suggesting that mechanisms involved in the aculli are

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1/ Picón-Reategui 1962, 1963; Monclou, Gomez, and Hurtado 1965; Blume and Pace 1969.

2/ Grinspoon and Bakalar 1976: 73.

TABLE 173

PEASANTS/WORKERS - GLOBAL SAMPLE

WITH WHAT COULD PEOPLE REPLACE COCA? BY ECOLOGICAL REGION

$X^2 = 69.96 > X^2_{.005}(8) = 21.955$ Significant

	Altiplano n=1367	Valley n=798	Tropics n=547	$\bar{X}$ n=2712
With nothing %	73	74	81	75
With beverages.%	3	2	2	2
With food %	5	13	13	9
With candy %	17	9	2	12
With wild coca %	2	2	2	2
Totals %	100	100	100	100

TABLE 174

PEASANTS/WORKERS - GLOBAL SAMPLE

WITH WHAT COULD PEOPLE REPLACE COCA? BY SEX

$X^2 = 26.791 > X^2_{.005}(4) = 14.86$ Significant

	Female n=532	Male n=2180	$\bar{X}$ n=2712
With nothing %	80	72	75
With beverages %	0	3	2
With food %	8	12	9
With candy %	11	11	12
With wild coca %	1	2	2
Totals %	100	100	100

TABLE 175

PEASANTS/WORKERS - GLOBAL SAMPLE

WITH WHAT COULD PEOPLE REPLACE COCA? BY AGE GROUP.

$X^2=29.209<X^2_{.05}(24)=36.415$ Not Significant

	15-24 n=304	25-34 n=609	35-44 n=650	45-54 n=556	55-64 n=311	65-74 n=189	75 + n=93	X n=2712
With nothing %	80	70	77	75	73	75	75	75
With beverages %	3	3	2	3	3	2	-0-	2
With food %	8	12	9	10	11	8	13	9
With candy %	9	13	11	10	11	14	11	12
With wild coca %	-0-	2	1	2	2	1	1	2
Totals %	100	100	100	100	100	100	100	100

TABLE 176

PEASANTS/WORKERS -GLOBAL SAMPLE

WITH WHAT COULD PEOPLE REPLACE COCA? BY LEVEL OF EDUCATION.

$X^2=29.352<X^2_{.05}(20)=31.41$ Not Significant

	0 n=1056	1-5 n=1328	6-8 n=258	9-12 n=60	R.N.S. n=8	U n=2	X n=2712
With nothing %	77	72	75	79	75	100	75
With beverages %	2	2	2	6	12.5	-0-	2
With food %	10	11	11	7	12.5	-0-	9
With candy %	9	13	11	8	-0-	-0-	12
With wild coca %	2	2	1	-0-	-0-	-0-	2
Totals %	100	100	100	100	100	100	100

quite complex. Some ten to fifteen years ago, Fernando Montesinos, working at the School of Pharmacology and Biochemistry of the Universidad de San Marcos in Lima, came to the conclusion that basic cocaine in coca leaves undergoes a conversion in the aculli process. He suggested that, through the process of the aculli, coca undergoes constant hydrolisis, first by action of the accompanying alkali, and then by the various digestive juices, saliva, gastric juices, pancreatic juice, bile, and intestinal juices being converted first to benzoyl-ecgonine and then to ecgonine. If this be the case, while the amount of cocaine circulating through the organism of the user would be minimal, the quantity of ecgonine would be considerable. 1/

Vicente Zapata Ortiz 2/ has criticized Montesino's work, mainly because it was based on animal and not human experimentation. According to Zapata Ortiz, animal saliva and digestive juices have qualities different from those of humans. The question remains open, and will continue to do so until we have pharmacokinetic research on the action of the aculli in humans.

Observed reactions to the aculli, however, seem to agree with Montesinos's theory. According to the hypothesis being explored by Burchard and colleagues at the University of Manitoba, ecgonine has an effect very similar to that of atropine. In other words, it rapidly converts carbohydrates to blood sugar, i.e. instant energy. This could explain why so many Bolivian peasants/workers and miners say that it is irreplaceable- even by food.

Aside from these considerations is the fact that coca constitutes a form of cultural identification and, in a way, represents rebellion against Hispanic culture. Enrique Mayer clearly explains how coca functions as one of the few remaining elements of the native's pre-Columbian tradition. The Indian has no history as to abuse of coca; rather he has used it and conceived of it, through the centuries, as something beneficial. It is Western man who has abused it, and, because of this abuse, is now threatening a whole network of well-rooted customs within traditional Amerindian culture. 3/

J. Reactions to Programs of Control

Having visited, in the course of our research, many centers of consumption as well as production, we were provided with an exceptional opportunity to explore opinions regarding any attempt to decrease or eradicate coca production in Bolivia. We found people to be eager to give opinions, and discovered that their opinions were almost always of a negative nature. There follow some examples from coca producing areas:

> "Most peasants in the region of Consata are accustomed to raising coca, though on a small scale. Almost all of their production goes for their own consumption. A little goes to the localities of Tacacoma and Collabamba to provide for certain necessities or to trade for potatoes, chuño,.... all of this for their own food." 4/

1/ Montesinos 1965: 11-17.

2/ Zapata Ortiz 1970: 287-294.

3/ Mayer 1977.

4/ Interview with Marcelo Mendoza, 36, Santalla, Consata, Larecaja, La Paz.

"In the first place, coca is a vital necessity. There are some producers who have five or six children, and they need money in order to support them. I say this because I know them; I constantly travel to the countryside." 1/

"Do you believe we will permit them to take our coca away? If that happens, no fruit will leave the Chapare for Cochabamba. We shall see if they can live without the Chapare." 2/

"If coca disappears, how are we going to make a living here in the Chapare? For our part, we do not want coca to disappear. They really want to take away life itself, because we are parents; we do not have land outside of here such as others have, even houses in Cochabamba. Nobody can take away our coca. I am not afraid; I prefer to die with my coca plants". 3/

"How can we live if they take away coca? Coca provides for our food, our family, our clothes. Is there anything that is coca's equal? No other crop gives us four harvests a year. We are not like city people who sit around heating chairs, like the doctores (professionals)." 4/

Although of a different nature, protests that users raise are just as strong. Their principal concern is how they will be able to work without a stimulant to which they have been accustomed since their youth.

"Working or not working, we always practice the aculli. Without coca we could do nothing. We peasants use the aculli even more than do the miners (not true, as we have seen). We always work our fields with coca. I believe that without coca we would not be able to sleep well and would be out of sorts as we worked. For lack of coca we would open our months saying 'ha ha ha' all day". 5/

"Without coca, in my opinion, workers would refuse to enter the mine; we cannot go in without it. Therefore coca is very important. It encourages us to work; it strengthens us to face the water in the mine shafts. Inside the mine it is humid and we get wet. Coca helps us keep warm". 6/

"Well, if coca should disappear, there would be no work nor mineral, because miners would no longer work. That's why we chew theleaf, so that we will feel more like working. If we don't have

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1/ Interview with Rosa Torrez de Valdivia, 38, Chulumani, Nor Yungas, La Paz.
2/ Interview with Miguelina de Nogales, 29, Chapare, Cochabamba.
3/ Anonymous peasant, Chapare, Cochabamba.
4/ Interview with unknown peasant, Chapare, Cochabamba.
5/ Interview with Gumercindo Gutierrez, 45, Realenga, Vicente Ascarrunz, Oruro.
6/ Interview with Severino Estrada Sankabaya, 48, Mina Chojlla, North Yungas, La Paz.

coca in our mouths, we stand around and are lazy. But when we have our coca, we work faster and more willingly. We also rest once in a while and renew our coca as we rest. If it were not for coca, we could not work at all". 1/

"If coca disappears, we workers have said we would no longer work the mines. We would no longer work without coca. And besides, coca gives us strength, especially to the drillers. Many workers say they would become lazy without coca, and that is the reason they do not want coca to disappear.... Coca is good for stomach ailments. We miners often have such ailments, maybe becuase we often work at night in the mines". 2/

"If there were no coca we might have stomach ailments because there are dust and smoke and other bad things in the mine. People could work up to a month, but then the stomachs of those who are older would swell up and they could die". 3/

"If there were no coca, people would have to buy it at any price. Coca is always a necessity for work. What could they do? Even if there were none, they would look for it any place they could because they are accustomed to always having coca". 4/

"I shall talk of the case of coca because we rural workers always work with coca. If not we become hungry and lazy. Therefore we would not work formally and there would not be enough production to maintain the towns and cities". 5/

"Well, friends, we would like for alcohol to disappear because we waste a lot of money on it. When we buy drink or alcohol we get drunk, we lose our sense, and we do not know what we are talking about. Then we get mad at people .... Drinking makes us get mad and we fight. That is why I want alcohol to disappear. Alcohol isn't needed. Coca, on the other hand, is indispensable, especially for the poor;

1/ Interview with Gregorio Paye, 45, Yampupata, Sampaya, Manco Kapac, La Paz.

2/ Interview with unknown miner, Mina Chayanta, Potosi.

3/ Interview with Justo Massi Tapalluni, 36, Aucapata, Mina San Jose, Ayata, Muñecas, La Paz.

4/ Interview with Gumercindo Gutiérrez, 45, Realenga, Vicente Ascarrunz, Oruro.

5/ Interview with unknown peasant, Santa Rosa, Arco Pongo, Inquisivi, La Paz.

drinking of alcohol makes people poorer. Our animals get lost and we end up sleeping anywhere, or else we cannot walk when we are drunk. Friends, alcohol should disappear, but no coca. We peasants need coca because we always work with coca". 1/

"People who do not practice the aculli can get along without it. We who are accustomed to it, on the other hand, could not. If we do not "chew" our coca, what are we to do? We have to eat and we immediately get sleepy. Those of us who are accustomed to the aculli will get sleepy and we can only yawn. We will get hungry and eat, and our stomachs will simply swell. Therefore, coca is good for all of that". 2/

We could continue with other comments, but these are sufficient to give an idea as to opinions peasants/workers and miners have on the possibility of substitution and eradication of coca. Their ideas are shared by many. Even abstainers in rural communities have talked to us of the critical need for coca on the part of the many who use it regularly.

That these opinions are widespread can be appreciated from the following tables, presenting responses to the question, "What would people say if there were no coca?'. Of the population of 2,712 peasants/workers surveyed, 40 per cent replied that people would rebel in some way or other, 13 per cent that their productivity would decrease, and 16 per cent that they would fall ill. Barely 10 per cent said that they would be able to adapt - and it should be remembered that this is the same percentage of our surveyed population that claimed that they do not use coca in any way shape or form. In other words, it would appear that all consumers, i.e. 90 per cent of the surveyed population, would have some type of negative reaction; approximately half of these would be so disturbed as to rebel against duly constituted authority. This sense of rebellion would apparently affect all ecological regions. People living in the tropics would oppose the move just as much and would be touched as much or more as peasants/workers from the valleys and the Altiplano.

1/ Interview with Pablo Solís Rodríguez, 43, Oveja Cancha, Otuyo, Cornelio Saavedra, Potosí.

2/ Interview with union leader, Oveja Cancha, Cornelio Saavedra, Potosí,

TABLE 177 PEASANTS/WORKERS - GLOBAL SAMPLE
WHAT WOULD PEOPLE SAY IF THERE WERE NO COCA?
BY ECOLOGICAL REGION

$X^2=61.36>X^2_{.005}(8)=21.955$ Significant

Ecological Region	They would rebel	They would fall ill	They would react passively sorrow	Their productivity would decline	Nothing, they could replace it with something else
Altiplano n=1367	42 %	16%	25 %	10 %	7 %
Valleys n=798	40 %	20%	20 %	15 %	5 %
Tropics n=547	40 %	20%	17 %	20 %	3 %
$\bar{X}$ n=2712	40 %	16%	21 %	13 %	10 %

Among miners, rebellion would apparently be even more widespread. Fifty per cent of all miners surveyed said that people would oppose the government in some way or another, 18 per cent said that they would fall ill, and 18 per cent said that productive capacity would decrease. What with sickness, decrease in productivity, and rebellion, lack of coca in the mines would appear to threaten the productive viability of this key economic sector. According to the responses given us, the work of 86 per cent of miners would be seriously affected by lack of coca. Sixty-nine per cent of peasants/workers, also an important economic sector for Bolivia, would be affected in like manner.

Specific forms in which individuals would oppose the government would naturally vary by personality and by locality. The most common suggested was a sit down strike, followed by a hunger strike. Although very few mentioned armed conflict, many respondents did say that people would lose all respect for the authorities. A few stated that people would put pressure on the government to, once and for all, do away with the manufacture of cocaine; they attributed the campaign against coca production solely to the growth of illegal processing and export activities.

TABLE 178 MINERS - GLOBAL SAMPLE
WHAT WOULD PEOPLE SAY IF THERE WERE NO COCA?
n = 277

They would rebel	They would fall ill	They would react passively sorrow	Their productivity would decline	Nothing, they could replace it with something else	Totals %
50 %	18 %	10 %	18 %	4 %	100 %

If we separate responses to this question by basic variables such as sex, age, and level of education, we find that the most rebellious people would appear to be male, young, and well educated. In other words, there would appear to be a greater tendency toward rebellion among those very groups for which a decrease in coca use is most often mentioned. Surprisingly, even 32 per cent of Evangelicals, the nucleus of our abstaining population, responded that elimination of coca supplies would bring mass rebellion.

TABLE 179 PEASANTS/WORKERS - GLOBAL SAMPLE
WHAT WOULD PEOPLE SAY IF THERE WERE NO COCA?
BY SEX

$X^2=20.5>X^2_{.005}(4)=14.86$ Significant

Sex	They would rebel	They would fall ill	They would react passively - sorrow	Their productivity would decline	Nothing - they could replace it with something else
Female n=532	34 %	19 %	25 %	12 %	10 %
Male n=2180	42 %	15 %	20 %	13 %	10 %
Totals	40 %	16 %	21 %	13 %	10 %

In an attempt to gather more personal appraisals as to possible changes in policies toward coca, we also asked each person what he himself or herself would do if there were no coca. The variety in responses reflected the existential situation of each person. Twenty-eight per cent of peasants/workers answered that they would not conform; 21 per cent said that their work would suffer either from sickness, from simple lack of work capacity, or from lethargy and sleepiness. A total of 31 per cent either had no opinion, thought that they would not be personally affected, or thought that they could replace coca with something else. In other words, in the case of the respondents themselves, reaction toward the possible disappearance of coca was more passive than was their estimation as to the potential reaction of others. This is a very understandable phenomenon; few people would confess to being rebellious, until that very moment when they would dare rebel. All respondents were identified on the schedule by name and community, and therefore, would be quite cautious in confessing to any subversive tendencies. But in commenting on the potential actions of others, they had no hesitation in predicting general discontent.

TABLE 180

PEASANTS/WORKERS -GLOBAL SAMPLE

WHAT WOULD PEOPLE SAY IF THERE WERE NO COCA?
BY AGE GROUP

$X^2=80.21>X^2_{.001}(24)=51.179$ Significant

	15-24 n=304	25-34 n=609	35-44 n=650	45-54 n=556	55-64 n=311	65-74 n=189	75-+ n=93	X n=2712
They would rebel %	46	44	41	31	37	34	30	40
They would fall ill %	16	14	16	18	16	17	16	16
They would react passively - sorrow %	17	17	20	32	22	23	27	21
Their productivity would decline %	13	13	13	11	13	11	10	13
Nothing, they could replace it with something else %	8	12	10	8	12	15	17	10
Totals %	100	100	100	100	100	100	100	100

TABLE 181

PEASANTS/WORKERS -GLOBAL SAMPLE

WHAT WOULD PEOPLE SAY IF THERE WERE NO COCA?
BY LEVEL OF EDUCATION

$X^2=43.85>X^2_{.005}(20)=39.997$ Significant

	0 n=1056	1-5 n=1328	6-8 n= 258	9-12 n = 60	N.R. n= 8	U. n= 2	X 2712
They would rebel %	36	41	51	48	50.0	-o-	40
They would fall ill %	17	16	16	16	-o-	-o-	16
They would react passively sorrow %	23	19	15	9	25.0	-o-	21
Their productivity would decline %	15	14	12	17	12.5	50	13
Nothing, they could replace it with something else %	9	10	6	10	12.5	50	10
Totals %	100	100	100	100	100	100	100

TABLE 182 PEASANTS/WORKERS - GLOBAL SAMPLE
WHAT WOULD PEOPLE SAY IF THERE WERE NO COCA?
BY RELIGION

$X^2=11.07>X^2_{.005}(4)=14.86$ Significant

	They would rebel %	They would fall ill %	They would react passively - sorrow %	Their productivity would decline %	Nothing, they could replace it with something else %
Catholic n=2482	41	16	20	13	10
Evangelical n=230	32	17	28	13	10
$\bar{X}$ n=2712	40	16	21	13	10

TABLE 183 PEASANTS/WORKERS - GLOBAL SAMPLE
WHAT WOULD YOU DO IF THERE WERE NO COCA ?

I would get sick and might die n = 189	7
I would not be able to work n = 298	11
I do not "chew" n = 489	18
I would become sleepy n = 81	3
I might give up "chewing" n = 434	16
I might replace it with something else n = 27	1
I would not adjust - sorrow n = 760	28
I would be insulted by people of the community n = 27	1
Nothing n = 271	10
No opinion n = 136	5
Totals % n = 2712	100

In speaking of what they would do if there were no coca, we again see that miners mentioned using coca as a source of energy and as an element of protection in their work more often than did peasants/ workers. Very few miners, and less than one per cent of surveyed peasants, mentioned the possibility of hunger due to the lack of coca. This constitutes yet another indication that the point of view that the acullicador maintains his habit only because he lacks food is essentially naive.

TABLE 184 MINERS - GLOBAL SAMPLE
WHAT WOULD YOU DO IF THERE WERE NO COCA?

I would get sick and maybe die n = 73	26 %
I would not be able to work n = 91	33 %
I would be hungry n = 14	5 %
I do not "chew" n = 28	10 %
I would be sad n = 35	13 %
I would be sleepy n = 32	12 %
I could give up "chewing" n = 4	1 %
Totals % n = 277	100 %

The possibility of facing problems without coca was so serious for 11 peasants/workers that they said they would commit suicide. The general reaction of our respondents was less drastic, but nonetheless quite serious. The following comments illustrate this point:

> "For us coca is one of the most important things in life. We make a living from it. Other crops do not produce the way that coca does. Coffee and other things do not bring a good price. In vain the government is saying that coca will disappear. We have said that we will secretly take coca to the Altiplano to trade for potatoes, charque, and other products. On the Altiplano, people must have coca in order to work. Coca also helps us to solve our problems. This is why we say we will not abandon coca. Coca is medicine for stomach ailments. We use coca to cure 'aire'. 1/

1/ An indigenous disease concept.

"Coca gives us strength. Coca was put here by God". 1/

"If there were no coca, with what would we buy school supplies for our children? In this case we could give our children to the government. We buy school uniforms by selling coca. With no coca there would be no money and we would have to leave our children; we could go leave them with the government". 2/

"We do not want them to poison our coca fields. We have always lived with coca. We sell coca and trade it for things to eat, anything we need. When we heard this news, we women wept. Old people are never without coca. When they told us they were going to poison the coca fields, we cried a lot saying, 'Instead of their poisoning the coca fields, we are going to die'. Coca is useful for everything". 3/

"Coca is very important for the defenses of the peasant and is, in my opinion, essential. If coca were to disappear it would hurt peasants, and especially miners. The majority of rural people use coca". 4/

"If there were no coca, we could not live". 5/

"Coca cannot disappear. If it does, people who use coca will go crazy. I do not know what people could do without coca. It would be preferable for alcohol to disappear before anything happened to coca". 6/

Upon arriving in Perú, the Spaniards discovered an advanced civilization with substantial knowledge about both wild and domesticated flora. Much of this knowledge was subsequently transmitted to the Old World, where it transformed the diet of Europeans. Corn, green beans, squash, and sweet potatoes were readily received, and today are basic elements in European and North American diets. One American drug - tobacco - was widely accepted as pleasurable and harmless. The acullico of coca, however, had a quite different fate. In general, it was considered to be a dirty habit practiced only by, if not savages, at least inferior people.

Through the centuries since the Conquest, the acullico of coca has been, and still is, a symbol of ethnic identification. Native cultures have been buffeted from one side and the other. It is truly miraculous that, despite this treatment, natives have been able to preserve something of their traditional heritage. To a large extent it has been the vitality of this heritage that has given Bolivia its stability, and that enables a subdued and defeated people to retain their pride.

1/ Interview with Severino Estrada Sankabaya, 48, Mina Chojlla, North Yungas, La Paz.
2/ Interview with María Natividad Peñaloza de Zabala, 56, Villa Aspiazu, North Yungas, La Paz.
3/ Interview with Josefina Gómez, 54, Inca, Apolo, Franz Tamayo, La Paz.
4/ Interview with Orlando Guido Moya, 43, Chacala, North Yungas, La Paz.
5/ Interview with María Natividad Peñaloza de Zabala, 56, Villa Aspiazu, North Yungas, La Paz.
6/ Interview with Francisco Licidro Janta, 36, Palca, Chayanta, Potosí.

More than any other element, coca permeates this heritage and society. The tradition inherited by the common people of Bolivia has taught them to use coca alkaloids constructively. The White man now threatens to take this also from the native, and only because, with his modern technology, he has misdirected the forms and purposes for which the plant has long been used.

After spending more than a year among peasants and miners, we are convinced that they are just as concerned about the traffic of cocaine as is the government. They would be willing to help in combating this traffic if, in doing so, their rights as traditional consumers were to be guaranteed. Interference with these rights would create extremely serious tensions among different levels of Bolivian society. It might even lead to violent and bloody confrontation. And white society could end up being guilty, once again, of ethnocide.

In this day and age when the great slogan of international politics is human rights, not to recognize the right that descendents of the first inhabitants of these lands have to maintain their cultural tradition would be inadmissable. It would be, moreover, irresponsibly playing with unknown factors within the Bolivian productive system. It has been proven that the acullicada of coca does not lead to physical dependence. This study, however, indicates that it does lead to strong psychic dependence. If peasants and miners are convinced that they could not be productive workers without their coca bolus, to remove coca would be to play with national production itself. And if their relationships with other human beings depend on offering a few coca leaves,without these leaves peasants could be truly defenseless creatures. In the entire world there is not a single drug, the raw material of which so permeates a nation's culture and society. The phenomenon of coca in Bolivia and Perú is unique in all the world. To understand it and, at the same time, to establish a public policy that is both adequate and humane, represents one of the greatest challenges of our times.

III. COCA IN THE HISTORICAL DEVELOPMENT OF BOLIVIA

A. The Pre-Hispanic Base

It is quite difficult to measure the true importance of coca production and use among the Peruvian-Bolivian Andean Community during the pre-Hispanic period. Some studies, influenced by the Peruvian chroniclers, have maintained that coca production and consumption in the Inca Empire were "a monopoly of the Inca state and its aristocracy; the use of coca was strictly regulated and only the governing class benefited from it " (Burchard 1974:209-251;Kubler 1946). We now know, however, that neither production nor daily use of coca exclusively benefited the Inca state. Both subject groups and ethnic enclaves free of the Inca hegemony had access and regularly used coca. Nor was coca use, at that time, just as now, due to lack of food. The leaf was used, in occord with personal preferences, for the aculli; as a medicine, for ceremony, and for social interaction.

Coca was produced as part of a complex system of exploitation of diverse ecological levels in intermontain regions known as the Yungas. It has been considered an "intertropical" plant because it is produced on the "lower reaches" of the mountains of the Yungas of La Paz, Yuracarés of Cochabamba, and the ranges of Vilcanota, Aviera, Cuchao, etc." (Bertrés, Felipe, 1901, Soc. Geog. Sucre, Year II, Nos.23,24, and 25).

It is hard to tell just when the Indians of Perú and Bolivia started using coca in their daily lives. It would appear,however, that the origins of cultivation are related to its use for chewing, medicinal, and religious-ceremonial purposes. Archeologists have proven that the practice of the aculli was quite common in pre-Hispanic times. They have found, along the coast of Perú, Inca as well as Pre-Inca (Nazca-Mochica and Pachacamac) mummies with coca bags, as well as ceramics (Nazca-Mochica) "with various indications as to the practice of chewing coca " (Rostoworowski 1973: 205) Some evidence has also been found in the area around Lake Titicaca. One consists of two coca chuspas drawn on a vase known as "Urphu" (Inca ceramics) in which chicha (a local alcoholic beverage made from corn or quinoa) was kept. This piece was found on the Island of the Sun. The other is the ceramic known as Huaco-retrato (Chimú). It "shows a man lying or sleeping on a bundle, with a coca chuspa in his hand" (Posnansky, Arturo, Tiahuanacu, Vol. III-IV, La Paz, 1958.: 61-62; 96-97). These two pieces suggest that coca was used for special occasions, as well in the daily lives of individuals.

B. The Colonial Period

Historians such as Pedro Cieza de Leon, Garcilazo de la Vega, Joseph de Acosta, and others referred repeatedly to the use of coca among Peruvian Indians for medicinal purposes, ceremonial occasions, and for daily chewing. They interpreted such use as constituting superstition and exaggerating vice. Mentioning chewing of coca, popular among most Indians, Cieza de León, perhaps a little carried away, calls the practice "surprising", a "vicious custom" of Indians "whose noxious action led to abuse" (Cieza de León 1973: 220-221). For his part, Joseph de Acosta, appreciating the stimulatory value of the leaf, considered that the practice of the aculli gave "strength and courage to the Indians", because without stretching the imagination, with a handful of coca they could walk "double shift without eating" (Acosta, Joseph de: 1962,181).

Because of its stimulant properties, coca was highly regarded by Indians who, therefore, grew it with "extreme care" and conserved it as something "very delicate" after harvest. It has been maintained that the habitual use of coca among Indians increased after the Conquest because it was "convenient for Spaniards as yet another way of exploitation and, through the energizing qualities of the leaf,of getting higher yields from the

Indian in the world of the mines (Marroquín, José 1943: 309).

In the early days of the colonial period, the Church tried to influence Spanish authorities against coca use. This was especially true with respect to use for Amerindian ritual, for Church authorities associated this with the practice of idolotry.Afterwards, however,upon seeing its economic possibilities, the Church no longer took a stand against either use or production. Because tithes on coca eventually came to pay most clerical salaries, the Church finally even encouraged production of the leaf by acquiring a number of coca haciendas.

Realizing its great economic potential, Spaniards quickly began to produce coca and amassed fortunes by marketing it to a ready public. By the sixteenth century, some 2,000 Spaniards had developed large businesses based on coca. Acosta could write: "contracts for coca in Potosí alone amounted to more than half a million pesos a year. This corresponds to a yearly consumption of between ninety and ninety- five thousand cestos; in fifteen eighty-three, Potosí consumed one hundred thousand".In Cuzco, a cesto of coca cost from two to two and a half pesos; in Potosí one cost between four pesos six tomines and five pesos .Because of its high demand, coca was the source of many "windfalls" Acosta 1962: 181). The cities of Cuzco, La Paz, and La Plata collected 80,000, 70,000, and 40,000 pesos annually from its sale.Merchants,in order to obtain higher profits, were experimenting with its "medicinal aspects" as well (Vega, Garcilazo de la 1967: 49).

The increase in production and consumption of coca soon attracted the attention of officials of the colonial goverment and of the Spanish Crown. These officials concluded that the trade should be either eradicated or controlled. Between 1555 and 1561, Viceroy Cañete tried to do away with coca production entirely because he associated it with idolotry, and with "the fact that the growing coca industry was absorbing labor from the mines" (Kubler 1946) . Soon afterwards, an ordinance by Phillip II in 1573 established punitive measures to the end of limiting production. Other ordinances in the provinces of Peru prohibited anyone from having "a field of more than 500 cestos of coca"; transgressors were to be fined 500 pesos. People caught shipping coca from production areas to Potosí were to be fined the same amount. Owners of coca patches or haciendas were to "provide food" and pay salaries to hired Indians. Owners could keep workers no longer than one mita, even if the workers themselves wanted to stay longer. But the ordinance failed. Accounts indicate that coca grew in importance in both producing and consuming areas. Because of its economic and social importance, production and consumption of the leaf could not be limited. By the beginning of the seventeenth century, both Indians and coca had become irreplaceable elements for hard labor of Potosí mines, (ANB Minas: 123) and by the end of the eighteenth century, many citizens of La Paz owned coca haciendas in Yungas. José Antonio Diez de Medina, one such hacienda owner, maintained that the opulence of La Paz was due to the coca production of Yungas (ALP.RE.1805).

Within the Colonial system, there existed a tax called the alcabala. A buyer had to paythe alcabala on any contract of purchase and sale. This tax was charged for trading as well, and was imposed on a number of products such as ají (hot peppers), wool, coca, etc. The first alcabala on coca was created during the reign of King Phillip II (1573). All coca merchants had to pay this tax in the jurisdictional seat of the district in which the product was sold, excepting only citizens of important cities such as La Paz, Potosí, and La Plata, who had the option of paying in their place of residence. The alcabala included aspects besides purchase and sale. Hacendados of Yungas, for example, had to pay it on agricultural supplies entering the area (AGN B.As. 1797-1799, Leg. 7,9-5-6, No. 2).

C. The Republican Period

As in the previous period, coca continued to be economically important for La Paz, as well as for the rest of the country. Increase in coca production during the Republican period was greater than even during the colonial period. This was undoubtedly due to the availability of more land in Yungas haciendas and to the existence of a guaranteed market in the mining and rural centers of the country. Little was exported to bordering countries and even less to Europe. Increased production was implemented primarily by the producers, though the government encouraged it in order to augment revenue from the coca tax. Soon after the founding of the Republic, one of its more distinguished presidents, Mariscal Andrés de Santa Cruz, while visiting Yungas, ordered the construction of a road into the area. It was hoped that this would encourage greater production of important agricultural products, coca among them. However, until the debate over cocaine, there was no specific state policy as to production and marketing of coca, for or against.

Upon emergence of the Republic, the Church did nothing to change its basic policy toward coca. Until recently, it continued to grow the leaf on its Yungas haciendas. As to consumption and marketing, the Church took no position whatsover. Its only censorious action was an occasional attack on ceremonial use because of its association with divination and superstition.

What did bring change during the republicen period was the founding of the Society of Yungas Landholders. According to Paredes, white and mestizo coca producers "formed valuable haciendas with the best coca land" taken from Indian proprietors (Paredes 1976: 296-297). Once these haciendas were well established, coca production increased substantially. Seeking more protection for their economic interests, these owners organized the "Board of Yungas Landholders". The organization was formalized by the government of Mariscal Santa Cruz in Sucre on July 6, 1830. This Board, later converted to the "Society of Landowners", played an important part in the socio-economic ascent of its members especially through the building of a road, paid for by the coca tax and opening the Yungas to vehicular transport. For the next 100 years the organization would play a key political and economic role, and would obtain advantages for both coca and other products important to the area.

Owners also developed corporate level enterprises, to the end of growing coca on a larger scale, and of producing other crops such as quinine, coffee, and to a lesser degree, cacao and sugarcane. An example of such an enterprise was Coriguaico. It issued 1960 shares that were held by 100 shareholders from the departments of La Paz, Cochabamba, Potosí, Oruro, Santa Cruz, and Arequipa in the Republic of Peru (Estatutos de la Empresa Agrícola "Coriguaico", 1885). Some of these enterprises were impressively large. The Cañamina hacienda, located jointly in the provinces of Yungas and Inquisivi, had 2,500 hectares of prime land alloted to the cultivation of coca (Pamphlet: Hacienda Cañamina, L.P., 1902:7).

Through publications by the coca Customshouse in Inquisivi we know of a similar organization for that province known as the "Society of Landholders of Inquisivi". Although we know little of its history, this organization undoubtedly was also involved in the production of coca.

Around the beginning of the twentieth century, the 75,000 quintales of coca produced annually in North Yungas, South Yungas, and Inquisivi accounted for "three fourths of the total producers of Bolivia". Production of coca appears to have been almost the only activity of importance in Yungas. A considerable portion of the harvest was exported. Between 1920 and 1925, of a total production of 16,347,115 kilograms, 14,185,872 kilograms went for local consumption, 1,877,544 kilograms were exported for Argentine sugar mills, 280,536 for workers in the Chilene nitrate fields, 190 kilograms went to Ecuador, 2,889 kilograms were exported to Germany, and England imported 84 kilograms for medical purposes (Moralos 1929: 157-158).

The majority of the owners of Yungas coca haciendas were aristocratic residents of the city of La Paz.
They played preponderant roles in the social hierarchy, economically as well as politically, and at a departmental level as well as nationally. Many members of the Society of Proprietors were outstanding people who held important administrative posts and constantly participated in political activities. They were, therefore, able to help the organization of which they were members. Benigno Clavijo, hacienda owner in Yungas, for example, while Prefect of the Department of La Paz in 1880, cooperated with the government in the reorganization of the Board or Society of Proprietors of Yungas; José María Camarra, at one time president of this organization, played an important part in the 1944 National Convention on the projected Bolivian Agrarian Reform; and Juan Granier Chirveches, an active member of the board of directors of the Society, was president of the Banco Agrícola and formed part of the National Coca Commission in 1949, thus cooperating with investigators from the United Nations.

During the second decade of the twentieth century, coca entered one of the most critical periods of its history. It was threatened by a League of Nations policy to limit and control production in order to curtail the manufacture of cocaine. Since even the earliest international agreements on narcotics, coca has been erroneously classified as a narcotic. In 1923, the League of Nations asked the Bolivian government to provide data on "the industry of coca and preparation of cocaine". The report was prepared by a member of the Society of Proprietors of Yungas and sent to the League by the president of the Society. Soon after, in 1925, the League of Nations tried to implement programs for the control and limitation of both opium and coca. Bolivia joined in this agreement without, however, committing itself to restricting production and use of coca among the Bolivian population. Coca producers were forced to take defensive measures on both national and international levels. Their argument to the effect that "Bolivian coca was food and surely one of the most complete foods" was, however, not very convincing (Sociedad de Propietarios de Yungas 1948). When, in 1929, Chile complained about Bolivian coca entering its territory, owners replied saying that coca "may be the only one of our agricultural products providing sizeable fiscal income. It has to be defended by the government as something that contributes to the National Treasury". The government tried to ignore complaints about the introduction of Bolivian coca into neighboring countries, and made an effort to support the coca interests of Yungas hacienda owners. With this support these owners did all they could to interfere with any international control of production and consumption. The government, then, acted with the implied conviction that the use of coca in Bolivia was not dangerous, but that rather it "benefited the vital economy of the native and proletarian classes of the nation". It was also aware, needless to say, that coca constituted an important source of fiscal revenues (Fernández, Nicanor 1932: 2).

Policies as to production and consumption of coca were therefore sharply divided. On the one hand was pressure from international organizations to control production of coca, which in turn constituted a response to pressures from countries affected by the traffic of cocaine. On the other hand was the strong resistence by producers against any type of limitation or control, dictated by their economic interests. Given this conflict, the Bolivian goverment was forced to defend these owners of coca haciendas who demanded that production, marketing, and consumption of coca in the country not be altered. The international campaign to eradicate or control coca in Bolivia, therefore, was doomed to failure from the outset.

Traditionally, defense of production, marketing, and consumption of coca has been a product of the income and social status of producers and

merchants, and the tax revenue of the goverment. For producers and merchants, increased production has meant better social and economic opportunities. The alcabala had been applied to coca during the Colonial period and generated substantial govermental income. Republican governments modified this tax to respond to circumstances and necessities arising out of the new state of affairs. Because its production and marketing provided sure sources of income for departmental and national govemments, coca was subject to several taxes, whereas only a real estate tax was applied to haciendas not producing coca (Morales 1929,115). During the first years of the Republic, the taxes were used for the construction of roads. By virtue of a decree issued on July 6, 1830, Yungas owners were allowed to impose a levy of 20 centavos bolivianos per cesto of coca for the opening of a road to Yungas. This amount was increased until, by 1945, it had reached 90 bolivianos. Coca also generated revenue for road and bridge construction through tolls, municipal taxes on places of sale, and a tax of one real on each cesto entering the market. The owners themselves benefited from some taxes, in that their Society of Propietors could spend certain revenues for self maintenance.

These included:
- 14 per cent on those taxes created by the law of April 17,1941.
- Floating taxes
- Voluntary taxes
- A tax of five Bolivianos per 25 pound cesto, established by the law of December 4, 1941 (Anuario Legislativo de 1945, Convención Nacional de 1946: 331).

Owners of coca haciendas were quite disturbed when Victor Paz Estenssoro and Walter Guevara Arze presented their Agrarian Reform project in 1944. José María Gamarra, one of the principal members of the Society of Proprietors, upon learning of this proposal, said, "I am extremely interested in this project because of my actual economic situation, involved as I am with the constant and honest working of my haciendas. I declare, from the start, that I am the first supporter of the Agrarian Reform if it is based on true social justice". He then proceeded to voluntarily offer his Tutucucho hacienda in Escoma, province of Camacho, for experiments on the reform. He also offered one of his haciendas in Yungas for the same purpose. Yet he made it clear that he was opposed to the destruction of the hacienda and possible division of hacienda lands among the peasants (Sanjinés, 1945: 334-343).

The impact of the Agrarian Reform in 1953 was, then, very disconcerting for hacienda owners. Many haciendas were confiscated and the land divided among the peasants who had worked them until that time. The traditional hacienda structure was almost completely destroyed, yet coca production declined less than had been originally feared, for peasants continued to grow the bush on their small plots of land. There were, to be sure, a number of problems due to the social and political confusion accompanying the emergence of new peasant leaders. A report by the Coca Customshouse in 1953 refers to such confusion as follows: "Because of a lack of understanding on the part of some peasant sectors, they refused to harvest coca after the Decree of Agrarian Reform. Thanks to explanations by officials of the Ministry of Peasant Affairs, however, the situation for coca and other agricultural products has returned almost to normal" (Aduana de la Coca, 1953). Free communities, of course, continued in their normal activities, and were only marginally affected by such events.

Shortly before the 1952 revolution, the international policy of substitution or limitation of coca use and production had progressed to the point of commissioning a serious study. In response to an official Peruvian request, the United Nations decided in 1947 to launch an investigative team for work in Bolivia and Peru. The work was carried out in 1949, with visits to both producing areas and centers of traditional use in both countries. Since the experts in charge of the investigation were neither anthropologists nor sociologists, they saw no useful function for coca.

They interpreted traditional use of the leaf as tantamount to drug addiction.

Included in the commission was Juan Granier, an active member of the Society of Propietors of Yungas. The group visited typical centers of production and consumption, such as the Yungas area of La Paz and Cochabamba and the mining district of Catavi. They also visited various rural communities in Cochabamba, and interviewed a number of Indians as to their use of the coca leaf.

The visit to Catavi was probably the most important one. Investigators were able personally to observe workers in their habitual aculli of coca. They asked about marital status, number of children, reasons for practicing the aculli, frequency of the aculli, amount consumed, and whether the aculli was used only in the mines or at home as well. They also looked into the age at which people began the practice, and whether wives and children joined in. A meeting took place at the mine which included foreign and Bolivian engineers, physicians, overseers, workers' representatives, police, the principal of the region's schools, and other employees. The commission saw that workers did not practice the aculli through vice, but as a protection "of their organisms" against "the dust of the mine". They observed that, except for Indians, shop workers, mill workers, and other employees did not practice the habit. Some employees maintained that "the use of coca fulfilled an important function in contributing to the nutrition of Indian and miner". They stated that, for workers, coca was 'a real necessity because they know it satisfies hunger and thirst", as well neutralizing physiological fatigue and stimulating "physical energies" for working. Others contradicted these opinions, saying that coca diminished working capacity. They noted that the education available to the miner should encourage a decrease in consumption of coca. According to the company physician, coca was the cause of nervous and moral inferiority in workers effects of coca were '[illegible]' to both the health and morale of miners. In order to abolish coca, the miner would have to be subjected to education and civilization. The conclusion was reached that all miners ate poorly because they believed that coca satisfied hunger and thirst. It was discovered that managers of the company store did not consider coca to be a basic staple. The store did, however, issue four ounces of the leaf to each worker every other day. Coca consumed in Catavi came from Yungas and Cochabamba. Miners started to practice the aculli at age 17 or 18.

According to its president, the Commission, despite not having technical expertise, gathered data "they considered to be the most important". Their conclusion was that they had studied the problem 'as thoroughly as possible in terms of the scientific aspect, and that the problem might have to be studied in more depth sometime in the future." The report was published in the La Paz newspaper El Diario on January 28, March 7,8, and 9, and April 6, 1950. As a follow up, according to reports by the coca customshouse for 1952-1958, and in accord with international agreements, Bolivia began to implement "a tough policy toward gradual radication of production' of coca. As part of this policy, Yungas areas previously used exclusively for coca were supposedly being planted now to fruit and coffee.

In 1962, Victor Paz Estenssoro, President of Bolivia, issued a supreme decree ordering the complete eradication of coca production, prohibiting new plantings and establishing measures for the gradual substitution of the crop with other agricultural products. This decree was never put into effect. To the contrary, coca production continued to increase, especially with the opening of vast new lands through the construction of a paved road linking Cochabamba with the Chapare. By 1972, coca had become the main crop in this region. Most producer were members of spontaneous colonies. Some had emigrated directly from the old production areas of Vandiola and Totora to take advantage of ample virgin lands, and these migrants provided models for others. Thus the very roads that provided rapid

access to urban centers and, by that token, some what discouraged consumption, stimulated production.

During the 1970's principal changes as to policies toward coca have been the establishment of the National Directorate for the Control of Dangerous Substances, an Institute of Drug Addiction, and the Project for Development of Chapare-Yungas (PRODES). The latter was founded for the purpose of replacing coca with other crops. All of these institutions have had backing by international organizations, especially the government of the United States of America. Their success, however, has been relative. In the first place, the geography of Bolivia militates against any type of control program. It is almost impossible to keep track of movement of people in isolated places, especially of people who are used to transporting their products by simple human or animal power over roads impassable by motorized vehicles. Even many vehicular roads are seasonal in nature, accessible only by trucks and fourwheel-drive vehicles, and totally uncontrolled. There also exists the well entrenched custom of avoiding control and taxes in any possible way. Added to these problems is the fact that nearly all Bolivian officials are poorly paid. Many agents of control, and even governmental officials, to cope with their penurious state, accept bribes. Even the best planned system can be destroyed under these circumstances. Control and registration data are not reliable, and due to difficulties in arriving at the truth, any rationalization program is well nigh impossible.

In sum, coca control programs are confronting the geographic, economic, and moral realities of Bolivia. for the first time in history, coca has become a contraband item. Many insist that, instead of diminishing in size, coca lands are constantly growing. No one knows what the truth of the situation may be. Despite tremendous efforts and expenditures, we still lack reliable data on the amount of coca produced in Bolivia each year.

The present study has demonstrated the enormous importance of coca within the traditional culture shared by the majority of Bolivians. It indicates that policies toward coca are among the most delicate matters faced by the nation. How can international pressures and needs be met without creating a serious internal crisis? To cope with Bolivia's dilemma will require the utmost in diplomatic skill, bureaucratic ability and honesty, and profound cultural understanding. Given the way in which coca has been , and will continue to be, inseparable from Bolivian history and life, it would appear that to attempt to abolish it would be incompatible with reality and fundamental human values.

The coming months and years will be a true trial for the policies, the economy, the society, and the moral base of both Bolivia and those other countries of the world that are affected by the decisions made here.

IV. CONCLUSIONS AND RECOMMENDATIONS

A. PRODUCTION AND MARKETING OF COCA

1. Available secondary information is, in general, not temporally sequential. Because of this and other deficiencies, adjustments must be made in arriving at production and marketing figures. This is particulary true with regard to area, yield, production, and costs.

2. A substantial discrepancy exists between volumes of coca registered by the Agricultural Customshouse and by the National Directorate for the Control of Dangerous Substances. This is demonstrated by the following figures:

Agricultural Customshouse:	5,783,810 Kg.
D.N.C.S.P. :	4,119,210 Kg.
Discrepancy:	1,664,210 Kg.

Because they are greater, volumes registered by the Agricultural Customshouse have been used as a basis for comparison with those presumibly marketed by producers.

3. For 1977, volumes of marketable coca, based on our secondary sources for production volumes and controlled by the Agricultural Customshouse. are:

Yungas Franz Tamayo	Chapare	Total Regions	Agricultural Customshouse La Paz	Agricultural Customshouse Cochabamba	Total Customshouse
1,910,430	7,728,380	9,638,810	2,117,300	4,656,000	6,773,300

We consider these to be underestimates of reality. However, because they are the hardest data available at the present, we have used them in our comparisons with requirements for legal use as well as for other basic calculations.The Directorate for the Control of Dangerous Substances has recently released a confidential memorandum in which supply is estimated as between two and three times as great, but we consider this to be an overestimate, principally because it is based on MAXIMUM yields and because the factors of loss and auto-consumption are poorly controlled. The Ministry of Agricultural and Peasant Affairs has supplied us with other estimates that would appear nearer to reality, but these are exceedingly preliminary. Because of this situation, any definitive statement as to production and supply must be considered premature. Final placement of our data on traditional consumption within such a framework must await production figures more reliable than those presently available.

4. According to our secondary sources, during the period between 1972 and 1977, the cultivated area in coca producing zones of La Paz, as well as the number of producers, decreased by 37 per cent. Yield increased 53 per cent and production decreased 40 per cent. For the same period, the Chapare showed a decrease of 21 per cent in cultivated area and one of 0.31 per cent in producers. Yield showed a hefty increase of 126 per cent, and production one of 77 per cent.

5. Given the fact that legal marketing of coca generates high incomes for each participant marketing sector, one must come to the conclusion that the system provides its own resources for financing operations and activities of each component, be this producers, transporters, wholesalers, or retailers. Natural and/or marketing risks are handled by each individual. Due to its restrictive and proscriptive characteristics, coca is subject to neither state nor private bank financing.

6. We know of no in-depth studies as to relationships between different participants in the coca market. The Institute of Social and Economic Studies (IESE) in Cochabamba, in its study on production and marketing of coca, claims the existence of strong bonds between wholesalers and retailers. These bonds are strongly influenced by ties of direct or fictive kinship; it is common to see the wife,niece,sister-in-law, compadre, etc.,of the wholesaler involved in the retailing of coca. One also finds the frequent case of truckers who, simultaneously, are wholesalers or owners of retail stores. The relationship

tends to be solely one of buying and selling. The merchant provides certain services to the producer such as the purchase of the product on the farm, provision of supplies, transportation, and, in many cases, advancement of money.

7. We have found there to be differences in the price of coca depending on quality and area of origin within a given production region. Thus, coca from high zones of the Chapare commands a better price than that from lower zones. Coca of good quality, or green coca, is more expensive than poorly dried blackish coca. Coca from the Chapare tends to be some 50 per cent cheaper than that from La Paz. Coca produced in North Yungas, particularly around Coripata, is higher priced than that from other Yungas areas. Because it is relatively unknown, Apolo coca is considerably cheaper than that from Yungas and the Chapare even though people who use it insist that it is among the best quality.

8. Revenue generated by taxes on marketing and distribution of coca benefits different institutions. For 1976 these were as follows:

- Agricultural Customshouse, Cochabamba	2,979,300	1/
- Agricultural Customshouse, La Paz	7,450,440	1/
- National Directorate for the Control of Dangerous Substances	960,621	
- Municipality of Cochabamba	247,195	
- Municipality of La Paz	42,210	
- District Internal Revenue Service: Tarija	556,194	
- District Internal Revenue Service: Potosí	116,800	
- District Internal Revenue Service: Sucre	28,307	
- Prefecture of the Department of Oruro	88,888	
- University in Cochabamba	26,721	
- University in La Paz	2,520	
- University in Tarija	560,500	
- University in Potosí	137,386	
- University in Chuquisaca	28,306	
- University in Oruro	91,593	
- Municipality of Oruro	68,102	
- Municipality of Tarija	3,630	
- Municipality of Potosí	26,068	
- Municipality of Sucre	14,040	
TOTAL	13,428,821	

9. Data with respect to consumption of coca in principal cities and other districts within each department, provided by merchants and appearing on "transit permits" issued by the National Directorate for the Control of Dangerous Substances, would appear not to reflect true consumption of the leaf. For example, the urban centers of La Paz, Santa Cruz, Potosí, Tarija, Oruro, and Sucre appear as destinations for coca consumed in each. But if we take into consideration the probable user population for each urban nucleus, (peasants near cities, workers, and home users), we see that it could not consume even 15 per cent of the amount shipped to each city.

10. Due to lack of clarity in procedures for issue and control of export permits by the National Customshouse, figures for volumes of coca exported to other countries cannot be accepted as reliable. This situation should, in the future, be carefully analyzed and legal procedures defined which would permit an adequate control of coca exports.

B. CONSUMPTION OF COCA

1. Our data on coca use are based on a survey carried out in the six highland departments of Bolivia. We randomly selected 100 of the

1/ These funds are distributed to different institutions (see Appendices 4 and 10).

total of 955 cantons that make up these departments. Within each canton, we took a sample of approximately five per cent of all households, using for this purpose the latest Bolivian pre-census. A total of 2,989 households were surveyed: 2,712 peasants/workers and 277 miners. In addition, surveys among coca merchants were carried out in 97 of the 100 cantons. Those consumers surveyed constitute a random sample of 65 per cent of the Bolivian population, and represent the nucleus of traditional coca users.

2. Due to lack of time and resources, neither departmental capitals nor the three lowland departments could be surveyed. We consider this to be a basic flaw in the study which should be corrected at some time in the future.

3. The surveyed population provides a cross section of basic socio-cultural and geographical variables in Bolivia. Among the 2,712 peasants/workers surveyed, for example, divisions were as follows:

Sex	Male	Female	Total
	2180	532	2712

Religion	Catholic	Evangelical	Total
	2482	230	2712

Ecological Region	Altiplano	Valley	Tropics	Total
	1367	798	547	2712

Age	15-24	25-34	35-44	45-54	55-64	65-74	75-+	Total
	304	609	650	556	311	189	93	2712

Level of Education	0	1-5	6-8	9-12	Normal	Univ.	Total
	1056	1328	258	60	8	2	2712

4. The percentages of the population that regularly consume coca are quite high. Among peasants/workers only 9 per cent were abstainers, and among miners, only 4 per cent. Data gathered from peasants/workers indicate that a larger proportion of men practice the aculli than do women, but that a large majority of both retain the habit. Eighty-eight per cent of miners and 79 per cent of peasants/workers, including women, regularly practice the aculli. Excluding women, 82 per cent of peasants/workers do so. Eight per cent of miners and 12 per cent of peasants/workers, including women, do not practice the aculli, but do use coca for other purposes.

5. There are many reasons for using coca. In answering the question, "For what do you use coca?", respondents mentioned sixteen uses. The four principal ones were: 1) as a source of energy for working, 2) for medicine, 3) for combating the cold, and 4) for asuaging hunger. Miners were different only in selecting "asuaging hunger" as reason number 3, and "combating the cold" as reason number 4. All of these motives for using coca, although selected solely on the basis of empirical experience, are in complete agreement with what is scientifically known about the acute effects of the aculli.

6. Levels of use are rather high. Averaging the quantity of coca consumed by abstainers, consumers but non-"chewers", and "chewers", we obtained the following figures:

Peasants/workers	Miners	Total Sample
9.41 ounces per week	17.16 ounces per week	10.13 ounces per week.

There are marked variations in level of consumption. Catholics consume more than Evangelicals; people living in isolated places consume more than those living near cities or on a main roadway; those who have attained higher levels of education consume less than those who have little or no education. The heaviest consumers are people living in the valleys, the lightest those on the Altiplano, and people living in the tropics are intermediate in their level of use — all facts that challenge the theory that coca is used principally as a way to adapt to high altitudes.

7. The preferred coca variety is, undoubtadly, that produced in Yungas, among which that from Coripata is considered the best because it is soft, sweet, and fragrant. The main reasons Chapare coca is consumed are its low cost and its availability.

8. According to 70 per cent of our surveyed population coca has no substitute. Only 11 per cent said that it could be replaced with food, and another 11 per cent that it could be replaced with candy. This suggests that people do not resort to coca because they lack food; if so, an increase in food supply would probably notaffect coca consumption. The belief that coca can be replaced by candy might be related to coca's function in raising blood glucose levels. The fact that the majority of people sharing this belief live on the Altiplano, where the problem of hypoglycemia is common, adds plausability to this hypothesis. Most of our surveyed population insisted that coca has no substitute, and that, if there were no coca, consequences would be serious for both consumers and for Bolivian society as a whole.

9. Only a minority of those surveyed believed that the use of coca is decreasing. Fifty-eight per cent said that, within their own communities, the same amount of coca or even more is used now than was used five years ago. The 37 per cent who believe that less is used attributed this decrease principally to the spreading of Evangelical sects and to the fact that the young are abandoning the custom. Only 3 per cent attributed the decrease to the influence of formal education. Merely being young does little to inhibit coca use. Those young people who have little or no education (less than six years) appear to be following established patterns; they use coca with the same dedication as did their progenitors. Where changes do occur is within the small minority which has had more than six years of education. There is s strong inverse relationship between level of education and level of coca consumption.

10. The surveyed population reacted quite negatively to a possible disappearance of coca. Among peasants/workers, 40 per cent were of the opinion that this situation would lead to a general rebellion, 16 per cent that people would become ill, and 13 per cent that agricultural production would seriously decrease. In the case of miners, 50 per cent believe that there would be rebellion, 18 per cent that people would fall ill, and another 18 per cent that productivity would be seriously impaired. These attitudes demonstrate the great importance given by peasants/workers and miners to coca as a source of energy.

11. The level of use reported by the surveyed population indicates that data on coca production emanating from previous studies have to be underestimates. If they were correct, marketable supplies from all production areas would fail to cover the traditional demand of only the six highland departments, even when the capital cities are excluded. If to these cities we add the three lowland departments, the deficit in marketable supply becomes substantial. According to these secondary sources, in 1977 Bolivia's marketable coca supply reached only 9,638,810 kilograms. Our data on consumption indicate that to satisfy traditional demand and legal exports, the country would require between

11,264,269 and 12,032,114 kilograms. This would imply a deficit in marketable supply oscillating between 1,625,459 and 2,393,304 kilograms. Given this situation, it is impossible to even speculate as to the amount of coca used for illegal purposes. The urgent need for a serious study of production is obvious. In the meantime, the only logical conclusion would appear to be that, if some portion of production is being processed for illegal purposes, it must be minimal.

C. RECOMMENDATIONS

1. The first step which should be taken is to determine, based on a totally serious and responsible study, the actual level of coca production in Bolivia. Until this is done, accurate appraisals as to the relationship among marketable supply, demand of the legal market, and diversion for other uses will be impossible.

2. Given that coca use is still so important in the every day life of peasants/workers and miners, the present policy of protecting traditional consumption should continue. Coca production should be rationalized, not eliminated.

3. Because the coca preferred for traditional uses is that produced in Yungas, i.e. the coca with a lower level of the cocaine alkaloid, production of this coca should be encouraged, as opposed to that of the Chapare.

4. Due to the heavy dependence of growers on coca as their major product, their income should be somehow guaranteed before interfering with their productive activities. Programs of agricultural-industrial development for Yungas and the Chapare are excellent and should be expanded.

5. It should not be expected that traditional coca use will disappear of its own accord. The custom is so deeply entrenched that it could be eliminated only by the elimination of traditional cultures. As these very cultures are considered to be one of Bolivia's principal resources, interfering with their requirements for coca could have very serious consequences.

6. Serious and well funded studies should be launched as to the relationship between traditional coca use and nutrition.

7. Studies should be carried out as to the long range effects of the aculli. Basic socio-cultural variables, such as sex, age, religion, level of education, type of work, diet, altitude, and consumption of alcohol and tobacco, should be carefully controlled. Only after such studies have been completed will we be able to know the true effect of this habit on the health of its adherents.

8. The distinction between the coca leaf and cocaine should be continuously emphasized. More research should be carried out on the other 13 alkaloids of coca and their influence on the traditional user. The pharmacokinetics of the aculli should be studied in order to establish, once and for all, how this form of absorbing alkaloids differs from others.

9. The traditional coca user should be considered an ally in the struggle against illegal drug traffic. Because he believes that his traditions and needs are threatened by this traffic, the traditional user is willing to help in combating it.

10. Present systems of control and registration are clearly both inefficient and deficient. If there are to continue to be national and international policies of rationalization, these systems need to be substantially restructured.

V. SELECTED ANNOTATED BIBLIOGRAPHY

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ANONYMOUS
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A brief note indicating that the Society for Forensic Medicine and Toxicology in Buenos Aires has voted unanimously that coca is neither useful nor indispensable to life in the Andes. The society recommends as a final goal the suppression of the habit.

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A comprehensive and well-organized discussion of cocaine. The author deals in detail with its history, uses, and effects, using these classifications to organize his exposition. It contains also several appendices with information on and an evaluation of U.S. drug legislation, refining and storing of cocaine, its determination, weights and measures, and finally, a chronology. One of the main themes running through the book is the role of "scientific ignorance

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BAKER, Paul T.
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Additional materials coming from Baker's work in Nuñoa, Department of Puno, Peru. By comparing natives of Nuñoa (altitudes of 4,000 me-

ters or more) with Quechua speakers from the Peruvian coast and with North American researchers, Baker concluded that the Nuñoa natives possessed several favorable adaptations: greater maximum oxygen consumption, greater heat production in the first hour of exposure to cold, and greater heat loss due to higher temperatures in the extremities. he suggests that they are better equipped to deal with high altitude stresses such as hypoxia and cold, and that this may be a genetic adaptation.

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This is followed by a detailed discussion of coca production techniques, the role of shade in caring for the plant, and the method of harvesting. Diseases are also discussed, as are methods of combatting them.

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A brief review of the historical and actual use and production of coca in Colombia. Statistical data are presented on production. Observations of the effect of coca on users are impressionistic and not based on laboratory work or controlled study. Author was vice-director of the Panamerican Sanitary Office, and later became Minister of Health for Colombia. His point of view is that chewing is extremely harmful, and that it leads to physical and moral degeneracy.

BEJARANO, Jorge
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In the translation some sections of the article have been omitted, but the major outlines of the author's argument remain untouched.

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The major work on coca in Colombia by the physician who, when minister of health, pushed legislation outlawing coca in Colombia. This publication contains much verbatim repetition from previous articles by the same author. There is a brief historical survey, a description of the present patterns of production in the country, and a strong statement as to the dangers of the drug. No experimental or scientifically controlled data are given. The monograph could be considered essentially a political treatise.

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A general article tracing the history of coca in Colombia and its geographic distribution. The article includes the decree promulgated during the time that the author was minister of health, calling for a total prohibition of coca. Reasons for the decree's total failure are given, and an appeal is made that the Colombian government launch a new, and this time effective, anti-coca campaign.

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An assessment of the progress made in Colombia's fight against coca since the author's previous publications in the early 1950's. Bejarano notes that the campaign has been fairly successful in the state of Huila, but that in the State of Cauca, where coca production and use was greater, little has been accomplished. He calls for renewed government effort along the lines previously set forth.

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A general, chatty article that discusses the origins, spread, and use of coca and the isolation and uses of cocaine. Psychological and moral deterioration are attributed to coca chewing, but no scientific evidence is presented.

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BONILLA Iragorri, Gerardo
1948 "El Cocaísmo en Colombia" Revista de Farmacología y Medicina Experimental 1(2): 259-260.

A brief review of Bonilla Iragorri's book, El Problema del cultivo y masticación de hojas de coca en Colombia, in which the author calls strongly for an eradication campaign. A political treatise rather than a scientific study.

BORGHELLI, Ricardo F., Martin A. Stirparo, Jorge H. Andrade, Mario H. Centofanti, and Ramon E. Barros.
1973 "Lesiones de la mucosa bucal por el uso de hojas de coca (Erythroxylon coca) en el grupo etario de varones de 20 años de la Provincia de Jujuy (Argentina)". Revista de la Asociación de Odontología Argentina 61(7): 250-254.

Report on the examination of 2174 army recruits, of whom 655 had one or more lesions of the buccal mucosa. Of these 655, 110 had lesions that were compatible with the habitual use of coca. Results of this study led the authors to develop a well controlled piece of research in Humahuaca (cf. 1975 article in Community Dentistry and Oral Epidemiology).

BORGHELLI, R.F., M.A. Stirpano, M.H. Centofanti and J.H. Andrade
1975 "Clinical and Epidemiological Study of the Buccal Mucosa of Inhabitants of Humahuaca". Journal of Dental Research 54(3): 640.

Three brief abstracts reporting the results of the research described in detail in the Community Dentistry and Oral Epidemiology article.

BORGHELLI. R.F., M. Stirparo, J. Andrade R Barros, M. Centofanti, and O.T. de Estovez.
1975 "Leukoedema in Addicts to Coca Leaves in Humahuaca, Argentina". Community Dentistry and Oral Epidemiology (Kobenhavn) 3(1):40-43.

An English language version of previously published Spanish language reports. The buccal mucosa of 301 subjects of both sexes, ages 30 to 87 years, was studied for leukoedema and leukoplakia. One hundred fifty were coca chewers and 151 non-chewers. Prevalences of 61.3% for leukoedema and 21.3% for leukoplakia were reported for the study group, and 9.2% and 3.9% for the control group. Lesions in the study group coincided with the placement of the coca bolus in the mouth. Histopathological analysis indicated that the lesions were benign. A defect of the study is that the users were on the average more than 10 years older than the non users.

BRECHER, Edward M. and the Editors of Consumer Reports
1972 Licit and Ilicit Drugs- Boston: Little, Brown and Company.

A Consumer Report on all kinds of licit as well as illicit drugs, including caffeine, nicotine, and alcohol. The discussion of each drug is made in its historical setting, and besides a pharmacolo-

gical description, includes the history of drug legislation, policies, and social attitudes related to each. It contains a brief section on the coca leaf, which traces very sketchily the known history of the use of the coca leaf, focusing mainly on its use in the United States, and thus mainly as an ingredient of Coca-Cola. In conclusion, it states that, "A search of the chewing literature has turned up little data to indicate that the chewing of coca leaves...is more damaging to mind or body than the drinking of coffee or tea."

BUCK, Alfred A., Tom T. Sasaki, Jean J. Hewitt and Anne A. Macrae
1968 "Coca Chewing and Health: An epidemiologic study among residents of a Peruvian village." American Journal of Epidemiology, 88(2): 159-177.

A controlled study of 51 pairs of coca chewers and non-chewers in a low-land Peruvian village. Pairs were matched for sex, age (within 10 years) and ethnic affiliation. Conclusions were that chewers had inferior health status with serious problems of anemia and intestinal parasites and lower weight-height ratios. Study is marred by the fact that, of the non-chewers, 65 percent of the Quechua and 28 per cent of the Mestizos were Protestants, and therefore abstained from alcohol as well. None of the Quechua chewers were Protestants and only four per cent of the Mestizo chewers. Liver problems, common among this chewer group, were absent among the non-chewers. Educational level was also uncontrolled.

BUCK, Alfred A., Tom T. Sasaki, Jean J. Hewitt, and Anne Macrae
1970 "Coca Chewing and Health: an epidemiologic study among residents of a Peruvian village". United Nations Bulletin on Narcotics 22(4):23-32. An abbreviated version of the 1968 publication by the same authors.

BURCHARD, Roderick
1974 Coca y trueque de alimentos. En Giorgio Alberti y Enrique Mayer, Reciprocidad e intercambio en los Andes Peruanos. Lima, Instituto de Estudios Peruanos.

An innovative article that affirms that coca is an extremely important element in the economy of both producer and consumer. The article describes traditional patterns of exchange, and shows how coca can be manipulated to increase the capital goods of the consumer.

BURCHARD, Roderick E.
1976 Myths of the Sacred Leaf: Ecological Perspectives on Coca and Peasant Biocultural Adaptation in Peru. Bloomington, Indiana: Indiana University. PhD Dissertation.

Coca leaf is the source of cocaine alkaloids. Researchers have presented various cocaine-models of coca chewing to explain its place in peasant bio cultural adaptation. This study offers an alternative model, or what is referred to as an ecgonine-model. The major argument in this part of the study is that the chewing of coca leaf contributes to the management of carbohydrate absorption and metabolism in a stressful enviroment where there may be a widespread problem of glucose homeostasis.
In a second part of this study, the focus shifts from the chewing of coca leaf to other aspects of its utility. It has long been argued that the cultivation and use of coca leaf contributes to low food production capacity for Andean peasants and is therefore "anti-economic.". This study argues that access to coca leaf has long meant and continues to mean access to food for the Andean peasants, and small peasant producers are able to maximize limited food production capacity and minimize risk through long-standing strategies of coca and food exchanges between peasants linked together by kinship and other alliances as part of a complex socio-economic and ecological system.

BYCK, Robert, ed.
1974 Cocaine Papers: Sigmund Freud. New York: The New American Library, a Meridian Book.

A compilation of information from sources on Freud's involvement in the study and use of cocaine. It contains English translations of Freud's writings on cocaine, interspersed with excerpts of Ernest Jones'biography, The Life and Work of Sigmund Freud, personal letters, and articles by various authors, including E. Merck, W.A. Hammond, Louis Lewin, Siegfried Bernfield,and Hortense Koller Becker.

CABIESES Molina, Fernando.
1948 "La acción Antifatigante de la Cocaina y la Habituación a la Coca en el Perú". Lima. Anales de la Facultad de Medicina 29(4): 316-367.

An analysis of the concept of fatigue, with emphasis on muscular fatigue as related to the central nervous system and the action of various chemical substances. Effect on this relationship of cocaine and coca, especially among high Andean populations. The effects of coca are differentiated from those of cocaine; the a-priori conclusions regarding the effects of coca chewing on fatigue are challenged.

CAPRILES, David
1937 La alimentación como factor social en el indio. La Paz, Imprenta del Instituto Nacional de Readaptación y Reeducación de Inválidos.

A discussion of nutrition among the Indians of the Bolivian altiplano and Yungas, with comparative indices of the real and optimal amounts of calories per meal, relating these to work activities. In a separate chapter the role of coca as a stimulant is discussed, particularly its effect on prolonging the work day due to its analgesic qualities.

CARDENAS, Martin
1948 "La 'Estalla' de la Coca." Cochabamba, Universidad de San Simon, Revista de Agricultura 4:8-17.

A classic article on the most serious disease affecting coca by Bolivia's foremost botanist.

CARDENAS, Martin
1952 "Aspectos psicológicos del coqueo". United Nations Bulletin on Narcotics 4(2): 6-10 .

A general discussion of coca chewing in Bolivia by an emminent Bolivian botanist. The question is raised as to whether the active alkaloid released by coca chewing is cocaine, or whether it is some other alkaloid produced by the disintegration and reconstitution of compounds found in coca. The cycle suggested, following Rusby (1888) is from cocaine to ecgonine. Cardenas does not believe that problems seen in Bolivia' s Indian populations today are due to coca chewing. He does argue, however, for the control of international cocaine traffic.

CARDENAS, Martin
1969 Manual de Plantas Económicas de Bolivia. Cochabamba, Bolivia: Imprenta Icthus.

A catalog of the plants found in Bolivia which in some way are economically useful. For every plant there is a short history besides the general description of the plant and its uses. The section on the coca plant deals in detail with the production and use of the leaf throughout history, and emphasises the fact that the question of the effects of the chewing of coca and the consumption of cocaine on the human body, remains controversial.

CHAMOCHUMBI Nelson M.;
1949 "Efectos de la Coca sobre el Metabolismo Basal en Sujetos no Habituados". Lima, Revista de Farmacología y Medicina Experimental, 2:94-113.

Report of a series of laboratory tests made on a varying number of young males (from four to eleven). A small number of controls were used of the same general age bracket. The conclusions are that 20 grams of coca leaves, when chewed, produce a great increase in Basal Metabolism Rate, and that alkaline substances potentiate the action of the leaves, particularly on the respiratory, cardio-circulatory, thermic, and neurostimulant functions of the body. Hydrochloric acid decreases the effect of the leaves on Basal Metabolism Rate, heart rate, and body temperature. Barbituric compounds (nembutal) antagonize this effect. It was found that the amount of coca alkaloids extracted during a period of chewing from 20 grams of coca leaves varies from 64 to 107 mgs. The conclusions are supportive of the subjectively perceived effects reported by chronic chewers.

CHAHUD Isee, A., L. Ayala Espinosa, R. Makino Makino, H. Espejo.Romero, y
1968 E. Horna.
"Lipidos Totales y Lidoproteinas en Indigenas Coqueros y no Coqueros". Madrid, Revista Clínica Española III (2): 161-164.

A research report on total lipids and lipoproteins in blood samples taken from 20 coca chewers and 32 apparent non-chewers in Ayacucho Perú. Sociocultural variables are very poorly controlled; the control group contained 15 women while the experimental group contained only 9. The age range of the control group was 18 to 50, while that of the experimental group was only 22 to 45. Conclusions are that, while alfalipoproteins were higher, betapoproteins were lower and quilomicrons were also lower than in comparable populations of the Peruvian coast. There were no significant differences between chewers and non-chewers. Protein problems that were discovered were attributed to inadequate died in both experimental and control groups rather than to any action of coca.

CHAHUD, Isee, A. L. Ayala Espinoza, H. Espejo Romero, R. Makino Makino, and
1969 H. Luna Seminario.
"Seroproteinas en Indígenas Coqueros". Madrid, Revista Clínica Española 115(3): 213-218.

Research report of blood studies made on 31 coca chewers and 20 non-chewers in Ayacucho. The major conclusions are that Andean man has a deficit of proteins which manifests itself in a lowering of seroalbumins. Compensating in part for this deficit is an increase of seroglobulins. Greater differences are found between a coastal control group and the two Andean groups than between the Andean subgroups of chewers and non-chewers.

CHALMETA, A. and C. Chalmeta
1938 "Les feuilles de coca dans les Pharmacopes". Bulletin des Sciences Pharmacologiques 40(4): 193-208.

A comparison of the pharmacologic content of coca leaves from Bolivia, Peru (E. truxillense) and Java. The highest percentage of alkaloids is found in the Bolivian coca. Page 97 contains chemical charts detailing the breakdown of coca into its various alkaloids. One of the basic conclusions is that the proportion of alkaloids soluble in ether has no relation either to the anesthetic power of the coca nor to its potential toxic effect.

CHOPRA, I.C. and Chopra, R.N.
1958 "The Cocaine Problem in India". United Nations Bulletin on Narcotics, April - June 10(2): 12-24.

A historical exposition of the growth of cocaine use in India. This use appears to have been limited to oral ingestion, and to have followed the major trade routes of the country. The authors insist that coca has never been produced in India, but that cocaine smuggling is constantly on the increase. Various effects of cocaine use are discussed based on anecdotal information. The two authors are well known in the field of drug studies, having focused principally on hashish.

CHRISTENSEN, Eunice M.
"Coca, Divine Plant of the Incas".
Anaesthesia: 4-12

A general history of coca use. The chief merit of the article is that it contains, in capsule form, a chronology of major discoveries about coca and cocaine. As an introduction to this chronology a paragraph describes with some detail the process of harvesting and processing.

CIUFFARDI, T. Emilio
1948 "Dosis de Alcaloide que ingieren los Habituados a la Coca", Lima, Revista de Farmacología y Medicina Experimental, I: 81-99. Primera Parte.

An experimental study of the amount of cocaine ingested by habitual coca chewers. The conclusion is that the amount is large enough to have serious effects on the user. The time factor, however, is poorly controlled.

CIUFFARDI, T. Emilio
1948 "Dosis de Alcaloides que Ingieren los Habituados a la Coca. Nuevas Observaciones". Lima, Revista de Farmacología y Medicina Experimental 1: 216-231. (Segunda Parte).

A report of careful laboratory observations of the amount of alkaloides removed from the coca bolus by 64 coca chewers. Chewers were allowed 30 grs. of coca each and an indefinite time period. The conclusions were that they extracted an average of 86% of the alkaloids through chewing and a mean of 3 mgrs. of alkaloids per kgr. of leaf. In general, extraction was more complete in older subjects who had chewed coca for a longer period. However, younger subjects ingested larger doses of alkaloids per body weight, in that they weighed less than older subjects. From 3 to 73 per cent of the leaves were chewed up and swallowed, the higher percentages corresponding to the individuals who had been coca chewers for longer periods of time. Ciuffardi calculates that 80% of the alkaloids are cocaine.

CIUFFARDI, T. Emilio
1949 "Contribución a la química del cocaismo". Lima, Revista de Farmacología y Medicina Experimental, 2:18-93

An experimental study of coca and its effects on chronic chewers, taking into account physiological and metabolic characteristics. Height, weight, pulse, respiration, fatigue, resistance, and work capacity are all tested on an experimental and control group.

COLLAZOS, Carlos, Hilda S. White, Ruth L. Huenemann, Emma Reh, Philip L.
1954 White, Aurora Castellanos, Rosa Benites, Yolanda Bravo, Angélica Loo, Irma Moscoso, Carmen Cáceres, and Aida Diesseldorff.
"Dietary Surveys in Perú". Journal of the American Dietetic Association 30(12): 1222-1230.

One of the early dietary surveys to come out of the Cornell-Vicos project. Comparisons are made of nutrient intake in Vicos and intake in Chacan, a free community in the same general region of Peru. These are based on surveys made at two points in time, in 1952 and 1953. The general conclusions are that almost 100 per cent of the families consumed less than 75 per cent of the recommended amounts of calcium and vitamin A, and 50 per cent or more of the families had less than 75 per cent the recommendations for protein and calories. Other important deficits were riboflavin and ascorbic acid. Iron, thiamine, and niacin intakes tended to be satisfactory.

COMAS, Juan
1970 (?)
"Influencia de la farmacopea y terapeútica en los indígenas de Nueva España en la obra de Juan de Barrios (1607)". Anales de Antropología: 125-150.

A synopsis of the work of Juan de Barrios, a pioneer Spanish physician in México. The synopsis contains a valuable listing of local herbs used in curing, but contains no direct reference to coca.

COURY, Charles
1970 "A 'drogue' et les toxicomanies chez les Americains d'avant la Conquete". Paris, La Presse Medicale 78(21):979-981.

A very superficial overview of the use of various drugs in pre-Columbian America. Among those discussed is coca, although this discussion is extremely brief and contains no original data or insights.

CROSBY, William H.
1939 "The Vasoconstrictor Action of Cocaine". Baltimore, Journal of Pharmacology and Experimental Therapeutics 65:150-155.

A research report of experimentation on the conjunctival and aural vessels of rabbits. The conclusions are that, as had already been established by other researchers, cocaine is a vasoconstrictor. However its ability to constrict would appear not attributable to the action of adrenalin. The research suggests that the site of action of cocaine is a dual one involving 1) a sensitization of the smooth muscle of the blood vessel wall to tonic sympathetic discharges and 2) an adrenalin-like action upon the sympathetic receptors of the muscle cell.

CRUZ Sanchez, Guillermo, and Angel Guillén
1948 "Estudio Químico de las Substancias Alcalinas Auxiliares del Cocaismo". Lima, Revista de Farmacología y Medicina Experimental, 1(2): 209-215.

Analysis of the chemical components of alkaline substances in different parts of Perú. Conclusions are that "tocra" (lejía) contains pottasium, sodium, magnesium and phosphorus with trace amounts of iron and antimony. The pH of 1% tocra solutions fluctuates between 10,6 and 11,5 and its alkalinity between 5 and 27,3%. "Tocra" increases the solubility of cocaine in water. Its basic destructive effect on cocaine solutions varies between 2,5 and 5,5% in a period or 30-60 minutes, and is therefore of little importance.

CRUZ, Pedro E.
1948 "La Sanidad en Colombia" Boletín de la Oficina Sanitaria Panamericana, 27(9): 806-813.

Report of the Minister of Health of Colombia. It contains a paragraph on coca and its noxious effects. The result was a decree ordering the destruction of all coca plantations. This decree was later modified due to the resistance of those who were to be affected.

DIXON, W.E.
1925 "Cocaine Addiction". British Journal of Inebriety. 22(3): 103-121.

A dated study of cocaine addiction, which is said to be the worst of all drug habits because it leads to the mental,moral, and physical degeneration of the user more rapidly than the depressant drugs of addiction. Coca is mentioned, but the information can be obtained from more reliable sources.

DIXON, W.E.
1930 "A Clinical Address on Drug Addiction". The Canadian Medical Association Journal. 23(6): 747-56.

In this general treatment on different drugs, including alcohol, tobacco, heroin, and cocaine, Dixon provides a summary of the information presented in his article on cocaine addiction published in the British Journal of Inebriety in 1925.

DUKE, James A., David Aulik and Timothy Plowman
1975 " Nutritional Value of Coca". Harvard University, Botanical Museum Leaflets 24(6): 113-119.

Nutritional analysis of coca leaves from Chapare, Bolivia. Compared to an average of 50 other Latin American Vegetable products, the leaves were found to be higher in calories, protein, carbohydrate, fiber, ash, calcium, phophorus, iron, vitamin A, and riboflavin. Coca was lower than the average for the 50 plant foods in oil content, moisture, niacin, and ascorbic acid. Ingestion of 100 g.of the Bolivian coca leaves tested would more than satisfy the Recommended Dietary Allowance for reference man and woman of calcium, iron, phosphorus, vitamin A, vitamin B_2 and vitamin E. However the leaves also contain alkaloids and may harbor pesticide residues.

DUQUE Gomez, Luis
1945 "Notas sobre el Cocaismo en Colombia". Bogotá, Boletín de Arqueología 1(5): 445-451.

Sociological analysis of coca in several departments of Colombia. Discussion of the various standards of living in different parts of Colombia. Consideration of coca as a factor that aids less favored groups in coping with their circumstances, due to its analgesic content.

ERNST, A.
1946 "Del Uso de la Coca en los Paises Septentrionales de la América Meridional". Caracas, Acta Venezolana 1(3): 273-284.

A historical study that, through the use of linguistic analogy, attempts to relate coca chewing in South America to coca chewing in several parts of Central America. No reference is made to the effects of chewing. In the conclusion several herbs having effects similar to that of coca are discussed.

A Spanish language version of the article published by the same author in 1890 in Proceedings of the International Congress of Americanists, Berlin, 1888, 7th session.

ESPINOZA Bravo, Clodoaldo Alberto.
1947 "La coca y el cocaísmo indígena peruano: El problema de la toxicomanía indígena." Boletín Indigenista (México) 7(4): 390-397.

A verbatim copy of the article published in La Reforma Médica (Lima) in 1948 .

ESPINOSA Bravo, C.A.
1948 "La Coca y el Cocaismo Indígena Peruano. El Problema de la Toxicomanía Indígena." Lima, La Reforma Médica 34:107-109.

A call to arms by a Peruvian physician to take a serious look at the coca problem in Peru. Mention is made of the relation of coca chewing to the use of alcohol and tobacco. The author strongly urges the Peruvian public to develop a conscience regarding the matter.

FEIGENBAUM, Aryeh
1956 "Freud and the Discovery of the Anaesthetic Properties of Cocaine." Acta Médica Orientalia: Journal of the Israel Medical Association 15(6-7): 201-205.

An exposition of the role of Sigmund Freud in the discovery of the anaesthetic qualities of cocaine and its adoption in surgical ophthalmology.

FERNANDEZ, Nicanor T.
1932 La Coca Boliviana. La Paz, Editorial "América",45 pp.

An early attempt on the part of the Sociedad de Propietarios de Yungas to challenge growing international pressure for the control of coca production. Valuable historical data regarding international control efforts are presented, including the position of the Bolivian delegate to the Geneva conference in 1927. The full text of the response of the Sociedad de Propietarios de Yungas to a request by the Bolivian government for information to be forwarded to the League of Nations is included. This gives insight into the points of view of the Sociedad, and the economic role of coca in the 1920's. A less objective work than Oro Verde de Yungas, but nevertheless of historical value.

FERNANDEZ Miranda, Emilio
1945 "La cocamanía en Bolivia". La Reforma Médica (Lima) 31(444):85-101.

This paper, presented by a Bolivian physician to a medical congress in Argentina, attacks coca use as a drug addiction. He borrows freely from Ricketts and others while offering nothing original on the subject.

FISH, F. and W.D.C. Wilson
1969 "Excretion of cocaine and its Metabolites in Man," London, Journal of Pharmacy and Pharmacology 21(supplement): 135s-138s.

Report of laboratory observations of a 23 year old male who usually administered to himself, by intravenous injection, 120 mg. cocaine hydrochlorate and 180 mg. diacetylmorphine in divided doses as desired. During the study period the drugs were given intramuscularly by nursing staff and a strict check was kept on drug dosage, times of administration, times of micturition, and volumes of urine voided.
The pH of each urine sample was measured with a pH meter and the samples stored pending analysis . Amounts of unchanged cocaine (1 %) excreted in the subject's urine agree with those previously reported (Woods, McMahon and Seevers, 1951) after submucosal administration (1-21%).

FISH, F. and D.C. Wilson
1969 "Gas Chromotographic Determination of Morphine and Cocaine in Urine." Amsterdam, Journal of Chromotography 40: 164-168.

In any routine monitoring of drug excretion the analytical method should be as rapid and simple as possible consistent with accuracy and spe -

cificity. Gas chromatography offers a more accurate means of quantifying results than thin-layer chromatography and has advantages of speed, specifity and sensitivity as compared with spectrophotometric determinations of morphine and cocaine extracted from biological media.

FOSSATI, Humberto
1948 Monografía de Nor y Sud Yungas. La Paz, Editorial Renacimiento, 28 pp.

A general description of Yungas with some important historical references regarding coca and its role in the region. Includes brief discussions of the colonial debate over the value of the leaf, the influence of coca in the emergence of La Paz, and early techniques and measures used in cultivation of the plant. Annex II contains an interesting discussion of control of coca export to Argentina by a few merchants in Villazon, and of steps taken by the Bolivian government to break that control.

FRISANCHO Pineda, David
1973 Medicina Indígena Popular. Lima: Librería-Editorial Juan Mejía Bava, 122 pp.

Written by a Peruvian physician, this book is made up of three parts: a patheogenesis of illnesses according to the Indian and popular beliefs; diagnostic procedures; and finally, therapeutic procedures. A short chapter deals exclusively with the coca leaf, but with its role in magic rather than medicine.

FROMBACH. K.D.
1967 "Beitrag zur Verbreitung und Auswirkung des Koka-Kauens in Perú." Zeitschrift für tropenmedizin und Parasitologie (Stuttgart) 18(4): 387-396.

An attempt todemonstrate the differential effects of cocaine, as it is administered either orally or parentally. With oral administration there follows a rise in basal metabolism, pulse, temperature, and the elimination of 17-cetoesteroids. The experiment does not use cocaine crystals, since these connot be administered in both ways. Conclusions are that oral administration is not habit forming, but that parenteral administration does lead to physiological dependence.

GAGE, Nicholas
1975 "Latins Now Leaders of Hard-Drug Trade". The New York Times, April 21, 9-15.

A newspaper account of the growing traffic in drugs between Latin America and the United States. Special emphasis is given to cocaine.

GAGLIANO, Joseph A.
1963 "The Coca Debate in Colonial Peru". The Americas, , July: 43-63.

A valuable historical review of the many changes of policy regarding coca during the colonial period. The article contains a skeletal description of the running debate between the pro-coca and the anti-coca forces. In the end, the pro-coca forces emerged as the policy makers. Good historical insight for the present coca crop substitution program.

GAGLIANO, Joseph A.
1965 "The Popularization of Peruvian Coca." Revista de Historia de América 59: 164-179.

A well researched, summary article describing the gradual discovery of Peruvian coca by the Western world. Of particular interest are the data on initial European reactions and the diffusion of the plant it - self.

GANTZER, Joachim, Hartmut Kasischke & Ricardo Losno
1975 Der Cocagebrauch Bei den Andenindianern in Perû: Unter Berücksichtigung Sozialmedizinischer und ideologiekritischer Aspekte." Diese Arbeit wurde im Rahmen des Sonderprogramms der Stiftung Studienkreis für Internationale Begegnung und Auslandsstudien (ASA) durchgeführt, 89 pp.
Compilation of various authors about the use of coca leaf. An Historical summary.

GARCES, V. Gabriel
1945 "El Indio Ecuatoriano y la Coca." América Indígena V(1): 287-293.

A brief article arguing that coca is unknown in present day Ecuador. The author refuses to speculate on the reasons, considering all explanations given to be inadequate.

GAY, George R., Charles W. Shephard, Darryl S. Inaba, and John A. Newmeyer
1973 "Cocaine in Perspective: 'Gift from the Sun God' to 'The Rich Man's Drug.'" Drug Forum 2: 409-430.

A general discussion of the growing use of cocaine, especially in the United States. Some historical background is given, with reproduction of billboards and advertisements from the turn of the century. Brief but accurate statements are made with regard to our present knowledge of chemistry, pharmacologic action, the effect on the central nervous system, the cardiovascular system, the eye, metabolism and excretion. The toxicity of cocaine is also discussed, together with the epidemiology of cocaine use. Conclusions are that cocaine leads to a strong psychic dependence without the development of physical dependence and with, therefore, absence of a characteristic abstinence syndrome when the drug is withdrawn.

GETAHUN, Amare & A.D. Krikorian
1973 "Chat: Coffee's Rival from Harar, Ethiopia. I. Botany, Cultivation and Use." Economic Botany 27(4): 353-377.

A general descriptive article of a leaf used in Ethiopia that presents many parallels with coca. Peasants use it as a work incentive, it is chewed in such quantities that it may represent an important element in the diet, and it is of great antiquity and probably older than coffee. Little is known of the physiological effects of chat from a scientific point of view.

GIMENEZ, Angel M.
1934 "Sobre la Represión del Coqueo (acullico). Proyecto de Ley." Buenos Aires, La Semana Médica 41(2): 1892-1895.

Presentation of a congressional bill outlawing all coca imports except those destined for pharmacies and the chemical industry. The six articles of the bill are accompanied by a justification based on a general appraisal of the generally accepted deleterious effects of coca chewing.

GODDARD, D., S.N. de Goddard, and P.C. Whitehead
1969 "Social Factors Associated with Coca Use in the Andean Region." International Journal of the Addictions 4(4): 577-590.

One of the very few sociological studies of coca use. The sample consists of 40 users and 38 controls interviewed in northern Argentina. The populations differed significantly in educational level, and the controls were light users whereas the subjects were heavy users. As in other studies of the series, this one was flawed by the fact that most of the chewers were migrant laborers who descended to the low-lands only for a few months of the year, whereas the controls were permanent residents of the lowlands. There were also significant differences in drinking patterns between the users and "non-users". The general conclusions are that coca chewing has little effect on social patterns, indeed that it is much the same as gum chewing, tobacco use, betel nut chewing, and alcohol consumption in societies where practices such as these are the norm.

GODDARD, D., S.N. de Goddard and P.C. Whitehead
1970 "The Effect of Coca on Health: A Research Note." International Journal of the Addictions 5(1): 165-168.

A brief research report on the results of a questionnaire administered to coca chewers and controls in Northern Argentina regarding health status. The questions related to recent sickness, hospitalization, appetite, heart, stomach, headaches, and sensations of weakness. The conclusions are that coca chewers more frequently have poor health than do non chewers. The study is flawed, however, by the fact that the chewers were migrant laborers from highland Bolivia whereas the non chewers were highland Bolivians who had settled permanently in Argentina.

GRANADO, José T.
1931 Plantas Bolivianas. La Paz, Editorial Arno Hermanos.

Pages 254-258 contain an exposition of the characteristics, varieties, growing habits, pests, geographical distribution, and utility of coca. A comparative analysis is made of the major components of coca from Totora, the Chapare, and Yungas de La Paz. This indicates that the cocaine content is highest in Chapare coca and lowest in that from La Paz (2.40 and 0.25 respectively).

GRANATO, L.
1924 A Cultura da Coca. Sao Paulo. Off. Graph. Monteiro Lobato Cia, 23 pp.

An early description of the techniques to be used for successful cropping of coca. The monograph terminates with an appeal that coca production begin on a large scale in Brazil.

GRANIER Doyeux, Marcel
1962 "Some Sociological Aspects of the Problem of Cocaism." United Nations Bulletin on Narcotics 14(4): 1-16.

A summary statement by a member of the United Nations Commission of Enquiry on the Coca Leaf, setting forth the official position of that body. The article draws heavily from the work of Gutierrez Noriega, and concludes with a pejorative description of the living conditions of Andean Indians.

GRAY, Gary M.
1973 "Drugs, Malnutrition, and Carbohydrate Absorption." American Journal of Clinical Nutrition 26: 121-124.

A brief discussion of the role of various drugs in carbohydrate consumption. One that is discussed is atropine. The conclusion is presented that atropine leads to an increased absorption of xylose, and that it

could be beneficial in treating patients with rapid intestinal transit. Its probable mechanism is set forth as increased contact time between carbohydrates and mucosa. The discussion is relevant for studies of coca chewing, in that ecgonine, the final metabolite of cocaine hydrolisis, has an atropine like effect.

GREENBERG, S. and J. P. Long
1974 "A Comparison of the Effects of Cocaine in Arterial and Venous Smoothe Muscle Response to Vasoactive Stimuli." New York, Proceedings of the Society for Experimental Biology and Medicine 145: 1439-1446.

A reserach report on experimentation carried out on twenty mongrel dogs. The conclusion is that the inability of cocaine to enhance the contractile responses of mesenteric veins to norepinephrine results from the sparse distribution of the nerve endings in this vein and perhaps from a difference in the beuronal membrane amine reuptake mechanism.

GUERRA, Francisco
1974 "Sex and Drugs in the 16th. Century." Edinburgh, British Journal of Addiction to Alcohol and Other Drugs 69(3): 269-289.

General historical discussion of drugs in the 16th century, with a brief paragraph (p.285) on early botanical and pharmacological descriptions of coca.

GUTIERREZ-Noriega, Carlos
1944 "Acción de la Coca Sobre la Actividad Mental de Sujetos Habituados". Lima, Revista de Medicina Experimental V.III(1): 1-18.

Report of interviews with 20 coca chewing prisoners in the Central jail of Lima. Experiences and problems of the prisoners are attributed to their coca chewing, although the causal relationship is unclear.

GUTIERREZ-Noriega, Carlos
1944 "Acción de la Cocaina Sobre la Fatiga en el perro". Lima, Revista de Medicina Experimental 3: 329-340.

A cocaine dose of 4 mgrs.per Kgr. was administered subcutaneously to four dogs and increased their resistence to fatigue. A dose of 8 mgrs. per Kgr. also increased their resistence, but to a lesser extent. While untreated dogs tried to evade the work imposed upon them, treated dogs did theirs with no attempt at evasion.

GUTIERREZ-Noriega, Carlos & Vicente Zapata Ortiz
1944 " Cocainismo Experimental.I. Toxicología General, Acostumbramiento y Sensibilización", Lima, Revista de Medicina Experimental V.III (4):279-306.

Report on intravenous injection of cocaine into dogs. Conclusions are that cocaine administered intravenously in strong doses can lead to addiction and that response to the cocaine injections intensifies over time, even when the dosage is maintained at an even level.

GUTIERREZ-Noriega, Carlos
1944 "Datos Históricos sobre la Habituación a la Coca en el Perú", Lima Revista de Medicina Experimental 3(4): 341-353.

A general historical treatment of coca use in Peru, presented much more fully by the same author in other works. Cf.Gutierrez-Noriega's monograph published by the Anales de Medicina.

GUTIERREZ-Noriega, Carlos
1944 "Observaciones en Enfermos Mentales Habituados a la Coca." Lima, Actualidad Médica Peruana : 154-159.

Report of brief studies of six mental patients who were also chronic coca chewers. The author makes no attempt to attribute their illness to coca use. Some interview materials are presented in which several patients claim that coca chewing leads to mental distortion. In mental tests that were administered, all but one subject performed better after chewing coca than in a state of abstinance.

GUTIERREZ-Noriega, Carlos
1946 "Observaciones sobre el Efecto de la Coca y la Cocaina en Estados Carenciales de Tiamina". Lima, Revista de Medicina Experimental V(1,2,3,4): 1-12.

Report of research on experimental pigeons. The conclusions are that the deprivation of thiamine increases the sensitivity of the organism to cocaine, and that pigeons given a diet without thiamine plus daily administrations of cocaine suffer from severe vitamin deficiency.

GUTIERREZ-Noriega, Carlos
1947 "Alteraciones Mentales Producidas por la Coca". Lima, Revista de Neuro-Psiquiatría 10 (2): 145-176.

Report of a series of interviews with coca chewers of the province of Huancayo. One hundred coca chewers were interviewed, after which 30 were given psychological evaluations. Although, in general, subjects denied any psychic alteration caused by chewing coca leaves, two reported otherwise. Other effects reported include the suppression of vital sensations, the development of an autistic state, euphoria, discromatopsia, poliopsia, micropsia, macropsia, and dismegalopsia. Personality is said to become introverted and passive. The conclusions suffer, however, from a lack of control of basic socio-cultural variables and from the lack of a consistent technique for personality and psychological assessment.

GUTIERREZ-Noriega, Carlos
1948 El Cocaismo y la Alimentación en el Perú. Lima, Anales de la Facultad de Medicina XXXI (1): 3-92.

A monograph summarizing the views of Gutierrez-Noriega regarding coca. In addition to comments on the role and impact of coca chewing, the monograph contains major digressions on the development of Peru's rural economy following conquest. An important document for any interested in a full statement of Gutierrez-Noriega's thinking. Coca, according to the author, is Peru's greatest scourge and must be abolished.

GUTIERREZ-Noriega, Carlos
1948 "Estudios sobre el Habito de la Coca". Lima, Revista de Farmacología y Medicina Experimental 1: 124-126.

A written appeal for studies of coca chewing. The article, although brief, contains a reference to the original request made to the United Nations that a Commission of Enquiry be appointed.

GUTIERREZ-Noriega, Carlos
1948 "Observaciones Sobre el Cocaismo Obtenidas en un Viaje al Sur del Perú". Lima, Revista de Farmacología y Medicina Experimental 1(2): 232-252.

General impressions formed in a journey throughout southern Peru. The observations presented were formed through simple observation and interviewing of key informants, such as school teachers, factory managers, and physicians. Coca use is related to physical and mental deterioration, cargadores (bearers) being a classic example. Statements are made to the effect that coca chewers lose practically all learning ability. Coca chewing is also related to a series of pathologies. The conclusions represent a point of view rather than the results of controlled research.

GUTIERREZ-Noriega, Carlos
1948 "Reflejos de Defensa y Cocaismo Experimental". Lima, Revista de Farmacología y Medicina Experimental 2: 236-244.

Report on laboratory experimentation with dogs. The animals were given cocaine habitually. They then were allowed access to the drug only after voluntarily submitting to painful stimuli. The conclusions are that cocaine is so addictive that the dogs were not deterred by the painfulness of the stimuli.

GUTIERREZ-Noriega, Carlos
1949 "El Hábito de la Coca en el Perú". América Indígena IX(2): 143-154.

A general article on the use of coca in Perú, summarizing the conclusions of the Gutierrez-Noriega research team to date. Much of the research reported is well controlled and the results continue to be valid; in other parts of the research, control of socio-cultural variables is inadequate. In general, observations concerning the effect of coca on fatigue are well based: those concerning the effect of coca on nutrition and mental processes are less so.

GUTIERREZ-Noriega, Carlos
1949 "Errores Sobre la Interpretación del Cocaismo en las Grandes Alturas". Lima, Revista de Farmacología y Medicina Experimental I:100-123.

A rebuttal of Carlos Monge's theory that coca aids in adaptation to high altitudes. One of the major arguments is that people live and work at altitudes as high or higher than those of the Andes in many parts of the world without ingesting coca. The real question as to whether coca gives some added physical advantage to high altitude man is never squarely addressed. The article would not pass the canons of contemporary scientific enquiry. It is valuable, however, in clarifying the nature of the important debate between the Instituto de Biología Andina and Dr. Gutierrez-Noriega.

GUTIERREZ-Noriega, Carlos
1952 "El Hábito de la Coca en Sud América". América Indígena XII(2):111-120.

A posthumous article giving a general overview of coca chewing in South America, with a summary of the conclusions reached by the Gutierrez-Noriega research team. The article lists some effects that could be considered benefits. It errs in its estimate of the time in which a daily dose is administered. In reporting on research into the effect of coca chewing on fatigue, the results are automatically called into question because of the nature of the subject and control populations - manual laborers and peasants in the former case, and medical students in the latter. Admission is made that alcoholism and malnutrition could account for differences measured as well as could coca. Much of the argument is based on a comparison of different Peruvian populations, rather than of individuals within tha same population. For this reason it would not pass contemporary scientific scrutiny.

GUTIERREZ-Noriega, Carlos & Humberto Rotondo
1939 "Experimental Catatonia Produced by Cocaine". Lima, Revista Neuro-psiquiátrica 2: 73-80

Report of an early experiment by Gutierrez-Noriega and a colleague in which catatonic states are produced in dogs and cats through intra-venous injection of cocaine.

GUTIERREZ-Noriega, Carlos & Victor W. von Hagen
1950 "The Strange Case of the Coca leaf". Scientific Monthly 70: 81-89.

A general descriptive article consisting of an introduction by von Hagen and excerpts from several of Gutierrez-Noriega's research reports and position papers. In general it is a repetition of the material that was published, in much fuller form, by Gutierrez-Noriega in Spanish.

GUTIERREZ-Noriega, Carlos & Victor von Hagen
1951 "Coca-The Mainstay of an Arduous Native Life in the Andes." Economic Botany 5: 145-152.

*An adapted reprint of the article by the same authors that appeared in Scientific Monthly in February 1950. This article more actively involves Gutierrez - Noriega than did the former one and is more internally consistent. It presents a succint, summary statement of Gutierrez-Noriega s conclusion after his years of work on the subject.

GUTIERREZ-Noriega, Carlos & Vicente Zapata Ortiz
1945 "Catalepsia Experimental Producida por la Cocaina". Lima : Revista de Medicina Experimental 4: 268-283.

Report on intravenous administration of cocaine to a dog that, in heavy doses, produced a catatonic state. One of the major conclusions was that the severity of the catatonic state was in direct proportion to the doses of cocaine.

GUTIERREZ-Noriega, Carlos & Vicente Zapata Ortiz
1948 "Observaciones fisiológicas y patológicas en sujetos habituados a la coca". Lima: Revista de Farmacologia y Medicina Experimental(1):1-31.

The first and one of the best articles to be published in Gutierrez-Noriega's journal. Most of the article is based on studies of 500 coca chewers in Huancayo who used a mean of from 30 to 40 grams of leaves per day. Good data are given on the acute effects of coca chewing, derived from research on subsamples ranging from 30 to 40 subjects each. The general conclusions are that weight increases with age, regardless of coca use (a contradiction of Gutierrez Noriega's frequent statement that chronic use leads to chronic malnutrition); that respiration, pulse, arterial pressure, buccal temperature, and muscular force tend to increase immediately after coca is chewed but that oculocardiac reflexes tend to decrease. Porcentages are given for each. Blood sugar also shows dramatic increase. The general state of health of coca chewers is shown to be poor to fair, but this is not conclusively attributed to coca use. Good information on acute effects.

GUTIERREZ-Noriega, Carlos & Vicente Zapata Ortiz
1948 "Estudio de la Inteligencia en Sujetos Habituados a la Coca". Lima : Revista de Farmacologia y Medicina Experimental 1: 32-68.

Several intelligence tests -Binet-Simon, the Non-Language Multi-Mental test of Terman, McCall and Lorge, and the Porteus Labyrinth - were administered to 200 coca chewers from Huancayo and 53 from the town of Moho, Department of Puno. The conclusions are that coca chewing lowers intelligence, and that the longer coca is chewed the lower intelligence falls. The study is marred by basic and serious problems. Control groups chosen come entirely from the Peruvian coast -an entirely different and much more Hispanized culture area. Educational level was not controlled in spite of the fact that study results themselves show that it is directly related to performance on the tests. Finally, the tests themselves were never standardized for a Peruvian population, much less for a Peruvian Indian population. Because of these shortcomings, the conclusions cannot be accepted as valid.

GUTIERREZ-Noriega, Carlos & Vicente Zapata Ortiz
1950 "Estudio de habituados a la coca en estado de abstinencia". Lima: Revista de Farmacologia y Medicina Experimental 3(1): 56-75.

A report of research on six cases in Huancayo, six in Huancavelica, and four in Puno. The design allowed the study of an abstinence period of 48 hours after chewing coca, followed by two coca chewing episodes six hours apart. General conclusions are that chronic coca chewers, during a period of abstinence, have low heart beat, arterial hypotension, decrease of muscular strength, decrease of reaction time, and increase of cutaneous sensitivity. When coca is then chewed, heartbeat increases, temperature rises, cutaneous sensitivity slightly drops, and muscular force increases. Respiratory rate seems seldom affected. The study in general is well controlled, but is marred by a comparison of muscular force that sets highland illiterate peasants off against Lima medical students.

GUTTICH, Von Helmut
1956 "Historisch Notizen über Curare und Cocain". Der Anaesthesist 5:56-58.

A brief, very general historical review of research and attitudes on curare and cocaine. With regard to the latter, major emphasis is given to German speaking researchers such as Freud and Koller.

HAMNER, James E.III and Oscar L. Villegas
1969 "The effect of coca leaf chewing on the buccal mucosa of Aymara and Quechua Indians in Bolivia". St. Louis: Oral Medicine and Oral Pathology 28(2): 287-295.

Report on buccal mucosal biopsies in thirty six men and ten women. Thirty nine were Aymara and seven were Quechua. All were tin miners and coca chewers. In the latter, it appeared as a thickened, soft, spongy, gray-white opacity; these features were limited to the one side in which the coca/lime quid was kept. There was no clinical difference in appearance between the Aymara and Quechua mucosa, nor was there any difference between male and female. No evidence of chronic ulceration or carcinoma was present in any of the examined patients. The degree of histologic leokoedema on the surface and the number of atypical spongy or vacuolated cells in the deeper epithelial strata did not depend upon the duration of coca leaf chewing. No clinical or histologic evidence was found to support the idea that leukoedema may be a premalignant condition. None of the patients displayed buccal carcinoma, in spite of lengthy exposure to coca leaf and calcium hydroxide.

HANNA, Joel M.
1970 "The effects of Coca Chewing on Exercise in the Quechua of Perú". Human Biology 42(1):1-11.

Report on a step test in which six coca users were compared with six non-users. During this submaximal work test, the coca chewers showed lower exercise and recovery heart rates and higher blood pressures. There was no evidence of metabolic advantage resulting from coca use; however when the results were projected into maximal working conditions, a slight difference was indicated.
In a later article, Hanna discards these findings, due to the fact that he had not controlled the age factor satisfactorily. Coca chewers had a mean of 23.80 years, whereas the non chewers had a mean of only 18.5. He concluded that the differences were due to this difference in age rather than to the fact that one group of subjects chewed and the other did not chew coca.

HANNA, Joel M.
1971 "Further Studies on the Effects of Coca Chewing on Exercise". Human Biology 43(2): 200-209.

Report of research on 5 habitual coca chewers and 7 non-chewers. Subjects were tested on a bicycle ergometer, at both the submaximal and the maximal levels. Each individual was tested twice, one day chewing coca and the other abstaining from coca. Oxygen intake, ventilation and blood pressure were not affected by coca chewing. At submaximal work levels heart rate was slightly elevated during coca trials. At maximal work levels, coca users tended toward longer endurance, but otherwise were similar to -users. When habitual and non-habitual coca users are contrasted there are no apparent differences. The conclusion is that coca has no apreciable influence on work capacity. Any real effect would seem to derive from perception of less effort or reduced fatigue. Possible mechanismus of such action are considered.

HANNA, Joel M.
1971 "Responses of Quechua Indians to coca ingestion during cold exposure". American Journal of Physical Anthropology 34(2): 273-277.

Fourteen Quechua men chewed coca leaves as they were exposed to mild cold stress of 15,5° C for two hours. When compared to their own responses in a similar exposure without coca, they showed lower finger and toe temperatures. This was attributed to a mild vasoconstriction induced by coca leaf chewing. During the second hour of cold, coca users also showed a more gradual decline in core temperature which could represent greater heat conservation.

HANNA, Joel M.
1972 "Reacciones que experimentan los indios quechuas al coquear durante la exposición al frio". Archives del Instituto de Biología Andina. Universidad Nacional de San Marcos, Lima 5(1):14-21.
A report of laboratory based research in which 12 Quechua from the Peruvian village of Nuñoa were exposed to low temperature with and without coca. The general conclusions are that coca helps to maintain body core temperature at the expense of the extremeties. This would seem to be a logical consequence of the vasoconstrictor action of cocaine. Hanna sees in this response a possible adaptive mechanism for peasants living under conditions such as those of the Peruvian Puna.

HANNA, Joel M.
1974 "Coca Leaf Use in Southern Peru: Some Biosocial Aspects." American Anthropologist, Washington 76(2): 281-296.

Reports of laboratory research on 6 habitual and 5 nonhabitual coca chewers. Each group chewed coca for a full day and abstained on another. 24 hours after either chewing or abstaining they were measured for heart beat, oxygen intake, and blood pressure both at rest and after ten minutes on a bicycle ergometer. None of the differences between coca and non-coca trials was statistically significant in either the user or the non-user category. In other tests 7 nonusers and 5 habitual users were asked to perform an exercise test, the final load of which was about 80% of maximal effort. No group differences were found. The major conclusions were that coca use during work performance may operate in two areas. First coca produces an accelerated heart rate during submaximal effort, and second, coca use may promote increased endurance time. A third series of tests involved the effect of coca chewing on cold stress. Here the conclusion was that coca chewing aids in conservation of body heat, a most desirable consequence in an area where caloric availability may be limited. Thus small doses of coca, characteristic of coca chewing, may be beneficial to certain aspects of the arduous life at high altitude. In addition, coca is so woven into the economic and cultural life of Andean peoples that its continued use is not related to simple addictive properties.

[illegible] M.
1976 [illegible]e" in Man in the Andes, edited by Paul T. Baker and Michael A. Little. Dowden, Hutchinson and Ross, Inc. Stroudsburg, Pennsylvania, pp. 363-378.

Report on a controlled study of a small group of coca users and matched nonusers in Nuñoa, Puno Peru. Article does not specify how crucial socio-cultural variables such as age, education, religion, and economic level were or were not controlled. Conclusions are that when coca is used in habitual quantities by habitual users, there are no profound psychological or physiological disturbances. During work, users have a slightly higher heart rate, suggesting some stimulatory effect. Coca leaf chewing also appears to aid conservation of body heat, a desirable quality in an area where caloric availability is limited.

HARWOOD, Theresa.
1974 "Cocaine". Drug Enforcement, (Spring, 1974). 20-25

A pharmacologist's analysis of cocaine and its effects on the users based on a comparison of the older literature (to 1950) with more recent treatments. Coca is mentioned as the source of cocaine. Illicit cocaine has its origins primarily in Peru and Bolivia, which produce some 35,000 kilograms per year.

HENKEL, Ray
1971 The Chapare of Bolivia: A Study of Tropical Agriculture in Transition. Ph.D. Dissertation in Geography, University of Wisconsin. Ann Arbor, University Microfilms 371 pp.

A solid study of agriculture in the Chapare of Bolivia. The work contains important material on coca production and trade. Especially valuable are observations on the efficiency of the agricultural and coca customs houses.

According to Henkel, barely 25 to 35 percent of the products shipped from the Chapare to national Bolivian markets were registered.

HERBST, Robert & Paul Achellenberg
1931 "Cocain und Muskelarbeit,II: Weitere untersuchungen über die beeinflussung des gasstoffwechsels. Arbeitsphysiologie 4(3):203-216.

Cocaine leads to a light and transitory rise in basal metabolism. At the same time it produces a rise in core body temperature, respiratory rate, and arterial pressure, and augments nervous sensitivity. With the body in upright position, there is a slight disequilibrium, and energy use for physical exertion is increased.

HERNANDEZ, J. F.A.
1946 "Narcomanias". La Farmacia Chilena 20:205-216

A general discussion of drug addiction from the point of view of Chile. The history of international attempts at drug control is presented, as well as its relationship to Chilean legislation. Two Chilean drug problems are highlighted: use of opium by Chinese living in Chile, and use of coca by workers in nitrate fields bordering on Perú and Bolivia. Coca use among the nitrate workers is said to have dropped markedly, due in large part to the fact that the manual worker has been displaced by modern technology. An appeal is made to complete Chilean legislation on narcotics.

HESSE, O.
1889 "Chemistry of the Coca Bases". London. The Pharmaceutical Journal and Transactions. 4(37): 866-867.

An early attempt to determine the nature of the coca bases. Special attention is given to cocaine.

HEWER, C. Langton
1976 Letters: "Cocaine and Coca". Anaesthesia 31(2): 294.

A letter from the editor emeritus of the journal Anaesthesia extolling the virtues of cocaine for vasoconstriction of the nasal mucosa. Gives some historical data about the use of coca in the Inca empire.

HODGE, William
1947 "Coca." Natural History (New York) 56(2): 86-93.

A general analysis of the pros and cons of coca use by Andean Indians based, in part, on the personal observations of the author. Although he judges coca to be a habit-forming, narcotic substance on the basis of observing both users and non-users in the Andes, he draws no real conclusion.

HOLFELDT, Fred.D.,Stephen, and Peter H. Forsham
1972 " Diagnosis and classification of reactive hypoglycemia based on hormonal changes in response to oral and intravenous glucose administration." American Journal of Clinical Nutrition 25: 1193-1201.

Report on laboratory research concerning the effects of intravenous glucose administration on human subjects. The purpose of the research was to develop techniques for diagnosing reactive hypoglycemia, late diabetic reactive hypoglycemia, hormonal deficiency states with hypoglycemia, and idiopathic hypoglycemia. Results of the tests indicate that the techniques developed are adequate for diagnosis after only a two day evaluation.

HOPKINS, Jerry
1975 "Cocaine consciousness: the gourmet trip." Journal of popular culture (Bowling Green, Ohio) 9: 305-314.

A pop-sociological treatment of the growing popularity of cocaine in American society from Coca-Cola to its arrival as a status symbol in 1974.

HOWELER, A.
1947 "Alcohol Als Antidotum Bij Acute Cocainevergiftiging". Amsterdam, Nederlands Tijdschrift voor Geneeskunde 91(III, 32): 2188-2192.

Alcohol is recommended as an antidote in cocaine poisoning. The author warns against the use of sedatives such as veronal in controlling cocaine spasms. A woman patient who was immediately heavily intoxicated by a sub-mucous injection into the nose of 1/2 gram of cocaine recovered by means of alcohol.

HUFF,J.C. Olmstead and J.E. Stone
1967 "The Effects of Certain CNS Stimulants upon the Spontaneous Activity of Mice Exposed to High Altitude and Low Partial Pressure of Oxygen." Fort Smith, Arkansas, Journal of the Arkansas Medical Society 64(6): 208-210.

Administration of a variety of CNS stimulants under low atmospheric pressure and low oxygen tensions. The animals given cocaine maintained an activity of a type which approached normality in extent and character. The authors argue that atropine, structurally related to cocaine, has about the same effect as cocaine under these conditions. They conclude that there would appear to be some reason for the use of coca leaves by the Andean highlander, although it is not certain that cocaine is the only compound which could serve their purposes.

IMLE, Ernest P.
1972 "Report of a study trip to Bolivia, June 27 to July 8, 1972." U.S. Department of Agriculture.

An impressionistic observation on the practices used in coca production based on a brief visit to the coca producing regions of Los Yungas (La Paz) and El Chapare (Cochabamba) and considerable hearsay. Contains data on production, harvesting, plant diseases and insects, and potential

profits for producers. An interesting general conclusion is that eradication of coca is impossible owing to its long history of cultivation and use and its fulfillment of an apparent need of the indigenous peoples of Bolivia.

INTERNATIONAL NARCOTICS CONTROL BOARD.
1972 "Report of the International Narcotics Control Board, on its work in 1971". Bulletin on Narcotics, 24(2): April-June 1972, 29-33.

This report gives only brief mention to coca, which is referred to as a double problem: (1) the consumption of coca leaf and (2) the export of illicit cocaine manufactured from it. As for the coca habit itself, the Board's opinion is that by virtue of its being so deeply rooted in the history and customs of the indigenous population it will not be quickly eradicated. However, the Board recommends that every effort be made to control it, since experience shows that "where indulgence of this kind has become an established social custom it readily turns to other substances as these become more widely known and more easily procurable".

JACOBJ, C.
1931 " Die peripheren wirkungen des kokains und ihre bedeutung für die erklärung des kokakauens des indianer". Archiv für experimentelle pathologie und pharmakologie 159: 495-515.

The ingestion of 100 c.c. of alcohol on an experimental basis elevated psychomotor activity above normal values, only to lead to a subsequent drop below such values. Oral ingestion of 80 mg. of cocaine resulted in a similar elevation, but without the subsequent depression that accompanied alcohol ingestion. Cocaine has an effect similar to that of adrenaline in the peripheral vascular system.

JARAMILLO, Gabriel Giraldo
? "Aspectos Históricos de la Alimentación Indígena". América Indígena :49-53

A rebuttal of the idea that Pre-Columbian diet was excellent and of high nutritive value. The question is asked as to why the Indians used coca if they had abundant food, since coca is used to withstand hunger. The argument is made that the pre-Columbian diet was sufficient only to mantain obedient masses, without rebellion and without the will for self improvement. The diet was sufficient in quantity, but lacking in fats and proteins, monotonous, and excessively voluminous and rich in cellulose.

JONES, Hardin & Helen Jones
1977
Sensual Drugs. New York: Cambridge University Press, 354 pp.

Written by a physiologist and his wife, this book focuses on the mental and physiological effects of sensual drugs. One feature is the careful attention paid to the effects of drugs on the sexual stimulation and activity of users and addicts. Where cocaine is concerned, the authors mainly deal with the questions of tolerance, claiming that it is possible for a human being to develop tolerance and reverse tolerance simultaneously. They offer a description of the causes of each. Although cocaine is mainly psychologically addictive, with chronic and heavy use, it can also be physically addictive.

KAUFMANN-Reinarz, O.
1964 "Arztbericht vom Leben unter den Indios im Alto-Chicama - Gebiet/Peru". Hippokrates 35(4): 149-151.

The author describes his medical experiences among this group of Indians, among others the use of coca.

KLEMENTSCHITZ, W. and P. Mathes
1952 "Die papierchromatographische Trennung einiger Coca-Alkaloide", Scientia Pharmaceutica 20 Jahrgang Heft 2: 65-69.

A discussion of the separation through the paper chromatographic method of some of the coca alkaloids.

KUCZYNSKI-Godard, Maxime H.
1940 "El hambre de proteinas, la anquilostomiasis, la coca y la opilación". Lima: La Reforma Médica 26(325): 110-114.

Rebuttal of a thesis by Prof. Maier of Zurich that coca chewing leads to anquilostomiasis. The author concludes that Kwango syndrome, found in the Belgian Congo, is identical to "opilation" that has been described for the Amazon. Both appear related to protein deficiency that is accentuated by the presence of intestinal parasites. Coca, the claims of Maier notwithstanding, has no direct relationship to the development of anquilostomiasis, since the malady exists in Africa where coca is unknown and also among the Adventists of highland Peru, who do not use the drug.

KUCZYNSKI-Godard, Maxime H.
1947 "El pensamiento arcaico-mítico del campesino peruano y la arqueología". América Indígena 7(3),216-48.

This essay on the origins of Peruvian campesino thought deals with coca only in that the leaves are "read" to diagnose problems and illness. Even this is mentioned only in passing.

KUCZYNSKI-Godard, Maxime H.
1940 La Actualidad Médica Social: El hambre de proteinas, la anquilostomiasis, la coca, y la opilación.

A comparative study of beri-beri and opilación in the Peruvian Andes and the Peruvian selva. The author argues that beri-beri is common in the Peruvian selva because of a scarcity of thiamine and protein in the diet. He disagrees with a Swiss researcher, H.W.Maier, who states that "the stomach problems of coca chewers after a certain period of time turn into a disease known as opilation." Kuczynski sees no connection between opilation and coca use. However, he argues that coca use in the highlands favors malnutrition, and therefore is homicidal.

KURSCH, Rodolfo
1971 "Pensamiento Aymara y Quechua". América Indígena 31(2): 389-396.

A case study of the role of coca in divination and ritual, based on work in Chuquichambi, Department of Oruro. It begins with a description of simple coca divination, then describes the Qhaira sacrifice and ceremony, and finishes with a description of more complex coca divination.

LA BARRE, Weston
1964 "The narcotic complex of the new world". Diógenes 48: 125-138.

An ethnological analysis of the role of native American drugs in shaping the role of shamanism. There is a brief mention of coca. Concludes that the original use of coca was religious, since in pre-Columbian times its use was restricted to religious functionaries.

LA BARRE, Weston
1970 "Old and New World Narcotics: A Statistical Question and an Ethnological Reply". Economic Botany 24(1)73-80.

La Barre undertakes an ethnological analysis of the question: Why the New World cultures possessed more narcotic plants than the Old World? Concludes that all that can be said is that there are more known psychotropic plants in the New World than in the Old and that knowledge of many such plants in the Old World was subsequently lost. There is only a passing reference to coca.

LEHMAN, Henry
1949 "La supresión de la venta de coca en Colombia". y "Suppression of the sale of coca in Colombia". Boletín Indigenista (México) 9:26-31.

A journalistic critique of the Colombian prohibition of the sale of coca, which is compared to the U.S. prohibition of the sale of alcoholic drinks and therefore doomed to failure. The author asserts that the prohibition will only increase the Indians'dependence on the leaf and force him to deal with unscrupulous white and mestizo drug traffickers. He argues that the only way to end the Indian's dependence upon coca is by improving his diet and living conditions.

LEON, Luis A.
1952 "Historia y extinción del cocaismo en el Ecuador. Sus Resultados." América Indígena 12(1): 7-32.

A general historical survey highlighting the original existence of coca use in Ecuador and its subsequent extinction. The principal reasons given for its extinction are orders emitted by Philip II in 1573 and 1574, establishing control over coca cultivation and limiting coca purchases to mining centers. No explanation is given as to why these orders did not have similar effects in Peru and Colombia. General statements are made to the effect that agricultural production in Ecuador was superior to that in the Spanish territories to the immediate north and south, but no data are given to back the statements up. As a historical explanation for the disappearance of coca in Ecuador the article is unsatisfactory.

LEON, Luis A.
1952 "La reaparición del cocaismo en el Ecuador". Boletín sobre Estupefacientes de las Naciones Unidas 4(2): 19-24. Abril-Junio.

A general discussion of the extinction of coca use in Ecuador. Historical documents are cited to demonstrate that coca was widely used in the early part of the colonial period. However by the end of that period its use had practically disappeared. The author attributes this change to the fact that there were no mines in Ecuador, that the mandates of the viceroy were more strictly applied than in other parts of Andean America, and that other products replaced coca when diseases invaded the coca plantations. The author asserts that the Ecuadorian Indian today is better fed and healthier than his counterparts in Peru and Bolivia, basically because he does not use coca. Unfortunately the article lacks specific data to back up its claims.

LINGEMAN, Richard R.
1976 Cocaine . The New York Times. Book Review November 28, 1976: 4.

Review of Grinspoon and Bakalar's Cocaine. The reviewer states that Grinspoon and Bakalar have demonstrated the lack of logic in the drug laws of the United States.

LITTLE, Michael A.
1970 "Effects of alcohol and coca on foot temperature responses of highland Peruvians during a localized cold exposure." American Journal of Physical Anthropology 32(2): 233-242.

Two groups of highland Quechua Indian males were tested under conditions of local foot exposure to cold air (0°C.). Foot temperatures were monitored throughout a one hour cold test and for 16 minutes recovery at room temperature (24C.). In the first group (age range 14-20 years), 29 subjects were tested while chewing coca leaves and while under control conditions. The second group (age range 20-50 years) of 25 subjects was tested while consuming 1.1 gm of ethyl alcohol per kilogram of body weight and again under control conditions. Both drugs (coca and alcohol) are habitually consumed by members of the native population.
The mastication of coca leaves had no effect on foot skin temperatures. Alcohol consumption however, elevated foot temperatures to between 4° and 6°. higher than control values at the end of 60 minutes of cold ex-

posure. It is suggested that alcohol consumption gives the Indian a slight thermal advantage and increases levels of comfort during natural cold exposure.

LOEHNING, R.W., V. Zapata Ortiz, F.W. Hughes and A. L. Tatum
1953 "Effects of cocaine on rats subjected to low tensions of atmospheric oxygen". Baltimore, Journal of Pharmacology and Experimental Therapeutics 108: 80-86.

A laboratory report on the effects of orally ingested cocaine on rats submitted to both sea level and high altitude oxygen levels. The conclusions are that ingestion of cocaine hydrochloride at the rate of 200 mgm./kgm./day has no evident effect on rats at or near sea level but at the oxygen level of an altitude of 14,000 feet a definite decrease in rate of growth occurs. Oxygen levels of high altitudes reduce food consumption by rate about equally, either with or without cocaine, yet the gain in weight is distinctly reduced in those animals consuming this drug. The cause of weight loss, therefore, must be due to something other than intake of food. Finally, when any dosage whatsoever ofcocaine, administered to rats maintained in normal air with a reduced content of oxygen, produced any detectable effects,these were entirely and consistently of a deleterious nature.

MARROQUIN, José
1943 "Cocaismo entre los Indígonas Peruanos". Crónica Médica (Lima) 60:309-315.

Coca addiction is seen as something beginning in infancy. Use of the leaf is said to have increased markedly with the Spanish Conquest, and was encouraged to increase productivity and make exploitation easier. Presently the average intake of coca among Peruvian Indians would appear to be 1 ounce per day. Coca chewing begins between 8 to 10 years of age. If the Indian drops the habit, he feels stomach fatigue, depression, and general malaise. Nevertheless he forgets coca use when he joins the army or becomes a Protestant. The feeling of warmth attributed to coca would appear to be purely subjective. Coca use leads to malnutrition, biological impoverishment, and susceptibility to a number of diseases. The solution for Peru is to detoxify the Indian population, lowering coca production, and solving the problem of inadequate foodstuffs.

MARTIN, Richard T.
1970 "The Role of Coca in the History Religion, and Medicine of South American Indians". Economic Botany 24(4): 422-438.

A fact filled general treatment of coca use by the natives of South America. The author argues that a major source of confusion is that the coca leaf has often been perceived as synonymous with one of its alkaloids - cocaine. Alkaloids can exert quite different effects when administered as they are naturally combined in the plant and when administered singly in pure form. Very little is known about the physiological activity of the associate alkaloids of the coca plant, and still less about their effects in combination. The necessity of looking into the possible importance of these other compounds is emphasized by the fact that an Indian will frequently reject the bitter coca leaves with the highest percentage of cocaine in favor of the sweeter leaves which are richer in the more aromatic alkaloids The article's conclusion then is that to deny the use of coca to the Indians would be as serious a disregard for human rights as would be an attempt to outlaw beer in Germany, coffee in the near east or betel chewing in India.

MAYER, Enrique
1977 " El Uso Social de la Coca en el Mundo Andino: Contribución a un debate y toma de posición". Lima : Departamento de Ciencias Sociales de la Universidad Católica. (Informe Preliminar y circulación restringida). 28 pp.

A brief , general discussion of the role of coca among the Peruvian campesino class. Well thought out and clearly presented the basic argument is that the real question that should be faced is the social and cultural role of coca, and not its biological effect. The author's point of view is that coca use stands as a powerful symbol of identity and solidarity separating those who belong to Andean peasant society from those who do not. The author sees current attempts at control as a new wave of cultural imperialism, and presents a strong contrary argument.

MERZBACHER, Von
1929 "Ueber Koka und Kokakauer. Reiseerinnerungen aus Südamerika". Muenchener Medizinische Wochenschrift 48: 2016-2019.

Experiences and commentaries with regard to coca chewing in the Andes its effect and value. The author concludes by advising, on the basis of personal experience that coca may be used to rehabilitate chronic tobacco smokers and alcoholics, and to combat altitude sickness.

METZGER, Duane, Christine von Glascoe and Aquiles Palomino
1975 "Summary Report". NIDA grant 5R01 DA01 267-01.14 pp.

A first year report of a two year study of coca use in Cuzco, Peru. The report lists 31 discrete projects either in process or planned for the second year of the research. Major emphasis is on cognition related to coca and coca use.

METZGER, Duane, Christine von Glascoe y Aquiles Palomino.
1976 " La Confirmación de Teorías Populares Bajo la Relación de Similari - dad'. Report No. 1 for NIDA grant 5R01 DA01 267-01. 23 pp.

A cognitive anthropological approach to the use of infusions for treatment of medical problems in Cuzco Peru. Coca is one of the herbs used for theinfusions.

METZGER, Duane G., Christine A. von Glascoe and Aquiles Palomino O.
1976 "Some Ethnographic and Botanical Notes on the Quechua Taxon: Munti Kuka . Report No. 4 of the NIDA grant 5R01 DA01267-01.13 pp.

A working paper describing a cognitive anthropological approach to the taxonomy of coca, with special emphasis on the wild coca found near Cuzco, Peru.

M.G.
1945 "Revista de Medicina Experimental III (4). octubre 1944, Lima, Peru." América Indígena: 341-342.

A bibliographical note praising the above volume for its contribution to understanding the role of coca chewing.

MILLER, Marc.
1976 " The Use of Propositional Inventories to Establish Homogeneous Attitudinal Systems: The Form of Erythroxylon Coca in Peru'. Report No. 3 for NIDA grant 5R01 DA1267-01. 38 pp.

A sophisticated analysis of a true/false matrix regarding coca in Cuzco, Peru. Major emphasis is given to techniques for quantitative analysis.

MILLER, Orville
1963 "Search for new drugs in medical folklore'. Journal of the American Pharmaceutical Association (Washington) 3(3): 131-132.

A pharmacological discussion of several folk remedies that really work. Author mentions the use of different alkaline substances by Peruvian coca chewers which aid in the extraction of alkaloids from the leaf. Calls for a concentrated effort to study this potentially valuable folk medicine before it disappears.

MONCLOA, Federico, Maria Gomez, and Alberto Hurtado
1965 "Plasma Catecholamines at High Altitude". Journal of Applied Physiology 20(6): 1329-1331.

A comparative study of the values observed in blood glucose determinations indicates:1) The fasting values are lower in high-altitude natives than in the sea level residents, and 2) insulin administration results in similar decreases of blood sugar in both groups, but the level reached at high altitudes is lower than at sea level due to the initial preinsulin value in the low-pressure environment. These facts do not yet have a satisfactory explanation. However, it seems justified to assume that the more pronounced hypoglycemia induced by insulin in high lands is apparently responsible for the greater concentration of epinephrine.

MONGE, Carlos
1946 "El Problema de la coca en el Peru". Anales de la Facul'ad de Medicina (Lima) 29(4): 311-315.

Monge argues that, although much been written about coca, little research has been carried out. He sees high altitude Andean man as differing in several basic respects from sea level man. Coca helps in his adaptation. Coca chewers do not become addicted: coca chewing is physiologically different from cocaine use: in coca chewing the cocaine is destroyed in the liver: cocaine is a knewn regulator of neuro-pulmonary mechanisms. Mongo's points of view were soundly attacked by Gutierrez Noriega Ricketts and the United Nations Commission of Enquiry

MONGE, Carlos
1952 "The need for studying the problem of coca-leaf chewing". Bulletin on Narcotics 4(4): 13-15.

A translation from Spanish to English of the article published in América Indígena in January of 1953.

MONGE, Carlos
1953 "La necesidad de estudiar el problema de la masticación de las hojas de coca". América Indígena 13(1): 47-53.

Given the confusion as to whether the mastication of coca leaf is a drug addiction or merely a pernicious habit, as manifested in studies by the United Nations and other international organizations, Monge stresses the need for serious scientific study of the coca leaf problem to end this confusion once and for all. His own work, as Director of the Peruvian Institute of Andean Biology and in the Cornell-Peru Project, indicates that the use of coca is not a drug addiction and that there is a direct relation between coca use and altitude.

MONTESINOS, A. Fernando.
1965 " Metabolism of Cocaine". United Nations Bulletin on Narcotics 17(2): 11-17.

Report on a series of studies carried out in the Faculty of Pharmacy and Biochemistry of San Marcos University in Lima. The major conclusions are that the average coca chewer uses 50 grams of coca leaf daily accounting for approximately 350 milligrams of basic cocaine which, in turn, corresponds to 235 milligrams of ecgonine. Upon ingestion in the mouth,cocaine undergoes constant hydrolysis, first through the alkali by which it is accompanied, and then through the different digestive juices, saliva gastric juice pancreatic juice, bile and intestinal juice, giving rise first to benzoyl-ecgonine and finally to ecgonine. The amount of cocaine thus circulating in the chewer's organism is insignificant and the amount of ecgonine very appreciable. The preliminary pharmacological and toxicological study of ecgonine indicates among other effects slight arterial hypotension and a high degree of innocuity

MONTGOMERY, Edward and Allen Johnson
1977 "Coca chewing and work outputs among Machiguenga Indians of Peru".Draft of an article submitted for publication to Human Biology. 5 pp.

An observation of work rates and caloric expenditures both with and without the use of coca in two typical work situations, one weeding moderate to heavy weeds in a hillside garden, and the other walking a ground distance of 2,000 feet up a sloping forest trail commonly used for hunting and collecting. The per minute caloric expenditures were obtained by measuring expired gas volumes with a Max Planck Respiration Gas Meter. The resulting data show a clear trend that when coca is chewed the length of time per unit of work invariably increases while the rate of energy output tends to decrease. Continual use of coca for several hours could effect substantial reductions in energy outputs. Certain other findings are consistent with this view. It is known that a reduction of maximal oxygen consumption is associated with coca use. Further, lower dietary caloric intakes have been observed for coca chewers.

MORALES, José Agustín
1938 El Oro Verde de los Yungas. La Paz, Imprenta del Instituto Nacional de Readaptación de Inválidos, 211 pp.

A classic work defending the legitimacy of coca production and use from the point of view of the Sociedad de Propietarios de Yungas. While the work as a whole is biased, it contains much valuable information. Included are discussions of coca production techniques, the early history of attempts at international control, the economic role of coca in the development of Yungas and La Paz, the history of the Sociedad de Propietarios itself, and the medicinal properties of the leaf. A clear distinction is made between use of the leaf in the traditional Andean fashion and use of refined cocaine. Chapter IX contains a valuable listing of medicinal fruits and herbs. An important book for anyone interested in the historical role of coca in Bolivia.

MULÉ, S.J.
1976 Cocaine: Chemical, Biological,Clinical, Social and Treatment Aspects. Cleveland, Ohio: CRC Press. 277 pp.

The purpose is to provide the scientist (chemical, pharmacological,psychological, clinical, behavioral, and social) with currently available data (state of the art), on cocaine's use and abuse in our society. A highly technical monograph which compiles articles by numerous authors. It begins with a review of the historical evolution of the substance, followed by a study of the chemistry, and articles on psychic dependence, tolerance, and the behavioral and physiological effects of acute and chronic use of cocaine.

MURPHY,H.B.M.,O.Rios, and J.C. Negrete
1969 "Abstinence et readaption: leurs effects sur les personnes qui practiquent la mastication de la feuille de coca". Bulletin des stupéfiants XXI(2): 43-50.

Report on one of the most carefully controlled studies of the effect of coca chewing on mental functioning. Ten coca chewers and ten non chewers were compared. Differences between the chewers and non-chewers were that the non-chewers performed mental tasks better and the chewers manual tasks better. Any impediment in performance would appear due to long term or chronic effects. Coca chewers, tested while not under the effect of the drug, performed more poorly than when under the effect of the drug. Differences noted in performance were, however, minimal, and were not looked upon by the researchers as interfering with the normal functions of the subjects.

MYERS, T.P.
1976 "Formative period occupations in the highlands of Northern Ecuador". American Antiquity 41(3): 353-360.

This archaeological study, based in part on the author's own field work, concludes that early formative period cultures in the highlands of Northern

Ecuador traded in coca as well as other items. Coca fields near Pimanpiro may have been one of the scarce resources that attracted trade to the area.

NATIONAL INSTITUTE ON DRUG ABUSE
1976 Cocaine - Summaries of Psychosocial Research. Rockville Maryland, National Institute on Drug Abuse.

Brief summaries of 69 books and articles dealing with cocaine and/or coca. The bulk of the material is on cocaine users. The bibliographical annotations are fuller than most and are broken down into such useful categories as purpose, methodology and general summary of the conclusions.

NATIONAL INSTITUTE ON DRUG ABUSE
1977 Cocaine 1977 Editor: Robert C. Petersen, Richard C. Stillman , NIDA Research Monograph #13. Rockville, Maryland: Division of Research of NIDA, 220 pp.

Summarizes current understanding of cocaine. An overview and a history of cocaine are followed by a chapter on the coca plant and its use. The remaining chapters, written by various people, contain information on behavioral effects of cocaine on animals and man, toxicology and the medical as well as recreational uses of cocaine. The chapter on the coca leaf is a comprehensive and well organized synthesis of the information published to date, recognizing the inconclusive and even contradictory nature of the greater part. Includes history, pharmacological, botanical, and sociological description, besides the usual speculation as to the real effects of coca consumption.

NATIONAL INSTITUTE ON DRUG ABUSE
1977 Drugs and Driving. Editor, Robert E. Willette, PhD. NIDA Research Monograph # 11. Rockville, Maryland: Division of Research NIDA, 137 pp.

Presents a critical review of the available literature relating drug use to driving and other complex human performance. Since very little basic research has been carried out on the effects of drugs, other than alcohol, while driving, this monograph proposes to move toward filling that gap. It is thus made up of a synopsis of a panel review, a summary of position papers, and drug impairment reviews written by the participants in the panel, on the various general classifications of drugs (anesthetics, tranquilizers, opiates, sedatives, stimulants, etc.).

NEGRETE, J.C. and H.B.M. Murphy
1967 "Psychological Deficit in Chewers of Coca Leaf", United Nations Bulletin on Narcotics 19(4):11-18.

The best controlled study of the chronic effects of coca chewing on mental functioning to be made to date. The study population consisted of 50 coca chewers and 42 non-chewers on a sugar cane plantation in northern Argentina. A battery of eight tests was administered. In all but two demographic categories set up by the researchers, the controls scored better than the chewers. There was, furthermore, a relationship between duration of chewing and certain test scores. Conclusions are that impairment is not sufficient to interfere with the type of tasks ordinarily undertaken by the subjects, but that it would interfere if the subjects were faced with work requiring substantially greater application of

intelligence. The findings are somewhat questionable, however in that the percentage of illiterates in the subject group was 54% for chewers and only 36% for controls.

NIESCHULZ, Otto
1969 'Kokaismus und kokainismus'. Soziale Medizin und Higiene 44:2276-2284.

Brief history of coca. The difference between coca use and cocaine use. The effects of coca chewing differ totally from oral or parenteral use of cocaine and its derivatives ecognine and cuskigrine in terms of both symptomology and addiction. Cocaine users offer symptoms of drug addiction. The simple coca chewer does not.

NIESCHULZ, Otto & P. Schmersahl
1969 'Untersuchungen über die Bedeutung des Kalkzusatzes beim Kauen von Coca-Blättern . Planta Médica (Stuttgart) 17(2):178-183.

The use of lime precipitates the alkaloid found in the coca leaf

NIESCHULZ, Otto Von
1971 'Psychopharmakologisch Untersuchungen über Cocain und Ecgonin . Arzneimittel Forschung 21(2): 275-284.

Parenteral administration of cocaine to mice causes motility increase and impairment of retention capability. These effects do not occur with oral administration. Ecgonine the compatible metabolite of cocaine has no stimulating properties. The activity of mice impaired by neuroleptic drugs or brain lesions and their physical capability is improved. The loss of euphorizing effects in chewing coca which justifies a differentiation of cocainism and cocaism. can be explained by a considerable metabolization of cocaine to ecgonine during the passage through the intestinal tract. In some preliminary experiments. both pseudoecgonine and ecgonine improved experimentally inhibited activity and increased physical strength.

NOYA. Nils D.
1977 'Coca y Cocaina'. Paper presented to the World Congress of Psychiatry. Hawaii, 20 pp.

A general discussion of the role of coca and cocaine in the Western World. Special emphasis is given to the Bolivian experience including new forms of high potency cocaine use. A clear distinction is made between coca chewing and cocaine use. The paper claims that cocaine use is becoming increasingly serious in Bolivia.

O' Brien and Robert C. Sullivan
1960 Cocaine and its Substitutes Tested with Infra-Red Spectrophotometer . United Nations Bulletin on Narcotics 12(2)· 35-36.

Report on a new spectrophotometric technique for distinguishing cocaine from its substitutes. The article is intended for use by police investigators.

ODRIA, Manuel R, Luis N. Sáenz & Emilio Romero
Republic of Peru, Ministry of Public Health and Social Welfare .
1953 New Peruvian Legislation on Cocaine Manufacture". Bulletin on Narcotics. 5(4)· 47-49

An English translation of President Manuel A Odria's decree of 11-VI-1953 establishing certain restrictions on the manufacture of cocaine in Peru. Provision is made for the control of coca shipments by means of transit notes providing information as to the source and quality of the leaves, their destination weight means of transport and the route. The decree is reprinted here without comment

OELKERS, H.A.& G. Schütze
1938 "Cocain und Blutzucker". Klinische Wochenschrift (Berlin) 17(25): 871-873.

Research and experimentation with cocaine administered orally and subcutaneously in animals, to demonstrate that the administration of cocaine causes long term hyperglycemia.

OLASCOAGA, Gustavo
1944 "La coca peruana en relación con la industria nacional" Revista Farmaceútica Peruana 13:7-15. 55.

A general treatise on the role of coca in Peru. After a brief historical sketch, the author describes the techniques of cultivation and the relationship between altitude, processing, and quality The botany of the plant is presented as is also its chemical content Ecgonine and cocaine are both discussed and the former is proposed as the central base of the latter. Coca chewing and cocaine addiction are equated and the backwardness of Peru attributed to the habit of using the drug Finally a proposal is made that Peru establish a cocaine factory to avoid human and monetary capital loss.

OTERO, Gustavo Adolfo
1951 La Piedra Mágica: Vida y Costumbres de los Indios Callahuayas de Bolivia. Mexico: Ediciones del Instituto Indigenista Interamericano. No.5.

A very detailed and complete description of every aspect of the life of the Callahuaya Indians of Bolivia from their mode of dress and life style, to their economy and religion and, finally, their medical science. In the chapter on vegetable food and stimulative products there is a section on the coca leaf. It begins with a general description of the leaf, its history, etc followed by a description of the special applications the Callahuayas have for the leaf. Later, in a chapter on divination, the author describes a "seeing" through the use of coca leaves, which he has witnessed.

PAIGE, David M., Eduardo Leonardo, Angel Cordano, J. Nakashima, Blanca Adrianzen T., and George G. Graham.
1972 "Lactose Intolerance in Peruvian Children: Effect of Age and Early Nutrition". American Journal of Clinical Nutrition 25(3): 297-301.

Ninety impoverished Mestizo children ranging in age from 10 months to 17 years were studied. Lactose tolerance tests were performed in the morning after an overnight fast. A load of 50 g/m^2 of body surface as a 20% suspension in water was given orally, after which a 0.2 ml microcapillary blood sample was obtained at 0,15,30,60, and 90 min. True glucose was determined by the ortho-toluidine method. A blood sugar rise of less than 26 mg/100 ml was considered a flat lactose tolerance curve (malabsorption) . Symptoms provoked by the ingestion of the lactose load, such as abdominal discomfort, cramps, flatulence, bloating, loose stools, and diarrhea were recorded as these occurred during the test and during the following 24 hours. A blood sugar rise below 26 mg/100 ml coupled with these symptoms was used to define an intolerant subject. The conclusions are that, irrespective of the child's early nutritional experiences, 93% had lactose malabsorption.

PARREIRAS, Decio
1961 "Data on the Illicit Traffic in Cocaine and Coca leaves in South America, with an annex on narcotics control in Brazil." Bulletin on Narcotics: 4: 33-36.

A report on Brazilian activities to stop the flow of cocaine into that country from Peru and Bolivia in the late 1950's and early 1960's. Claims that these efforts almost stopped the traffic completely. There is an annex on Brazilian antinarcotics legislation of the period.

PAZ SOLDAN, C.E., Ramon E. Ribeyro, and Felipe Portocarrero
1934 "La coca peruana y su futuro régimen político". Lima, La Reforma Médica 20(180): 69-74.

A general description of international attempts at controlling coca, with a lament over the Peruvian government's failure to respond. An appeal is made for the government to encourage the development of cocaine factories to supply the international legal market, while at the same time discouraging coca chewing. An administrative structure is proposed for supervising the legal production of cocaine.

PAZ ESTENSSORO, Victor
1962 Decreto Supremo No. 06279 . La Paz, Gaceta Oficial de Bolivia: 3275-3276.

A supreme decree calling for eradication of coca in Bolivia.

PEÑARANDA, Enrique C.
1942 Decreto Supremo, January 13, 1942. La Paz. Anuario Administrativo: 36-37.

A supreme decree calling for the collection of taxes on quinine, coffee, coca, and other products of the Yungas in the Coca Customs House.

PEÑARANDA, Enrique C.
1942 Decreto Supremo, February 2, 1942. La Paz, Anuario Administrativo: 115-116.

A supreme decree establishing a coca Customshouse in Cochabamba.

PEREZ ALCALA, Raul
1952 "La Coca en Bolivia ". United Nations Bulletin on Narcotics 4(2):11-16.

Bolivian support of the United Nations report calling for elimination of coca production. Perez Alcalá sees in coca a noxious substance. He argues that the coca chewer is physiologically and psychologically harmed, that he flees human contact. The international anticoca campaign has thrust coca beyond the range of purely national interests. In light of this fact, "What does it matter what happens to the Indian's use of coca; what matters is to increase his production". Crop substitution is then proposed. The work is impressionistic, admittedly based on very few sources, and lacks any grounding in scientific research.

PEREZ DE BARRADAS, José
1940 "Antigüedad del uso de la coca en Colombia". Revista de la Academia Colombiana de Ciencias Exactas, Físicas y Naturales correspondiente de la Española (Bogotá) 3: 323-326.

Coca chewing in Colombia was historically endemic among sierra populations such as the Arawak, Chibcha, Paeces, and Moguex. Representations of the habit are found even among the statues of San Agustín. These peoples tended to grow coca for their own use only; large plantations did not exist. The author indicates that coca use spread as far north as Nicaragua, and that it very probably had diffused from Peru. Colombian coca chewers attribute the same qualities to the leaf as do chewers in other Andean countries: a source of energy, a means of combating hunger and fatigue. In modern Colombia coca use is clandestine.

PHILLIPS, Joel L.
1974 A Cocaine Bibliography - Nonannotated . Rockville Maryland, National Institute on Drug Abuse.

A general bibliography on cocaine, containing a number of items that deal exclusively with coca. Although intended to be comprehensive, it lacks a number of important articles and books.

PICON-Reategui, E.
1962 "Studies on the Metabolism of Carbohydrates at Sea Level and at High Altitudes". Metabolism 11(11):1148-1154.

A comparative study of the changes in blood glucose, lactate, pyruvate, plasma inorganic phosphate and plasma potassium after oral administration of glucose in two groups of adult men, one being residents at sea level and the other residents at an altitude of 14,900 feet. Although the glucose was consistently lower in the altitude group, the trend of the curves, after oral administration of glucose, followed similar patterns in both groups. Behavior of plasma inorganic phosphate and plasma potassium were the same at both altitudes. There is no satisfactory explanation for the lower blood glucose level in the high altitude resident in the fasting state nor for the difference in lactate and pyruvate responses in both altitudes at the end of the experiment.

PICON-Reategui, E.
1963 "Intravenous Glucose Tolerance Test at Sea Level and at High Altitude". Journal of Clinical Endocrinology 23: 1256-1261.

Determinations of capillary blood glucose, before and after intravenous glucose administration, were made in 2 groups of healthy males: one group residing at sea level and another at 14,900 feet above sea level. Under basal conditions, the blood glucose concentration was lower at high altitudes, but reached a higher peak 4 min, after its administration. This was probably related to the lower absolute extracellular water volume in residents of high-altitude because of their smaller body size. The drop in blood glucose, after the initial rise, ocurred at an increased rate at high altitudes. At both altitudes, the utilization of glucose varied in relation to the blood concentration of this substance. In general, at a given blood glucose concentration, the utilization is greater at high altitudes.

PICON-Reategui, E.
1966 "Effect of Chronic Hypoxia on the Action of Epinephrine in Carbohydrate Metabolism". Journal of Applied Physiology 21(4): 1181-1184.

Research report on the action of a test dose of epinephrine on aspects of carbohydrate metabolism in 12 men residing at 150 m. above sea level and 12 others residing at 4,540 m. The results indicate that neither the duration nor the degree of the glycogenolytic action of epinephrine on the liver is substantially affected by altitude. It also suggests that the reserves of glycogen in the liver were adequate in the two groups of subjects studied. The glycogenolytic action of epinephrine on the muscle seemed to be the same in duration but not in degree in the two groups. However the rate of increase of lactate was faster and greater in the high altitude group, indicating either a greater glycogenolytic action of epinephrine on the muscle or a delay in the removal of lactate from the blood in the high altitude group. The rate of oxidative removal of lactate may also be faster at high altitudes. Chronic exposure to high altitude also tended to suppress the subjective symptoms produced by epinephrine.

POEPPING, Robert M. and Richard T. Kopanda
1836 "Review of: Reise in Chile, Peru und auf dem Amazonenstrome, während der Jahre, 1827-1832". The Foreign Quarterly Review 17(33):38-40.

In his travels in South America. Poepping came into contact with coca, which he blamed for the degeneracy of the Indian, whom he said suffered an "incurable deficiency". Coca is said to affect the nervous system in the same manner as opium. Thus, the addict becomes, "unfit for all the serious concerns of life".

POST, Robert M. and Richard T. Kopanda
1976 "Cocaine, Kindling and Psychosis". American Journal of Psychiatry 133(6): 627-634.

The authors review evidence that repeated administration of central ner-

vous system stimulants may be associated with progressively increasing effects on pathological behavior and seizures rather than tolerance. They suggest that these progressive effects may be related to electrical kindling, a phenomenon in which repetitive subthreshold stimulation of the limbic system eventually leads to major motor seizures. They suggest a kindling model that combines physiological, biochemical, and psychological elements.

PRANCE, Guillean T.
1972 "Ethnobotanical Notes from Amazonian Brazil". Economic Botany 26(3): 221-237.

A brief description of coca use among the Maku. Coca leaf is harvested and placed in a large flat pan to toast until it is crisp and dry. It is then ground with banana leaf ash. The resulting powder is mixed with cassava and forms part of the daily diet of the Maku.

QUIJADA Jara, Sergio
1950 La coca en las costumbres indígenas. Huancayo, Peru: Talleres Cín - sal. 73 pp.

This essay by a Peruvian folklorist discusses the Indian's application of coca to work, travel, funerals, the livestock fiesta, medicine, in short, to all aspects of daily life. He has also included some songs and poems about coca. He concludes that coca is so much a part of the Indian's customs and daily life that it is impossible to abolish it through legislation. The only means of ending the abuse of coca is through education and the improvement of the Indian's social and economic condition.

REID, William A.
1914 "Coca -The Wonderplant of the Andes". Bulletin of the Pan American Union (Washington) 38(5): 640-656.

A general defense of coca dealing with its cultivation, commercialization and use. The author uses the usual popular sources, especially Mortimer. He also undertook some personal observation in Bolivia. Besides generally defending coca, his major conclusion is that more study is needed.

RICKETTS, Carlos A.
1940 "La cocainomanía del indígena, factor de degeneración racial". La Crónica Médica (Lima) 57: 25-30, 73-78.

A "toxicological" analysis of the so-called "Indian Problem" by a Peruvian Physician. Ricketts blames the abuse of coca and alcohol for the physical, mental, and moral degeneracy of the adult Indian. The habitual use of coca subjects him to chronic cocaine intoxication, which is erroneously compared with opium. Ricketts recommends restrictive measures to eradicate the use of coca by the Indians.

RICKETTS, C. A.
1952 "El Cocaismo en el Peru". América Indígena XII (4):309-322.

A general article combining pseudo-history and second hand accounts of research reports with polemic attacks on Carlos Monge's high altitude thesis. The article ends with an appeal that the Peruvian government end coca production.

RICKETTS, C.A.
1954 " La Masticación de las Hojas de Coca en el Perú". América Indígena XIV (2): 113-125.

Another general article by Ricketts that includes a major attack on the Monge high altitude thesis. Page 119 contains some interesting data on coca use in Bolivia, and pages 120 and 121 a brief resume of the conclusions recently published by Hurtado, Salazar, Barbella and Yates. The latter report demonstrated increased work capacity on the part of coca chewers . Ricketts does not challenge the findings,

but argues that this increase in work capacity is at the expense of me tabolic balance.

RISEMBERG Mendizabal, Francisco
1944 "Acción de la coca y de la cocaina en sujetos habituados". Lima: Revista de Medicina Experimental 3: 317-328.

Report of acute effects of coca chewing in 18 chronic chewers. Conclusions are that the major acute effects are a slight mydriasia, a rise in temperature, moderate tachycardia, a slight rise in blood pressure, and an intensification of reflexes. The users served as their own controls.

ROGERS, D.J.
1963 "'Divine' leaves of the Incas." Natural History (New York) 72(1):33-37.

A brief, general article dealing with the production, commercialization, and use of coca. It draws on a few of the better known works for historical data and limited, personal observation in the coca producing region of Coroico, Bolivia. Rogers' major conclusion is that very little is really known about coca owing to the absence of scientific, experimental studies, and that such studies are difficult to formulate and carry out. The article says nothing that has not been said before.

SABBAG, Robert.
1975 Snowblind: A Brief Career in the Cocaine Trade. Indianapolis: The Bobbs-Merrill Company, Inc, 284 pp.

The true story of a cocaine smuggler and dealer, whose career ended in prison. Allegedly factual except for the names used.

SAENZ, Moisés
1933 "Sobre el indio peruano y su incorporación al medio nacional". México: Publicaciones de la Secretaría de Educación Pública, 68 pp.

This item contains a brief section on coca use providing some interesting information on methods of cultivation in Peru as well as data on how the leaf is used. Coca use is said to be a harmful vice.

SAFFORD, W.E.
1917 "Narcotic plants and stimulants of the Ancient Americas". Annual Report of the Smithsonian Institution, 1916. Washington 1917, pp 409-411.

Safford includes a short section on coca, principally describing chuspas and bundles of coca leaves that he found in prehistoric burial sites along the Peruvian coast. He also devotes some attention to the lime gourds and the use of the alkaline substances in chewing coca. His major conclusion is that, when wisely used, coca is a blessing to man, but when abused it becomes a terrible curse.

SALSER, J.K. Jr.
1970 "Cubeo Acculturation to Coca and its Social Implications". Economic Botany 24(2): 182-186.

Description of the diffusion of coca use into an Amazonian tribe. Harvesting is done daily and the coca is consumed as a powder. The purposes of use are to stimulate work and to deaden hunger pangs.

SAUL, F. William.
1964 "Primitive but Effective: Herb Medicines of the Amazon Jungle". The Journal of the Kansas Medical Society. September: 458-464.

This article, by a Kansas radiologist, discusses several herbal drugs used by the indigenous population of the Amazon. Based in part on three, two-month "safaris" which took him to various parts of the Amazon Basin, the article makes reference to coca, which is used primarily for its narcotic effect, but also for some medicinal purposes. Coca addiction is said to lead to "serious mental and physical deterioration and ultimate death by some superimposed common infectious disease".

SCHMIDT, Von Heinrich and Magdalene Späth
1963 "Der Einflufs von Cocain, Iproniacid und Pyrogallol auf die durch Adrenalin ausgelöste Blutzuckersteigerung". Azneimittel forschung 13(9): 761-764.

Employing continuous blood sugar determinations, increases due to adrenaline were ascertained in cats after parenteral administration of cocaine and pryogallol in the portal vein. Blood sugar, however, remained unaffected by iproniazide after injection of adrenaline. Cocaine and pyrogallol had no effect on blood sugar elevation by glycogen. These findings do not contradict the view that the actions of pyrogallol (methyl transferase inhibitor) and cocaine are blocking the cellular storage of catecholamines.

SCHWAB, Robert S., Thomas L. DeLorme, and and Kurth Zimmerman
1952 "Observations on the Effects of Chewing Cocaine Wax or Coca Leaves on Muscular Fatigue". Transactions of the American Neurological Association 77: 256-259.

Voluntary ergographic curves in 10 normal subjects showed no difference in form of work done before or after chewing either the wax preparation or the leaves. In psychoneurosis patients there was an increase in the amount of work done after the chewing of leaves that varied between 15 and 50 per cent. In the same patients, however, normal saline injections also produced an increase in their ergographic curves. In 6 patients with Parkinson's disease there was no difference between the curves with or without the cocaine preparations.

SHARP , Gordon.
1909 "Coca and Cocaine Studied Historically". The Pharmaceutical Journal. 82: 28-30, 117-18, 184-86, 355-56.

A brief summary of the history of coca and cocaine by a Scottish physician, based on a few popular sources. There is also a section on the chemistry of cocaine. In terms of the history of coca, this article offers nothing original.

SHULTES, R.
1963 "Botanical sources of New World Narcotics: Coca". Psychedelic Review 1: 165-166.

A panoramic view of native American narcotics plants. Although not an hallucinogen, coca is discussed as a major narcotic plant deserving further study. Defends coca chewing on the basis of his own personal experiences, as relatively harmless and blames government efforts at extirpation for driving the Indian to alcohol use.

SIEGEL, R.K., C.A. Johnson, J.M. Brewater and M.E. Jarvik.
1976 "Cocaine Self-Administration in Monkeys by Chewing and Smoking". Pharmacology, Biochemistry and Behavior 4(4): 461-467.

Experimental findings from work with monkeys, who were given access to chewing gum and cigarettes with and without admixtures of cocaine. The conclusions are that monkeys will self-administer cocaine, albeit in small amounts, when provided with an experimental opportunity to do so.

SOLIS S., Abel.
1952 "Limitación de la producción de hojas de coca en Bolivia". Boletín sobre Estupefacienves de las Naciones Unidas 4(2): 17-18.

A former president of the Sociedad de Propietarios de Yungas supports the UN. recommendations for the gradual suppression of the production and use of coca leaf through the improvement of economic and social conditions of the consuming population. He argues that coffee would be a good substitute crop, since it brings high prices and is easier and less expensive to produce than coca.

SOUTH, Robert B.
1976 ? "Coca in Bolivia". The Geographical Review , pp. 22-23.

A geographer's treatment of coca use in Bolivia and some implications of the external demand for cocaine on this traditional cash-crop and its marketing system. Data were gathered from selected secondary sources and, surprisingly, a limited amount of archival research. The rising demand for cocaine explains the recent increase in production while traditional consumption has remained static, or decreased. The same phenomenon explains the recent emergence of the Chapare as the major coca producing region of Bolivia, replacing the Yungas of La Paz, traditionally the leading producing region. The ultimate solution to the problem will be found in areas of demand, not supply.

STEWART, F.E.
1885 "Coca-leaf cigars and cigarettes". Philadelphia.Medical Times and Register. 15(465): 933-35.

A physician's report on his experiments with coca cigars and cigarettes,which aimed to determine if the commonly reported effects of coca -- relief from fatigue, hunger, etc. -- were present when the leaf was smoked. Concludes that they are present, but to a lesser degree.

STOCKWELL, G. Archie
1877 "Erythroxylon coca." Boston Medicine and Surgery Journal. 96(14):399-405.

A dated medical analysis of coca based on published sources and some personal observation. Some attention is given to traditional use and production, but this information can be better obtained elsewhere. The author shares the opinion, common at the time, that coca used in moderation can be beneficial, but if abused can be most harmful.

TOFFOLI, F. and U. Avico.
1963 "Valutazioni Chimiche Sulla Pasta di coca e sui Residui della Estrazione Industriale della Cocaina dalla Pasta di Coca". Rendiconti Istituto Superiore di Sanita 26: 1011-1023.

The evaluation methods of total ecgonine are discussed and a test for determination of cocaine in coca paste is described. The test consists of cold-oxidation with permanganate of secondary alkaloids and extraction with ether of cocaine, which is finally weighed. The U.V. absorption spectra of ecgonine and of anhydroecgonine are also specified. This is followed by a description of a paper chromatographic method which enables separation and determination of ecgonine and of anhydro-ecgonine in mixtures. The Italian original of an article that later appeared in the United Nations Bulletin on Narcotics.

TOFFOLI, Francesco and Ustik Avico
1965 "Coca Paste from the Industrial Extraction of Cocaine, Ecgonine and Anhydroecgonine" United Nations Bulletin on Narcotics 17(4): 27-36.

The methods of determining "total ecgonine" are discussed. A method is described for determining the cocaine in coca paste· low temperature

oxidation of the secondary alkaloids with permanganate, extraction with ether, and weighing of the cocaine base. The absorption spectra are specified, and the specific optical rotations at various ph values are given for ecgonine and anhydroecgonine, from which rotations the apparent constants of acid basic dissociation have been deduced. The rotations obtained are measured by comparison with those obtained in the acid hydrolysis of cocaine. A description is given of a method of paper chromatography by which the ecgonine and anhydroecgonine in the mixtures are separated and then determined, and the results are given of the determinations of these two components, and of the methyl ester of anhydroecgonine, in the residues from the manufacture of cocaine from coca paste.

ULLOA, José Casimiro, Miguel F. Colunga and José A. de los Rios.
1888 "Informe sobre la Coca". La crónica Médica. 6(62): 27-31.

An early medical defense of coca by three Peruvian physicians focusing on: (1) therapeutic properties and physiological effects, (2) hygienic properties, (3) medical applications, and (4) suggestions for increasing the consumption and export of Peruvian coca and cocaine. This study was written before the world decided that cocaine was a "bad" drug.

UNANUE, José Hipólito
1821 "Abstract from a communication ... to Samuel L. Mitchell, dated at Lima, 1st. Feb. 1821." The American Journal of Science and Arts (New Haven), 3: 397-99.

A brief, but favorable, synopsis of coca use and cultivation in Peru, by the author of a detailed study of the leaf. Coca is valuable to the Indians in that it enables them to work hard in the high altitude of the Peruvian highlands.

UNITED NATIONS
1949 "The Commission of Enquiry on the coca leaf". Bulletin on Narcotics 1: 20-25, 39-41, 52-54.

A brief exposition of the purpose of the U.N. Commission of Enquiry sent to South America in 1949 to study the coca chewing and the manufacture of cocaine. The article summarizes the major arguments both for and against the use of coca leaf, as well as the steps taken by international agencies for its control up to 1949. No real conclusions are drawn, but it is suggested that in order to control the illicit cocaine traffic it will be necessary to subject the production of coca leaf to some measure of control.

UNITED NATIONS
1950 "Coca Chewing, geography and nutrition". United Nations Bulletin on Narcotics 2(4): 2-13.

A synopsis of the larger report of the United Nations Commission of Enquiry on Coca. The article contains no information on scientific studies of the relationship of coca to nutrition. Comparisons that are made are those between coca using and non-coca using regions of Peru.

UNITED NATIONS
1950 "Commission of Enquiry on the Coca Leaf". United Nations Bulletin on Narcotics 2(4): 41-52.

A report on the activities and findings of the Commission of Enquiry which spent three months talking with government officials, physicians, and other authorities as well as making personal observations in Peru and Bolivia. Apparently, little or no time was spent interviewing users of coca. The Commission reached the conclusion that coca chewing was harmful since its effects were due to the action of cocaine. It recommended that both production and use of coca leaf be gradually suppressed.

UNITED NATIONS
1962 "Ten years of the coca monopoly in Peru". Bulletin on Narcotics 14(1): 9-17.

A revised version of the 1959 memorandum issued by the Peruvian Estanco de la Coca. Instead of moving to eradicate coca production as recommended by the U.N. Commission of Enquiry in 1949, the Estanco has adopted a "Peruvian approach to the problem" by defending coca as an important source of wealth and employment. Once social legislation liberates the Indian masses from their static condition, the coca habit will rapidly disppear in Peru. Provides some statistical data on production, consumption (masticación), tax revenues, and exports of coca leaf.

UNITED NATIONS
1965 "Inter-American Consultative Group on Coca Leaf Problems, Lima 14-21 December 1964." Bulletin on Narcotics 17(4): 37-41.

A report on the conclusions of this conference which resolved that "cocaism" is a negative factor in the development of countries where it is prevalent. Recommends the restriction of legitimate uses to: (1) medical and scientific uses, and (2) industrial uses, Moreover, every effort should be made to eliminate cocaism and limit the production of coca leaf.

UNITED NATIONS
1965 "Report of the Inter-America.. Consultative Group on Coca Leaf Problem". Lima, Report no. TAO/LAT/51. Circulation restricted, 43 pp.

Minutes of the meeting of the consultative group in Lima. Valuable from the standpoint of appraising the present status of attitudes and policies with regard to coca control. The Bolivian delegation described the general situation in their country but made no commitments.

UNITED NATIONS
1966 "Twenty Years of Narcotics Control under the United Nations". Bulletin on Narcotics 18(1):1, 31-33.

A summary of U.N. efforts to get Peru and Bolivia to limit coca production. Coca chewing is considered a harmful drug addiction, because " the Indians chew coca leaf on account of its cocaine content". Yet, the recommendation is for gradual suppression.

UNIVERSIDAD MAYOR DE SAN SIMON
1972 Informe Preliminar. Producción y Comercialización de la Coca. Cochabamba, Bolivia: Instituto de Estudios Sociales y Económicos, Facultad de Ciencias Económicas.

A preliminary report of a study of the production and comercialization of the coca leaf, Where production is concerned, a comparative study is made of coca with coffee, bananas, rice and corn. The aspects of comercialization which were included in the study were the markets, rates of transportation, taxes, costs, prices,and profits. The report includes a detailed description of the methodology used.

UNIVERSIDAD MAYOR DE SAN SIMON
1975 Cuadros Estadísticos de Producción Agrícola. Cochabamba, Bolivia: Instituto de Estudios Sociales y Económicos, Facultad de Ciencias Económicas.

A compilation of statistical tables of the different factors involved in agricultural production in the regions of the Yungas in the department of La Paz, and the Chapare in the department of Cochabamba. In each table a comparison is made of the respective data for the principal agricultural products of these regions: corn, rice, yuca, coca, bananas, oranges, tangerines, limes, grape fruit, avocado, pineapple, and papaya.

URIBE Piedrahita, Cesar
1942 "Esquema para un Estudio de la Patología Indígena en Colombia". América Indígena, 2: 67-74.

A general discussion of pathologies found in Colombia. One that is included is coca chewing. The conclusions are based on hearsay rather than research. They include statements such as the fact that coca chewers develop mouth cancer and paralysis of the upper digestive tract. No evidence is presented to support such statements.

USCATEGUI Mendoza, Nestor
1961 "Distribución actual de las plantas narcóticas". Revista de la Academia Colombiana de Ciencias Exactas, Físicas y Naturales. 11(43): 215-228.

An ethnological study of the use of narcotic plants among the Indians of Colombia based in part on the author's own field work. Coca is used by several groups both in the highlands and in the Amazon. Thus, there is considerable attention devoted to its cultivation, preparation, and use by these different groups. No major conclusions are drawn, since this is primarily a listing of the groups and the drugs they use.

VALDIVIA Altamirano, Augusto
1937 El Ulo: plaga de los cocales. La Paz: Ministerio de Agricultura, Colonización e Inmigración, 8 pp.

A description of the Ulo, a small moth which causes much damage to the coca fields. For combating the plague, the author recommends the use of insecticides, lamps for killing the moths which are attracted to light, or a wasp which is the Ulo's natural enemy.

VARGAS Machuca, Ramon
1944 "Antagonismo y sinergismo entre la cocaina y el cloruro del calcio". Lima, Revista de Medicina Experimental 3: 216-231.

Dog experiments on the mutual effects of cocaine and calcium. The conclusions are that cocaine and calcium act synergistically, raising arterial blood pressure, increasing respiratory frequency and diminishing its amplitude. Cocaine decreases the sinus-carotid reflex, and calcium intensifies it. When the sinus-carotid reflex is initially stimulated by the calcium, the cocaine produces only a slight depression over the primitive reflex.

VASQUEZ Lapeyre, Luis.
1952 "Labor de la Comisión Peruana para el Estudio del Problema de la Coca". Perú Indígena (Lima), 3(7-8), 16-135.

A report on the findings of the Peruvian Commission for the Study of Coca, which attacks the U.N. Commission of Enquiry's report recommending the eradication of coca production and consumption as unscientific and inconclusive. The Peruvian Commission, following the lead of its president, Dr. Carlos Monge, argues that coca use does not produce drug addiction nor is there any reason to believe that it causes malnutrition. Furthermore, it recommends that a scientific study of coca use should be made before any move towards eradication is undertaken.

VELLARD, Jehan-Albert
1967 "La Médecine Indigène Sud- Americaine." Géneve. Bulletin de la Société Suisse des Américanistes 31: 3-15.

A general treatment of the history and role of various drugs among America Indian groups. Although coca is discussed, the treatment is superficial and adds little to our understanding.

VERZAR, F.
1955 "Nutrition as a factor against addiction". American Journal of Clinical Nutrition 3(5): 363-374.

A synopsis of the nutritional portion of the 1950 United Nations Commission's report on coca. The author was a member of the commission.

WARDEN, C.J.H.
1888 "Cocatannic Acid, from the leaves of erythroxylon coca grown in India." London, Pharmaceutical Journal and Transactions 18: 985-987.

An early pharmaceutical technique for production of cocatannic acid. Of most interest is the fact that it was developed using leaves of erythroxylon coca from India. Chopra, writing in the 20th. century, denies that coca was ever grown in India.

WHITE, C. Langdon
1951 "Coca Chewing in the Andes". Pacific Spectator (Stanford, CA).5(2): 242-249.

A journalistic treatment of coca use that relies principally upon impressionistic, and often erroneous statements, with little documentation to back them up. At least the author had the good sense to recommend that no action be taken to eradicate coca use until scientific studies have revealed its true nature.

WISLICKI, Leo
1961 "Drugs and Body Temperature". Georgetown Medical Bulletin 15: 137-141.

Laboratory studies of the effects of various drugs on the body temperature of rabbits and cats. Conclusions are that the effect of an intramuscular injection of a large dose of cocaine hydrochloride(40 mg) on the rectal temperature of rabbits varies widely, although most animals agitate and convulse within a few minutes. The convulsions pass by within half an hour, but the changes in body temperature develop much more slowly. Usually there is an elevation of one to two degrees, which reaches its peak in one to two hours and returns to its original level in another two to three hours.

WOLFF, Pablo J. Oswaldo
1940 "Quelques considérations sur la coca en Amérique du Sud". Schweizerische Medizinische Wochenschrift. 70(25): 606-609.

An undocumented attack on coca use that says nothing that has not been said elsewhere.

WOLFF, Pablo Oswaldo
1952 "Consideraciones generales sobre el problema de la masticación de la hoja de coca". Bulletin on Narcotics. 4(2): 2-5.

An article by a high official of the World Health Organization attacking the use of coca leaf that says nothing and presents no data to back up its generalizations.

WOLFF, Pablo Oswaldo
1952 "General Considerations on the Problem of Coca-Leaf Chewing". Bulletin on Narcotics 4(2): 2-5.

An English language version of the article published in the Spanish language edition of the same Bulletin.

WOLFF,Pablo Osvaldo
1950 ? "Bibliography: Publications on the Chewing of Coca Leaves." United Nations Bulletin on Narcotics 2: 105-113.

The first serious attempt to pull together a bibliography on coca chewing. The effort was related to the work of the U.N. Commission of Enquiry. Good for historical perspective.

WOODS, L.A. McMahon and M.H. Seevers
1951 Distribution and Metabolism of Cocaine in the Dog and Rabbit". Baltimore, Journal of Pharmacology and Experimental Therapeutics 101(2): 200-204.

Report of research on dogs and rabbits. Conclusions are that intravenous injection of cocaine in the dog is followed by a rapid initial drop in the plasma concentration. About 1 to 12 per cent of the administered cocaine is excreted over a 24 hour period in the urine of the dog. Accordingly 88 to 99 per cent of the cocaine is metabolized by this species. After subcutaneous injection of comparable doses the rabbit shows a much lower plasma level of cocaine than the dog. Only traces of cocaine can be found in the urine of rabbits after cocaine injection. Amounts injected are proportionately higher than those used by man, so that the conclusions are not transferable.

ZAPATA Ortiz, Vicente
1944 "Modificaciones psicológicas y fisiológicas producidas por la coca y la cocaina en los coqueros". Lima: Revista de Medicina Experimental, 3: 132-162.

A comparative study of the effects of coca and cocaine on two groups of adult males. The first consisted of non coca users who were employees of the Faculty of Medicine and the health services of Lima, and the second of coca chewers who were inmates in the central prison of Lima. All were given a one per cent solution of cocaine and the coca chewers were allowed to chew their normal ration. The conclusions were that in normal subjects cocaine slightly increases reaction time, increases speed performance of an attention test, and also increases the number of errors. In coca addicts, coca and cocaine increase reaction time. Coca leaves in these addicts shorten both performance time and number of errors of an attention test. The leaves also increase body temperature, the range of heart beats, arterial blood pressure, respiratory movements, and spinal reflexes.

ZAPATA Ortiz, Vicente
1945 "Acción de la cocaina en sujetos no habituados". Lima :Revista de Medicina Experimental. ? :307-316.

Report on laboratory studies of the effect of oral administration of one to three miligrams per kilogram of weight or a one percent solution of cocaine. The subjects were eleven medical students and laboratory workers in Lima, Peru. None were coca chewers or cocaine users. Conclusions were that the cocaine caused a very slight increase in temperature, and slight modifications in mental activity. Modifications observed in pulse, blood pressure and breathing were unimportant. There was also a slight increase in the spinal reflexes, as well as a modification in certain neuro-vegetative reflexes.

ZAPATA Ortiz, Vicente
1948 "Acción de la cocaina sobre el metabolismo basal de sujetos no habituados". Lima: Revista de Farmacología y Medicina Experimental 1: 69-80.

Additional research on the effects of cocaine on basal metabolism, using 15 young men and 3 women, all of whom were either medical students or laboratory workers in Lima. A one per cent solution of cocaine was administered orally, and on repeated occasions. It was found that small doses of cocaine hydrochlorate (1 mgr. x Kgr.) produced a discrete increase of B.M.R. in most of the individuals studied. Large doses (2 or 3 mgrs. x Kgr.) produced great increase of B.M.R. in all the individuals studied, in some cases reaching abnormal levels. While B.M.R. varied in controls to whom cocaine was not administered, these variations were far lower.

ZAPATA Ortiz, Vicente
1952 "El problema de la masticación de hojas de coca en el Perú". Boletín sobre Estupefacientes de las Naciones Unidas 4(2): 25-32.

An earlier version of the English language condensation published in the International Journal of Addictions in 1970.

ZAPATA Ortiz, Vicente
1970 "The Chewing of Coca Leaves in Peru". International Journal of Addictions 5(2): 287-294.

A fact filled, summary article reporting on the results of some 30 years of Peruvian research on coca. Data given are the average amount of coca used by chronic chewers, the percent of alkaloids they remove from the coca through chewing, the percentage of cocaine excreted through the urine, and the conclusion by Montesinos (1965) that cocaine ingested through chewing undergoes hydrolysis by the alkaline substances that are used during chewing and by the different gastro-intestinal substances, being first transformed into benzol-ecgonine and finally into ecgonine. Zapata-Ortiz disagrees with Montesinos' findings in that they were based on in vitro studies of the action of gastric, pancreatic, and intestinal juices, taken from dogs, on cocaine. Acute effects of coca chewing are also discussed.

ZORRILLA Eguren, Javier
1977 El hombre andino y su relación mágico religiosa con la coca. Lima, Universidad Católica Departamento de Antropología.

A general analysis of the role played by the coca leaf within the andean religious tradition. The author concludes that a close relationship exists between social health, psychic health, and physical health. In the world of andean man, coca plays a key role in the maintenance of human balance.

B. GENERAL REFERENCE WORKS

ANDREWS, George and David Solomon
1972 The Coca Leaf and Cocaine Papers. New York and London: Harcourt Brace Jovanovich 372 pp.

A collection of 17 articles on coca and cocaine. The quality of the articles is very mixed, and the time frame spans more than 100 years. The two best contributions on coca mastication are Martin's 'The Role of Coca in the History, Religion, and Medicine of South American Indians," and "The Consumers Union Report on Coca Leaf and Cocaine."

GRINSPOON, Lester and James B. Bakalar
1976 Cocaine: A Drug and its Social Evolution. New York: Basic Books, Inc., 308 pp.

The best up-to-date compendium of knowledge regarding cocaine and the raw material from which it comes - the coca leaf. A clear distinction is made between coca mastication and cocaine use. Much emphasis is given to the irrationality of U.S. drug laws.

MORTIMER, W. GOLDEN
1974 History of Coca, the divine plant of the Incas. San Fransisco, Fitz Hugh Ludlow Memorial Library.

The classic work on the history of coca, rescued from out-of-print neglect. The original was published in 1901.

NACIONES UNIDAS
1950 Informe de la Comisión de Estudio de las hojas de coca. Lake Success New York: Consejo Económico y Social. Suplemento Especial N° 1,174 pp.

Report of the United Nations Study Commission on coca use, based on interviews and observations in Bolivia and Perú. A primary historical document for understanding policies regarding coca.

VI. A P P E N D I C E S

APPENDIX 1

COMPARATIVE DATA ON COCA PRODUCTION, CONTROL, AND MOVEMENT, REFLECTING VARIOUS SOURCES OF INFORMATION-PERIOD 1972-1977
(IN THOUSANDS OF KILOGRAMS)

YEAR	I. E. S. E. a/ YUNGAS f/ SURFACE Ha.	I. E. S. E. a/ YUNGAS f/ PROD. kg.	I. E. S. E. a/ CHAPARE SURFACE Ha.	I. E. S. E. a/ CHAPARE PROD. kg.	C.E.E.D. b/ CHAPARE SURFACE Ha.	C.E.E.D. b/ CHAPARE PROD. kg.	UNIVERSITY OF UTAH c/ LA PAZ g/ SURFACE Ha.	UNIVERSITY OF UTAH c/ LA PAZ g/ PROD. kg.	UNIVERSITY OF UTAH c/ CHAPARE SURFACE Ha.	UNIVERSITY OF UTAH c/ CHAPARE PROD. kg.	D.E.S.E.D. d/ CHAPARE SURFACE Ha.	D.E.S.E.D. d/ CHAPARE PROD. kg.	M.A.C.P. e/ CHAPARE SURFACE Ha.	M.A.C.P. e/ CHAPARE PROD. kg.	AGRICULTURAL CUSTOMSHOUSE LA PAZ h/ kg.	AGRICULTURAL CUSTOMSHOUSE CHAPARE kg.	DIRECT. CONTROL DANG. SUBSTANCES LA PAZ i/ kg.	DIRECT. CONTROL DANG. SUBSTANCES CHAPARE kg.
1972	6,286.59	1,958.25	3,190.7	3,060.6	5,451	4,754.17	-.-	2,209.51	-.-	5,912.77	-.-	-.-	-.-	-.-	2,435.6	4,246.31	-.-	-.-
1973	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	2,569.2	5,662.65	-.-	-.-
1974	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	2,478.44	5,373.58	-.-	-.-	2,150.5	5,643.97	-.-	-.-
1975	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	9,686.0	20,052.0	2,572.5	4,199.40	-.-	-.-
1976	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	7,249.0	13,755.0	2,404.4	3,379.41	1,695.06	2,220.58
1977 j/	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	970.84	985.45

a/ Institute of Social and Economic Studies, Faculty of Economic Sciences, University of San Simon, Producción y Comercialización de Coca. Cochabamba, Bolivia, 1972.

b/ Commission for Peasant Social Security, Volume III, Marco Socioeconómico. La Paz, Bolivia, 1972

c/ Survey on Rural Production, Consumption, and Income, La Paz, 1971

d/ Center for Economic and Social Development, Censo en el Chapare, Cochabamba, 1974

e/ Ministerio de Asuntos Campesinos y Agropecuarios. Departmental Directorate, Department of Statistics, Cochabamba. Report for 1975-1976.

f/ North and South Yungas (Provinces).

g/ Inquisivi, Franz Tamayo, and North and South Yungas Provinces.

h/ Yungas, Inquisivi, Apolo, and Pelechuco.

i/ Coripata, Chulumani, Irupana, Coroico, Apolo, Cajuata, Caranavi.

j/ January - June 1977.

SOURCE: Data provided by the above cited publications and entities.

NOTE: According to 1977 data provided by the National Directorate for the Control of Dangerous Substances, based on a census of coca producers in the Department of Cochabamba and La Paz, there were, in that year, 5,500 producers in the former department and 7,000 in the latter. Crosstabulating these figures with production data from earlier studies of IESE and CEEDD we obtain the following production estimates for 1977: in Cochabamba 10,493,750 kg. based on a cultivated area of 4,850 hectares, and in La Paz 2,473,374 kg. based on a cultivated area of 5,320 hectares (La Paz, October, 1977). It should be pointed out that these results are tentative, since the deadline for registration of producers was, at the request of the producers themselves, officially extended for 30 days beyond October 25, 1977. As a result, the number of producers may be larger than the above figures indicate, and the amount of production correspondingly greater.

APPENDIX 2

COMPARATIVE DATA ON COCA PRODUCTIVITY, REFLECTING VARIOUS SOURCES OF INFORMATION - YEARS 1972, 1974, 1975, and 1976. (YIELDS IN KILOGRAMS PER HECTARE)

YEAR	Yungas	a/ Chapare	CSSC b/ Chapare	DESEC c/ Chapare	M A C A Yungas e/	Chapare f/	PRODES d/ Chapare
1972	303.54	959.23	872.16	-.-	-.-	-.-	-.-
1974	-.-	-.-	-.-	2,168.13	-.-	-.-	-.-
1975	-.-	-.-	-.-	-.-	464.92	2,070.20	-.-
1976	-.-	-.-	-.-	-.-	-.-	1,897.50	-.-
1977	-.-	-.-	-.-	-.-	-.-	-.-	3.450

a/ Institute of Social and Economic Studies, Faculty of Economic Sciences, University of San Simón, Producción y Comercialización de Coca. Cochabamba Bolivia, 1972.

b/ Commission for Peasant Social Security, Volume III, Marco Agroeconómico. La Paz, Bolivia, 1972.

c/ Center for Economic and Social Development, Censo en el Chapare. Cochabamba, 1974.

d/ PRODES, Chapare Regional Directorate. "Memorandum". Cochabamba, September, 1977.

e/ "Sample survey on agricultural production, costs and benefits of coca, citrus, and coffee in the area of Chulumani (Yungas of La Paz)." Division of economic studies and agricultural marketing. La Paz, Bolivia, 1975.

f/ Department of Statistics, Departmental Directorate of Agrarian Affairs. Cochabamba, 1975-1976.

SOURCE: Table developed on the basis of the above cited sources.

APPENDIX 3

LA PAZ: VOLUMES OF COCA CONTROLLED BY THE AGRICULTURAL CUSTOMSHOUSE BY PLACES OF ORIGIN - PERIOD 1966-1976

YEAR	YUNGAS DRUMS	INQUISIVI DRUMS	APOLO DRUMS	PELECHUCO DRUMS	T O T A L DRUMS	KILOGRAMS
1966	84,950	2,510	5,180		92,640	2,038,100
1967	79,740	3,610	5,210		88,560	1,948,300
1968	72,450	2,580	3,060	420	78,510	1,727,200
1969	76,280	3,650	3,720	1,190	84,840	1,866,500
1970	82,540	2,700	2,850	1,450	89,550	1,970,000
1971	92,830	3,660	4,760	970	102,220	2,248,800
1972	98,680	3,900	7,030	1,100	110,710	2,435,600
1973	103,680	4,170	7,870	1,060	116,780	2,569,200
1974	86,740	3,520	6,560	930	97,750	2,150,500
1975	105,960	3,420	6,970	580	116,930	2,572,500
1976	101,750	3,200	4,260	-	109,290	2,404,400
TOTAL	985,600	37,000	57,470	7,710	1,087,780	23,931,100

SOURCE: Department Agricultural Customshouse, Statistics, Review and Control. La Paz, September 22, 1977

DIX 4

COCHABAMBA: COLLECTION OF COCA TAXES BY THE AGRICULTURAL CUSTOMSHOUSE AND DISTRIBUTION OF REVENUE AMONG VARIOUS GOVERNMENT ENTITIES FOR THE YEARS 1966-1976 a/
(IN THOUSANDS OF BOLIVIAN PESOS)

YEAR	SMALL BALE KILOS		TOTAL TAX $b.	DISTRIBUTION AMONG VARIOUS ENTITIES: NATIONAL ROAD SERVICE	%	AGRICULTURAL CUSTOMSHOUSE	%	SOCIAL WORK CHAPARE	%	DEPARTMENTAL PREFECTURE	%	SAN SIMON UNIVERSITY	%	CUSTOMS POLICE CHAPARE	%
1966	304.8	3,446.8	1,342.5	692.6	51.59	232.8	17.34	134.3	10.00	127.5	9.5	120.8	9.00	34.5	2.57
1967	265.1	3,105.9	1,272.4	656.4	51.59	220.6	17.34	127.2	10.00	120.9	9.5	114.6	9.00	32.7	2.57
1968	245.8	2,787.6	1,180.0	608.8	51.59	204.6	17.34	118.0	10.00	112.1	9.5	106.2	9.00	30.3	2.57
1969	260.3	2,951.8	1,249.4	644.6	51.59	216.6	17.34	125.0	10.00	118.7	9.5	112.4	9.00	32.1	2.57
1970	248.2	2,813.9	1,191.1	614.5	51.59	206.5	17.34	119.1	10.00	113.2	9.5	107.2	9.00	30.6	2.57
1971	235.1	2,666.1	1,128.6	582.2	51.59	195.7	17.34	112.9	10.00	107.2	9.5	101.6	9.00	29.0	2.57
1972	315.13	4,248.3	1,513.6	780.8	51.59	262.5	17.34	151.4	10.00	143.8	9.5	136.2	9.00	38.9	2.57
1973	388.9	5,662.5	2,620.8	1,352.1	51.59	454.4	17.34	262.1	10.00	249.0	9.5	235.9	9.00	67.3	2.57
1974	497.7	5,643.9	2,398.1	1,237.2	51.59	415.8	17.34	239.8	10.00	227.8	9.5	215.8	9.00	61.6	2.57
1975	360.3	4,199.4	3,703.3	1,910.5	51.59	642.1	17.34	370.3	10.00	351.8	9.5	333.3	9.00	95.3	2.57
1976	297.9	3,379.4	2,979.3	1,537.0	51.59	516.6	17.34	297.9	10.00	293.0	9.5	268.2	9.00	76.6	2.57
TOTAL	3,429.4	40,903.7	20,579.1	10,616.7	51.59	3,568.2	17.34	2,058.0	10.00	1,935.0	9.5	1,852.2	9.00	528.9	2.57

a/ As a general rule, the Agricultural Customshouse charged $b. 4.80 per cesto (small bale) between 1965 and 1974 and, since 1975, $b. 10.00.

SOURCE: Data provided by the Agricultural Customshouses of La Paz and Cochabamba. La Paz, October 1977.

APPENDIX 5

COCA PRODUCTION COSTS AND PROFITS - AREA OF CHULUMANI, YUNGAS, DEPARTMENT OF LA PAZ, 1976
($b. AVERAGE PER HECTARE)

CONCEPT	PRODUCTIVE CYCLES FOR COCA CULTIVATION				
	0 YEAR	1-5 YEARS	6-10 YEARS	11 YEARS OR MORE	TOTAL AVERAGE
1. Planting costs a/	16,955	-.--	-.--	-.--	16,955.00
2. Other costs b/	-.--	4,583.50	6,280.00	4,761.29	5,208.26
3. Total costs	16,955	4,583.50	6,280.00	4,761.29	8,144.95
4. Yield (small bales of 30 pounds)	-.--	33.60	44.65	22.63	33.69
5. Prices c/	-.--	309.38	309.38	309.38	309.38
6. Gross return	-.--	10,395.17	17,813.82	7,063.15	10,424.05
7. Net return	-.--	5,811.67	7,533.82	2,301.86	2,279.10

a/ Preparation of terrain with contract labor, preparation of seed beds, planting by contract labor, installations and tools.

b/ Cultivation activity (weeding, pruning, application of pesticides). Harvest (picking and drying of leaves). Includes overhead expenditures calculated at 12 per cent.

c/ Median sales price (representing 62 per cent of all sales).

SOURCE: Sample survey of agricultural production, costs, and returns for coca, citrus, and coffee in the area of Chulumani (Yungas of La Paz). División of Economic Studies and Agricultural Marketing, Ministerio de Asuntos Campesinos y Agropecuarios, La Paz Bolivia, 1975.

APPENDIX 6-i

NUMBER OF WHOLESALE MERCHANTS AND VOLUMES OF COCA MOVING FROM THE CHAPARE (COCHABAMBA) TO SPECIFIC MARKETS
January - June 1977

DESTINATION	SPORADIC WHOLESALERS	PERMANENT a/ WHOLESALERS	TOTAL WHOLESALERS	VOLUME HANDLED in kg.
1. La Paz				
City	24	4	28	71,392
Colquiri	8	-.-	8	3,956
Lahuachaca	1	1	2	874
Umala	2	-.-	2	368
Sub Total	35	5	40	76,590
2. Cochabamba				
City	5	-.-	5	1,426
Aiquile	37	12	49	45,287
Anzaldo	1	-.-	1	207
Arani	3	1	4	253
Arque	1	-.-	1	46
Ayopaya	2	-.-	2	69
Capinota	8	5	13	6,118
Sacaba	1	1	2	1,242
Cliza	9	3	12	4,462
Colomi	2	-.-	2	3,818
Epizana	1	-.-	1	23
Independencia	18	4	22	4,853
Mizque	14	4	18	4,968
Pojo	13	3	16	2,461
Punata	36	16	52	33,166
Quillacollo	7	4	11	2,829
Sayari	1	-.-	1	23
Tacopaya	1	-.-	1	115
Tin-Tin	1	3	4	828
Tiraque	1	-.-	1	230
Totora	32	9	41	10,189
Ventilla	2	-.-	2	207
Vinto	2	-.-	2	92
Sub Total	198	65	263	122,912
3. Santa Cruz				
City	63	16	79	37,835
Bella Vista	2	-.-	2	930
Camiri	23	8	31	44,114
L. Cahuana	1	-.-	1	115
Comarapa	4	3	7	1,656
El Torno	1	1	2	782
Guadalupe	1	-.-	1	92
Mineros	45	15	60	20,976
Montero	192	39	231	116,334
Portachuelo	-.-	1	1	920
Puerto Fernandez	20	6	26	11,132
Saavedra	1	-.-	1	230
Saipina	1	-.-	1	46
Puerto Suarez	1	-.-	1	230
Torrecillas	-.-	1	1	989
Tujal	1	-.-	1	46
Vallegrande	14	2	16	11,454
Warnes	8	7	15	5,566
Yapacani	34	5	39	14,260
Sub Total	412	104	516	267,697

Continued.....

APPENDIX 6 - ii

DESTINATION	SPORADIC WHOLESALERS	PERMANENT WHOLESALERS	TOTAL WHOLESALERS	VOLUME HANDLED in kg.
4. Oruro				
City	57	1	76	127,995
Empresa Bolivar	15	1	16	7,889
Calazaya	1	-.-	1	23
Antofagasta	1	-.-	1	690
Carangas	1	-.-	1	138
Chaguarani	1	-.-	1	138
Challapata	8	1	9	1,242
Colcha	1	-.-	1	1,150
Salinas de G Mendoza	3	-.-	3	322
Huanuni	-.-	1	1	230
Huari	7	5	12	12,374
Kami	1	1	2	874
Machamarca	2	-.-	2	851
Poopó	1	-.-	1	69
Mina Quioma	2	1	3	2,116
Santa Fe	2	-.-	2	69
Tolapalca	1	-.-	1	92
Sub Total	104	29	133	156,262
5. Potosí				
City	68	11	79	118,772
Atocha	10	1	11	11,661
Betanzos	3	3	6	3,956
Catavi	1	-.-	1	1,748
Chaqui	1	-.-	1	92
Chayanta	2	-.-	2	598
Colquechaca	3	2	5	6,417
Cotagaita	2	1	3	5,750
Llallagua	52	12	64	91,954
Ulica	2	-.-	2	183
Maragua	2	-.-	2	1,035
Pampatambo	1	-.-	1	483
Pocoata	1	-.-	1	1,541
Sacaca	15	1	18	7,038
San Pedro	21	4	25	9,637
Tupiza	18	2	20	18,745
Ucuni	3	1	4	1,955
Uncía	7	-.-	7	4,186
Uyuni	8	-.-	8	5,888
Vila Vila	2	-.-	2	322
Villazón	2	-.-	2	345
Vitichi	10	1	11	8,809
Walomisa	1	-.-	1	69
Yura	1	-.-	1	23
Sub Total	236	39	275	301,208
6. Chuquisaca				
Sucre City	38	16	54	68,770
Azurduy	1	-.-	1	92
Bustillos	1	1	2	1,334
Chuqui	2	-.-	2	368
Culpina	1	-.-	1	690
Huacareta	2	-.-	2	414
Mojocoya	1	-.-	1	322
Monteagudo	11	23	34	19,642
Moromoro	1	-.-	1	230
Muyupampa	9	5	14	15,755
Padilla	8	7	15	7,889
Poroma	1	-.-	1	230

Continued .....

APPENDIX 6 - iii

DESTINATION	SPORADIC WHOLESALERS	PERMANENT WHOLESALERS a/	TOTAL WHOLESALERS	VOLUME HANDLED in Kilos
Ravelo	10	7	17	8,441
San Lucas	1	-.-	1	414
Villa Serrano	2	1	3	3,795
Zudañez	-.-	1	1	322
Sopachuy	2	1	3	1,196
Tarabuco	2	8	10	11,546
Yamparaez	1	-.-	1	23
Sub-total	94	70	164	141,473
7. Tarija				
Yacuiba	1	-.-	1	575
GENERAL TOTAL	1,080	312	1,392	1'066,717

a/ The totals for wholesalers working out of the Chapare are:

Sporadic (working less than four months out of the six):	989
Permanent (working four months or more out of the six):	119
T O T A L	1,208

Comparing the total of 1,208 obtained from the control vouchers with that of the above chart (1,392), a difference of 184 wholesalers is obtained. This is due to the fact that each wholesaler may sell in different places, thus resulting in his/her being counted more than once.

SOURCE: "Guias de Tránsito" of the National Directorate for the Control of Dangerous Substances.

APPENDIX 7 - 1

NUMBER OF WHOLESALE MERCHANTS AND VOLUMES OF COCA MOVING FROM PACEÑA PRODUCING AREAS (LA PAZ) TO SPECIFIC MARKETS January - June 1977

DESTINATION	SPORADIC WHOLESALERS	PERMANENT a/ WHOLESALERS	TOTAL WHOLESALERS	VOLUME HANDLED in Kilos
1. La Paz				
City	1	-	2	82.8
Cañaviri	1	-	1	151.8
Caracato	-	1	1	1.258.6
Charazani	4	-	4	1.832.6
Colquiri	12	8	20	9.121.8
EMUSA	5	1	6	3.427.9
Escoma	2	-	2	496.8
Eucaliptus	4	1	5	703.8
Lahuachaca	1	-	1	82.8
Patacamaya	1	-	1	41.4
Puerto Acosta	13	3	16	22.756.2
Quime	3	-	3	427.8
Tablachaca	1	-	1	207.0
Viloco	3	1	4	455.4
Sub-total	52	15	67	41.046.7
2. Cochabamba				
City	1	-	1	13.8
Buen Retiro	1	-	1	165.6
Sub-total	2	-	2	179.4
3. Santa Cruz				
City	50	24	74	51.912.8
Charaqua	-	1	1	2.539.2
Camiri	9	7	16	37.900.3
Mineros	2	2	4	1.918.2
Montero	18	9	27	13.637.2
Tojo	1	-	1	176.6
Warnes	4	2	6	3.469.3
Sub-total	84	45	129	111.553.6
4. Oruro				
City	88	41	129	83.927.5
Arenales	1	1	2	303.6
Avicaya	-	1	1	1.007.4
Challapata	3	3	6	1.559.4
Caracollo	2	1	3	262.2
Escorani	2	1	3	621.0
Estación Arenal	1	-	1	69.0
Estación Central	1	-	1	124.2
Huanuni	7	1	8	1.617.4
Huari	1	3	4	1.173.0
Iruna	1	-	1	124.2
E. Kami	2	1	3	7.521.0
Morococala	2	-	2	96.6
Pazña	2	1	3	400.2
Severuyo	1	1	2	427.8
Santa Fé	1	1	2	1.697.4
Toledo	10	7	17	4.029.6
Sub-total	125	63	188	104.961.5

7 - ii

DESTINATION	SPORADIC WHOLESALERS	PERMANENT a/ WHOLESALERS	TOTAL WHOLESALERS	VOLUME HANDLED in Kilos
5. Potosí				
City	76	39	115	128.958.2
Aqua de Castilla	2	2	4	427.8
Animas	1	-	1	27.6
Atocha	62	11	73	43.439.6
Atoroma	1	1	2	1.159.2
Barrosquira	-	1	1	1.255.8
Chilcobija	2	-	2	358.8
Chocaya	1	-	1	110.4
Chocloya	1	-	1	640.3
Colquechaca	-	1	1	496.8
Llallagua	23	10	33	7.272.6
Larke	-	1	1	41.4
Oploca	3	1	4	513.4
Oro Ingenio	-	1	1	345.0
Pulacayo	1	-	1	41.4
Quechisla	1	1	2	5.467.6
Rio Mulatos	4	4	8	1.308.2
Rosario	7	-	7	1.393.8
Cerdas	8	5	13	4.554.0
Tupiza	23	11	34	20.103.8
Umanata	1	-	1	55.2
Uyuni	16	11	27	25.074.6
Villazón	42	20	62	152.589.4
Ref.Espíritu Santo	1	-	1	375.4
Telamayu	1	-	1	82.8
Caiza	1	-	1	220.8
Puna	1	-	1	640.3
Sub-total	279	120	399	396.954.2
6. Chuquisaca				
City	5	2	7	1.407.6
Chihuana	1	-	1	41.4
Caiquari	1	-	1	345.0
Camargo	2	4	6	2.536.4
Cuevo	1	-	1	441.6
Culpina	9	9	18	28.695.7
San Lucas	1	2	3	1.231.0
Villa Abecia	2	-	2	287.0
Sub-total	22	17	39	34.985.7
7. Tarija				
City	30	15	45	74.459.3
Bermejo	18	9	27	56.695.9
Entre Ríos	1	-	1	66.2
Iscayachi	2	2	4	750.7
Pozo Tarija	1	-	1	154.[illegible]
Villamontes	3	3	6	14.051.2
Yacuiba	10	7	17	70.606.3
Sub-total	65	36	101	216.784.2
GRAND TOTAL	629	296	925	906.465.3

a/ Total of sporadic wholesalers: 565
Total of permanent wholesalers: 156
GRAND TOTAL 721

SOURCE: "Guias de Tránsito" of the National Directorate for the Control of Dangerous Substances.

APPENDIX 8

MOVEMENT OF COCA TO BOLIVIA'S DEPARTMENTAL CAPITALS, BY PRIMARY POINT OF EMBARCATION January-June, 1977

DEPARTAMENTAL DESTINATION	POINT OF EMBARCATION CHAPARE	LA PAZ	TOTAL
1. La Paz			
City	71.392	82.8	71.474.8
Other Centers	5.198	40.963.9	46.161.9
Sub-total	76.590	41.046.7	117.636.7
2. Cochabamba			
City	1.426	13.8	1.439.8
Other Centers	121.486	165.6	121.651.6
Sub-total	122.912	179.4	123.081.4
3. Santa Cruz			
City	37.835	51.912.8	89.747.8
Other Centers	229.862	59.640.8	289.502.8
Sub-total	267.697	111.553.6	379.250.6
4. Oruro			
City	127.995	83.927.5	211.922.5
Other Centers	28.267	21.034.0	49.301.0
Sub-total	156.262	104.961.5	261.223.5
5. Potosí			
City	118.772	128.958.2	247.730.2
Other Centers	182.436	267.996.0	450.432.0
Sub-total	301.208	396.954.2	698.162.2
6. Chuquisaca			
City	68.770	1.407.6	70.177.6
Other Centers	72.703	33.578.1	106.281.1
Sub-total	141.473	34.985.7	176.458.7
7. Tarija			
City	-	74.459.3	74.459.3
Other Centers	575	142.324.9	142.899.9
Sub-total	575	216.784.2	217.359.2
GRAND TOTAL	1.066.717	906.465.3	1.973.182.3

SOURCE: "Guías de Tránsito" of the National Directorate for the Control of Dangerous Substances.

APPENDIX 9 - 1 NUMBER OF COCA RETAIL SITES IN THE CITY OF LA PAZ, BY SECTORS 1977

SECTOR	ZONE	NUMBER OF SITES							QUANTITY/SITE SMALL BALES (Cestos)	TOTAL SMALL BALES (Cestos)	LOCATION
		Street	Nocturnal	Store	Feria	Market	Agency	Total Number			
1. Gran Poder	Central	51	-	2	-	-	1	54	0.5-2	50.5	Streets: Max Paredes, Santa Cruz, León de la Barra, Antonio Gallardo Eloy Salmón, Sebastían Segurola.
2. Garita de Lima	Central	58	2	1	2	1	-	64	0.5-1	27.5	Streets and Avenues: Tumusla, Buenos Aires, Calatayud Market, Antonio Quijarro, Max Paredes and Bautista.
3. Alto Lima	North West (El Alto)	-	-	-	21	(J)	-	21	0.5-1	11.5	16 de Julio Avenue.
4. Munaypata	North West (El Alto)	2	-	2	12	-	-	16	0.5	8.0	Streets and Avenues: Cristo Vencedor, San José, Lima and Collasuyo.
5. Villa Dolores	South West	-	-	4	6	2	-	12	0.5	6.0	Streets: Ignacio Warnes, Once, "Villa Dolores" Market.
6. Chijini	Central	7	-	3	-	-	-	10	0.5	5.0	Streets: Sagárnaga, Isaac Tamayo, Benancio Burgoa Rodriguez, Emilio Calderón, Ricardo Bustamante.

APPENDIX 9-ii

SECTOR	ZONE	NUMBER OF SITES							QUANTITY/SITE SMALL BALES (Cestos)	TOTAL SMALL BALES (Cestos)	LOCATION
		Street	Noc-turnal	Store	Feria	Mar-ket	Agency	Total Number			
7. Villa Victoria	North	2	(2)	4	-	-	-	6	0.5	3.0	Streets and Avenues: República, Gral. Murguía, Virrey Toledo, José María Asin.
8. El Tejar	Central	3	-	-	1	-	-	4	0.5	2.0	República and Collasuyo Avenues.
9. Villa Copacabana	East	3	-	-	-	-	-	3	0.5	1.5	Tito Yupanqui Avenue.
10. Puente Topater	Central	2	-	-	-	-	-	2	0.5	1.0	Manuel Silverio Street and Pando Avenue.
11. Evaristo Valle	Central	2	-	-	-	-	-	2	0.5	1.0	Pando Avenue.
12. Ovejuyo	South East	-	-	2	-	-	-	2	0.5	1.0	Ovejuyo
13. Cementerio	Central	2	-	-	-	-	-	2	0.5	1.0	Bautista Avenue.
14. Villa San Antonio	East	2	-	-	-	-	-	2	0.5	1.0	31 de Octubre Avenue.
15. Villa Nueva Potosí	South East	2	-	-	-	-	-	2	0.5	1.0	Luciano Alcoreza Street.
16. Tembladerani	South	1	-	-	-	-	-	1	0.5	0.5	Jaimes Freyre Street.
17. Tacagua	South	1	-	-	-	-	-	1	0.5	0.5	Manuel Jofré Street.
18. Los Andes	West	1	-	-	-	-	-	1	0.5	0.5	Manuel Cossio Street.
19. Churubamba	Central	1	-	-	-	-	-	1	0.5	0.5	Pando and Inquisivi Avenues.
20. Cota Cota	South East	-	-	-	-	1	-	1	0.5	0.5	Bus Stop N°23
21. Pura Pura	North	-	-	1	-	-	-	1	0.5	0.5	Huayna Potosí Street.
22. Calle Collasuyo	Central	-	-	1	-	-	-	1	0.5	0.5	Collasuyo Street.

APPENDIX 9-iii

SECTOR	ZONE	NUMBER OF SITES: Street	Noc-turnal	Store	Feria	Mar-ket	Agency	Total Number	QUANTITY/SITE SMALL BALES (Cestos)	TOTAL SMALL BALES (Cestos)	LOCATION
23. Calle Rodruiguez	Central	-	-	-	1	-	-	1	0.5	0.5	Rodriguez Street.
24. Gra. Inofuentes	South East	-	-	-	1	-	-	1	0.5	0.5	Between Once and Doce Streets, Obrajes.
25. Cancha "El Tejar"	Central	1	-	-	-	-	-	1	0.5	0.5	Héroes del Pacífico Street.
26. Alto "La Paz"	Nor West	1	-	-	-	4	-	5	o.5	o.5	Ferrea Way (Ceja 'El Alto") and "El Alto" Market.
TOTALS		142	2	20	44	8	1	217	0.5-2	128.5	

SOURCE: Field research carried out from the 5th to the 30th of October, 1977. La Paz, October 1977.

NOTE: Seventy eight of the Sites, located in 23 different sectors of the city, regularly stock approximately half a cesto (small bale) each, i.e. account for a combined stock of 49 cestos, approximately 40 per cent of the coca legally stocked by retailers in the city. The remainder is clustered in only three sectors (Gran Poder, Garita de Lima, and Alto Lima), where 139 sales places stock from one half to two cestos each, accounting for a total of 89.5 cestos.

APPENDIX 10

LA PAZ: COLLECTION OF COCA TAXES BY THE AGRICULTURAL CUSTOMSHOUSE AND DISTRIBUTION OF REVENUE AMONG VARIOUS GOVERNMENT ENTITIES FOR THE YEARS 1966 - 1976 a/ (IN THOUSANDS OF BOLIVIAN PESOS)

	DISTRIBUTION AMONG VARIOUS ENTITIES														
YEAR	TOTAL TAX	DEPARTMENTAL PREFECTURE	NATIONAL ROAD SERVICE	SAN ANDRES UNIVERSITY	MUNICIPALITY LA PAZ	MUNICIPALITY YUNGAS	INTERNAL REVENUE SERVICE	MINISTRY OF PUBLIC HEALTH	MINISTRY OF AGRICULTURE	MAYORALITY COROICO	MAYORALITY CORIPATA	MAYORALITY IRUPANA	MAYORALITY CHULUMANI	TREASURY
1966	4,142.86	1,907.09	1,039.54	225.58	293.58	-.-	173.16	100.16	100.16	64.39	64.39	64.39	64.39	-.-
1967	4,192.51	2,124.71	1,494.75	329.92	270.78	-.-	194.72	131.34	91.26	84.45	84.45	84.45	84.45	17.25
1968	4,178.96	1,935.08	1,022.75	261.16	245.66	-.-	221.74	102.85	102.76	66.07	72.07	71.07	66.97	11.70
1969	4,866.20	2,179.90	1,136.40	292.80	279.50	288.90	252.40	112.30	112.30	-.-	-.-	-.-	-.-	11.70
1970	4,857.13	2,179.90	1,136.40	292.80	279.50	-.-	252.40	112.30	112.30	111.21	146.21	111.21	111.21	11.70
1971	5,209.59	2,800.20	1,136.40	146.40	232.65	443.92	210.33	112.30	112.30	-.-	-.-	-.-	-.-	15.10
1972	5,728.15	2,846.70	1,327.50	342.10	326.50	-.-	294.90	120.68	120.68	84.35	84.35	84.35	84.35	11.70
1973	7,340.52	4,856.51	1,327.50	360.00	235.81	-.-	213.00	-.-	-.-	84.00	84.00	84.00	84.00	11.70
1974	4,845.43	3,595.00	1,025.63	-.-	-.-	-.-	-.-	-.-	-.-	92.00	77.00	77.00	77.00	10.80
1975	9,157.30	6,212.40	1,629.10	-.-	-.-	-.-	-.-	-.-	-.-	76.00	76.10	76.00	76.00	11.70
1976	7,150.44	5,676.03	1,488.47	-.-	-.-	-.-	-.-	-.-	-.-	69.46	69.46	69.46	69.46	8.10
TOTAL	61,578.09	36,313.52 (59%)	13,764.42 (22,35%)											

a/ The coca Customshouse, converted now into the Agricultural Customshouse, has been in operation since 1941. The tax charged until 1976 was $b. 30.5 per drum for coca from Yungas and Inquisivi, and $b. 15.4 per drum for Apolo and Pelechuco coca.

SOURCE: Departmental Agricultural Customshouse, Review and Control, La Paz. September 26, 1977.

APPENDIX 11

BOLIVIA: VOLUME AND VALUE OF COCA LEAF EXPORTS
(1968-1976)

YEAR	KILOGRAMS	$us.
1968	671.328	555.565
1969	750.711	621.502
1970	530.959	601.365
1971	632.623	741.959
1972	700.800	847.800
1973	803.551	964.261
1974	938.507	1.121.729
1975	819.927	1.028.770
1976	867.632	1.041.936

NOTES: 1) The countries importing coca are Argentina, the United States, and France (1968-1974).

2) Export of coca leaves according to Customs (1975):
La Paz 782,239 Kg. - Value $us. 963,836
Cochabamba 37,688 Kg. - Value $us. 64,934

3) Export by countries of destination (1975):
Argentina 799,592 Kg. - Value $us. 961,620
United States 68,400 Kg. - Value $us. 68,040

APPENDIX 12

ANNUAL REVENUES ACCRUING TO THE MUNICIPALITY OF LA PAZ THROUGH THE SALE OF COCA - AGENCIES AND STORES (1966-1967)

YEAR	DECLARED CAPITAL	NUMBER OF TAXPAYERS	FIXED ANNUAL TAX $b.	SURCHARGE SAN ANDRES UNIVERSITY	SURCHARGE OTHERS a/	ANNUAL TOTAL $b.
1966	500	1	60	14	15	89
1966	3.000	1	300	65	34	399
1966	5.000	1	200	40	5	245
1967	2.000	1	300	160	170	1.130
1968	1.000	1 b/	200	40	5	245
1968	3.000	3 b/	250	50	20	320
1969	-	-	-	-	-	-
1970	2.000	1	400	80	5	485
1970	5.000	2 b/	250	100	296	646
1971	500	4	200	80	5	285
1971	1.000	1	60	12	5	77
1972	-	-	-	-	-	-
1973	3.200	1	200	100	10	310
1973	4.000	1 b/	175	75	10	260
1974	500	1 b/	300	60	10	370
1974	700	1	400	80	10	490
1974	2.000	5 b/	500	100	5	605
1974	3.800	3 b/	1.000	200	10	1.210
1975	800	1 b/	350	70	10	430
1975	2.000	7 b/	600	120	10	730
1975	5.000	2	600	120	10	730
1976	500	1 b/	600	120	10	730
1976	800	1	300	60	32	392
1976	2.000	1 b/	600	120	10	730
1976	4.500	1	600	120	10	730
1977	500	1	600	120	10	730
1977	2.000	2	800	150	170	1.130
1977	6.000	1 b/	100	20	10	130

a/ Purchase or permit

b/ Sale of coffee and coca

SOURCE: Municipal Treasury, registry of taxpayers, La Paz, October 1977.

NOTE: Variations in payment of the permit or tax are due to:

a) Debits carrying over from previous years.
b) Time payments and partial payments.
c) The lack of specificity for the coca tax in the Municipal Tax Code, i.e. the tax has not been categorized.

APPENDIX 13 - i

INFORMATION ON COCA FOR CHUQUISACA, TARIJA AND POTOSI (1977)

I. CHUQUISACA

1.

TABLE 1

YEAR	AMOUNT COLLECTED $b.
1972	9.514.00
1973	10.824.00
1974	7.194.00
1975	10.524.00
1976	28.307.50
T O T A L	66.363.50

a/ The Departmental Treasury of Chuquisaca has an appointed collector to gather this tax, and allows him to keep 15 per cent of the collections.

SOURCE: Office of the Director of the Departmental Treasury of Chuquisaca, Sucre, September 28, 1977.

2. UNIVERSITY OF SAN FRANCISCO XAVIER

The University receives five per cent of the tax paid on coca shipped into Chuquisaca.

TABLE 2

YEAR	AMOUNT COLLECTED $b.
1972 a/	19.035.18 a/
1973	18.880.00
1974	19.391.63
1975	64.505.08
1976	198.568.34
T O T A L	320.380.23

a/ Data obtained from the Accounting Department of the Internal Revenue Division. La Paz, October 1977.

SOURCE: Office of the Director of General Administration, Chief of Finance, Sucre, September 28, 1977.

3. GENERAL DIRECTORATE OF INTERNAL REVENUE - SECTION FOR THE CONTROL OF COLLECTIONS, SUCRE.
   a) No data exist for annual collections 1/
   b) According to the tax vouchers, 15 per cent of the total tax is distributed as follows:

1/ These correspond to the Departmental Treasury.

APPENDIX 13 - ii

5 per cent tax for introduction of coca

5 per cent university surcharge

5 per cent personal tax

Charge for sales permit $b. 10.-

c) According to the registry of taxpayers for the months of January and July, 1977, there exist the following number of merchants:

MONTHS	NUMBER OF MERCHANTS	TOTAL COLLECTED	FREQUENCY 4 times	3 times	2 times
January (4 to 25)	29	40.410	5	2	5
July (2 to 30)	24	25.850	1	3	5

SOURCE: General Directorate for Internal Revenue, Section for the Control of Collections, Sucre, September, 1977.

4. MUNICIPAL MAYORALITY OF CHUQUISACA

NUMBER OF TAXPAYING COCA RETAILERS

CATEGORY	N°	LICENSE	PERMIT	SITIAJE $b. (daily)	TOTAL ANNUAL COLLECTIONS $b.
Retailers	10	260 a/	260 a/	-.-	5.200
Retailers b/	17	260 a/	260 a/	-.-	8.840
Streets and sidewalks	c/	-.-	-.-	1	
TOTAL	27	260	260		14.040

a/ License: Registered and authorized to sell coca. Annual permit with an obligatory tax. Each case has the following obligations:

1. License or fixed annual permit fee.	$b.	200
2. University surcharge 20 per cent.	"	40
3. Codesa surcharge 5 per cent.	"	10
4. Purchase of tax form	"	10
TOTAL annual tax	$b.	260

b/ Sell alcohol and coca.

c/ Undetermined number.

SOURCE: Municipal Treasury of Chuquisaca, Chief of Collections, Sucre, September, 1977.

NOTE: According to informants in the mayor's office, the number of retailers who pay taxes to the municipal treasury is small because of the large number of small-scale street vendors who pay only a daily tax (sitiaje) of one peso to ambulatory collectors. Another factor may be the recent abolition of local customshouses in response to general public clamor for lowering the price of all products brought into the city.

APPENDIX 13 - iii

II. TARIJA

SPECIAL NOTE: All merchants involved in the coca trade, for both internal and external markets, are required to present the following documents, on reaching their destination:

1) Tax receipt from the Agricultural Customshouse.

2) Shipping permit from the National Directorate for the Control of Dangerous Substances.

3) An export permit from the National Directorate of Customs in La Paz.

1. DISTRICT INTERNAL REVENUE ADMINISTRATION

COLLECTIONS ON COCA SHIPMENTS
PERIOD 1972-1976 a/

YEAR	AMOUNT $b.	TAX b/ (%)	PRICE $b.	NUMBER OF DRUMS
1972	49.956	5	27.6	905
1973	53.452	5	27.6	969
1974	167.293	5	27.6	3.030
1975	402.312	5	27.6	7.305
1976	536.194	5	27.6	9.713
TOTAL	1.209.207	5	27.6	21.922

a/ The District Internal Revenue Administration has an appointed collector who receives a percentage of the collections according to a scale approved in La Paz.

b/ Five per cent of the sales price is retained at the checkpoints.

SOURCE: District Internal Revenue Administration, Chief of ticket sales and customs.

2. JUAN MISAEL SARACHO UNIVERSITY

The amount received by the university is five per cent of the sales price of each drum.

COCA TAX REVENUES FOR THE PERIOD
1972-1976 a/

YEAR	AMOUNT $b.	TAX b/ $b.	SALES PRICE $b.	NUMBER OF DRUMS
1972	79.552	8	160	9.944.00
1973	130.776	12	240	10.898.00
1974	226.240	20	400	11.312.00
1975	405.350	50	1.000	8.107.00
1076	560.500	50	1.000	11.210.00
TOTAL	1.402.418			51.471.00

a/ For the years listed above a call was made for any interested party desiring the post of tax collector. Since there were no takers, a collector was named and given the right to retain 10 per cent of all taxes obtained.

APPENDIX 13 - iv

b/ (From the previous page). Five per cent sales tax.

SOURCE: Juan Misael Saracho University. Division of Finance. September, 1977.

According to the monthly report of the Office of Inspection and Coca Taxation of Juan Misael Saracho University, the following number of persons were involved in the coca trade during the months of January and July, 1977.

MONTHS	NUMBER OF MERCHANTS	TOTAL REVENUE $b.	FREQUENCY 4 times	3 times	2 times
January (1 to 27)	20	46.600	1	1	1
July (1 to 28)	20	49.200	-.-	1	1

3. MAYORALITY OF TARIJA

COCA MERCHANTS IN THE CITY OF TARIJA WHO PAY ANNUAL MUNICIPAL PERMIT FEES

CATEGORY	NUMBER OF TAXPAYERS	REVENUE FROM PERMITS $b. each	total	UNIVERSITY 20 % OF TOTAL		SCHOOL CONSTRUCTION 10 % each	total	TOTAL PAID $b.
First	5 a/	300	1.500	60	300	30	150	1.950
Second	4 b/	200	800	40	160	20	80	1.040
Third	1	150	150	30	30	15	15	195
Fourth	2	120	240	24	48	12	24	312
Fifth	7 b/	100	700	20	140	10	700	910
Sixth	1 b/	70	70	14	14	7	7	91
Seventh	2 b/	50	100	10	20	5	10	130
Eighth	1 b/	40	40	8	8	4	44	52
Ninth	1 b/	30	30	6	6	3	33	39
TOTAL	24		3.630		726		363	3.719 c/

a/ Two sanctioned for lack of payment.

b/ One sanctioned for lack of payment.

c/ Surcharges amount to an additional $b. 139, for an annual total of $b. 4,858.

SOURCE: Kardex for permit fees of the Municipal Treasury of Tarija, September, 1977.

NOTE: Unregistered street vendors are illegal in Tarija, so there is consequently no sitiaje charge. All sales locations are fixed and tax is paid in advance. Yet the coca trade does generate income for the municipality. The following were its receipts for 1976 (January to December).

APPENDIX 13 - v

NUMBER OF DRUMS	TAX PER DRUM	PRO SOCIAL SECURITY	SURCHARGE FOR UNIVERSITY	SCHOOL CONSTRUCTION	TOTAL a/
12.879	20	1 %	20 %	10 % b/	311.671.80

a/ Does not include the surcharge of $b. 5.00 for the purchase of the tax voucher.

b/ Even though this charge is specified on the tax form, it has not yet been put into effect.

SOURCE: Major's office of Tarija, Chief of Information and Extraction, report of April 6, 1977.

4. DEPARTMENTAL DIRECTORATE FOR THE CONTROL OF DANGEROUS SUBSTANCES - OFFICE OF NARCOTICS, TARIJA

This office affects five wholesalers who bring coca from major producing zones every fifteen days in amounts in excess of 40 drums each.

III. POTOSI

1. DISTRICT INTERNAL REVENUE ADMINISTRATION FOR THE DEPARTMENT OF POTOSI.

According to the tax voucher, the District Administration of Potosí receives revenue from coca shipments in the amount of five per cent of their total value, including $b. 10. for purchase of the voucher itself. The amounts thus collected are the following:

REVENUE FROM TAXES ON COCA SHIPMENTS FOR THE PERIOD 1972-1976.

YEAR	AMOUNT
1972	8.024.80
1973	8.250.00
1974	29.200.00
1975	47.400.00
1976	116.800.00
TOTAL	209.674.80

SOURCE: Accounting Division for the Internal Revenue Service, La Paz, October, 1977.

2. TOMAS FRIAS UNIVERSITY
REVENUE FROM TAXES ON COCA SHIPMENTS FOR THE PERIOD 1972-1976

YEAR	AMOUNT
1972	19.720.00 a/
1973	29.220.30
1974	50.496.30
1975	87.876.30
1976	137.386.03
TOTAL	324.698.65

a/ Data obtained from the Accounting Division of the Internal Revenue Service, La Paz, October, 1977.

APPENDIX 13 - vi

SOURCE: General accounting book for Tomas Frias University, budgeted income for the years 1973-1976. Potosi, September 1977.

NOTE: Until April of 1977, Tomas Frias University received five per cent of all taxes imposed on coca shipped into the city, with the Internal Revenue Service acting as the collection agent. Control of these funds was monthly, and merged with the general control of University income. Coca being shipped to various provinces within the Department was considered in transit, and the respective taxes were collected by the Internal Revenue representatives within those provinces.

Since March, 1977, the University has been searching for an improved method of collecting these taxes. To this end it has appointed a coca tax collector, and allotted him seven per cent of the revenues he generates as an honorarium. The Internal Revenue Service continues its tax collecting activities, and the two entitites cooperate closely to avoid conflict.

NUMBER OF COCA MERCHANTS IN POTOSI

TYPE	Nº
1. Stores a/	30
2. Union Market	38
3. Special activity b/	10
TOTAL	78

a/ On Oruro and Betanzos streets in the city of Potosi.

b/ Have no facilities of their own, but sell coca in provincial fairs.

SOURCE: Office for the Control of Coca Shipments, Tomas Frias University, Potosi, September, 1977.

3. MAYORALITY OF POTOSI

We were unable, unfortunately, to obtain complete date for the Municipality of Potosi due to the fact that they have no registry or careful control of sales taxes collected on coca within the city. Those municipal taxes collected are for annual and semi-annual permits, and are posited on the declared capital of merchants who sell a number of items in addition to coca. Coca in transit to provincial locales is not subject to municipal taxes.

APPENDIX 13 - vii

According to information given by employees of the Municipal Tax Office, the city also has retail street vendors who pay an annual permit fee of $b. 86.- for the privilege of occupying a one by two meter spot. For each day that they occupy that spot, they must also pay a sitiaje of $b. 2.-. These payments generated the following revenues for 1976.

NUMBER OF RETAILERS	ANNUAL PERMIT FEE		SITIAJE/YEARLY a/		TOTAL REVENUE
	$b. each	total	$b. each	total	yearly $b.
38	85	3.268	600	22.800	26.068

a/ Based on 300 active days at $b. 2.- per day (excluding Sundays).

SOURCE: Municipal Tax Office, Potosi, September 23, 1977.

The following figures are the prices for coca set by Municipal Ordinance for the city of Potosi.

	PACEÑA COCA		VANDIOLA COCA (COCHABAMBA)	
1	pound	$b. 32.-	$b.	20.-
1/2	pound	" 16.-	"	10.-
4	ounces	" 8.-	"	5.-
1	ounce	" 2.-	"	1.50

APPENDIX 14

MEAN CONSUMPTION AND TOTAL ANNUAL CONSUMPTION FOR PROVINCES SURVEYED

Excluding Departmental capitals

PROVINCE	No. OF HOUSEHOLDS	MEAN ANNUAL CONSUMPTION PER HOUSEHOLD	TOTAL ANNUAL CONSUMPTION
Oropeza	20,337	7.13 kilos	144,905.62
Azurduy	3,888	12.28 kilos	47,761.82
Tomina	5,514	6.88 kilos	37,936.62
H. Siles	4,803	20.44 kilos	98,193.91
Nor Cinti	12,010	17.66 kilos	212,070.92
Sud Cinti	4,188	6.26 kilos	26,213.68
Luis Calvo	2,413	12.91 kilos	31,144.05
LA PAZ			
Murillo	30,380	7.63 kilos	231,799.40
Pacajes	16,447	10.22 kilos	168,088.34
Muñecas	5,737	20.80 kilos	119,343.90
Larecaja	11,159	17.32 kilos	193,275.76
Franz Tamayo	3,646	35.31 kilos	128,739.54
Ingavi	20,069	10.23 kilos	205,305.87
Loayza	10,617	8.44 kilos	89,607.48
Inquisivi	16,662	13.33 kilos	222,092.99
Sud Yungas	12,439	18.94 kilos	235.589.99
Los Andes	12,197	8.13 kilos	99,217.48
Aroma	15,016	10.89 kilos	163,492.45
Nor Yungas	11,689	11.67 kilos	136,458.93
Bautista Saavedra	2,570	32.07 kilos	82,423.97
Manco Kapac	5,942	6.04 kilos	35,866.30
COCHABAMBA			
Arani	9,710	23.64 kilos	229,545.53
Arque	6,879	29.48 kilos	202,819.09
Punata	10,499	10.81 kilos	113,496.69
ORURO			
Cercado	9,209	15.21 kilos	140,068.89
Abaroa	10,137	12.06 kilos	122,300.58
Sajama	5,769	10.58 kilos	61,036.02
Litoral	1,128	6.08 kilos	6,856.48
Poopó	6,310	27.45 kilos	173,205.88
POTOSI			
Frias	7,531	19.08 kilos	143,691.48
Bustillo	18,620	45.91 kilos	855,188.25
Cornelio Saavedra	11,087	12.37 kilos	137,200.19
Chayanta	20,226	17.16 kilos	347,064.00
Charcas	4,676	18.47 kilos	86,365.72
Nor Chichas	10,272	20.23 kilos	207,775.39
Sud Chichas	12,434	16.56 kilos	205,867.13
Sud Lipez	1,108	19.11 kilos	21,174.43
Linares	14,040	15.01 kilos	210,772.07

PROVINCE	No. OF HOUSE-HOLDS	MEAN ANNUAL CONSUMPTION PER HOUSEHOLD	TOTAL ANNUAL CONSUMPTION
Gral. Bilbao	2,225	8.01 kilos	17,827.97
Daniel Campos	2,992	8.95 kilos	26,778.40
		TARIJA	
Cercado	3,037	15.51 kilos	47,103.87
Arce	5,453	9.81 kilos	53,506.03
Gran Chaco	6,933	5.01 kilos	34,715.94
Mendez	5,176	6.12 kilos	31,655.49
O'Connor	2,505	7.66 kilos	19,188.30

SUMMARY

PROVINCE	No. OF HOUSE-HOLDS	MEAN ANNUAL CONSUMPTION PER HOUSEHOLD	TOTAL ANNUAL CONSUMPTION
Chuquisaca	53,153	11.26 kilos	598,222.62
La Paz	174,470	12.10 kilos	2'111,302.40
Cochabamba	27,088	20.15 kilos	545.951.31
Oruro	32,553	15.47 kilos	503,467.85
Potosí	105,220	21.48 kilos	2'259,705.03
Tarija	23,104	8.06 kilos	186,169.63

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APPENDIX 15 ORIGIN AND DESTINATION OF COCA

La Paz - Yungas
January - June,1977 1/

COCA MERCHANTS - LA PAZ

DESTINATION	ORIGIN	MONTH	SPORADIC MERCHANTS	PERMANENT MERCHANTS	No. DRUMS	No.CESTOS	VALUE $1
1. Agua de Castilla-Potosí	Chulumani	January	--	1	10	--	5.000
"	"	March	--	1	--	2	1.000
		TOTAL 2/	--	2	10	2	6.000
"	Coripata	February	1	--	--	9	4.000
"	"	April	1	--	--	4	2.000
"	"	TOTAL	2	--	--	13	6.000
"	TOTAL 6 months		2	2	10	15	12.000
2. Animas-Ptotosí	Coripata	February	1	--	--	2	1.000
"	"	TOTAL	1	--	--	2	1.000
'	TOTAL 6 months		1	--	--	2	1.000
3. Arenales-Oruro	Chulumani	January	--	1	--	12	6.000
"	"	TOTAL	--	1	--	12	6.000
"	Coripata	June	--	1	--	4	2.400
"	"	TOTAL	--	1	--	4	2.400
"	Coroico	June	1	--	--	6	3.600
"	"	TOTAL	1	-	--	6	3.600
'	TOTAL 6 months		1	1	--	22	12.000
4. Atocha-Potosí	Cojuata	April	2	--	41	9	40.500
"	"	TOTAL	2	--	41	9	40.500
"	Chulumani	January	10	1	112	169	159.500
"	"	February	7	1	89	87	84.780
"	"	March	12	3	37	165	103.050
"	"	April	7	2	--	96	44.000
"	"	May	7	3	52	72	75.100
"	"	June	6	--	4	47	31.200
"	"	TOTAL	39	10	290	636	482.630
"	Coripata	January	8	3	88	148	183.000
"	"	February	6	--	70	53	62.000
"	"	March	5	1	92	28	57.650
"	"	April	4	3	50	92	74.960
"	"	May	12	4	174	425	327.800
"	"	June	6	2	113	193	158.000
"	"	TOTAL	32	7	587	945	863.410
"	Coroico	February	1	--	--	9	4.000
"	"	March	1	-	--	1	500
"	"	April	1	--	--	5	2.000
"	"	TOTAL	3	-	--	15	6.500
"	Irupana	January	1	2	25	18	24.000
"	"	March	1	--	--	7	3.500
"	"	April	2	--	--	9	3.500
"	"	TOTAL	4	2	25	34	30.000
"	TOTAL 6 months		62	11	953	1.669	1.448.040

1/ Source: 'Guías de Tránsito'. National Directorate for the Control of Dangerous Substances, Cochabamba - La Paz.

2/ The totals for merchants refer to the total number of merchants of each type who operate in each locality. They do not represent the sum of the columns. The numbers appearing to the right of each month indicate the number active that month.

DESTINATION	ORIGIN	MONTH	SPORADIC MERCHANTS	PERMANENT MERCHANTS	No.DRUMS	No.CESTOS	VALUE $b.
5. Atoroma-Potosí	Chulumani	January	--	1	--	24	12.000
"	"	February	1	--	--	20	10.000
"	"	April	1	--	--	20	8.000
"	"	TOTAL	1	1	--	64	30.000
"	Irupana	June	1	--	--	20	9.000
		TOTAL	1	--	--	20	9.000
"	Suri	April	1	--	--	20	10.000
"	"	TOTAL	1	--	--	20	10.000
"	TOTAL 6 months		1	1	--	84	49.000
6. Avicaya-Oruro	Chulumani	March	--	1	--	27	14.000
"	"	June	--	1	--	16	8.000
"	"	TOTAL	--	1	--	43	22.000
"	Coripata	May	--	1	--	30	20.000
"	"	TOTAL	--	1	--	30	20.000
"	TOTAL 6 months		--	1	--	73	42.000
7. Barrosquira Potosí	Chulumani	March	--	1	--	23	12.000
"	"	May	--	1	--	22	12.000
"	"	TOTAL	--	1	--	45	24.000
"	Coripata	April	--	1	--	23	18.000
"	"	TOTAL	--	1	--	23	18.000
"	Irupana	January	--	1	--	23	12.000
"	"	TOTAL	--	1	--	23	12.000
"	TOTAL 6 months		--	1	--	91	54.000
8. Bermejo-Tarija	Chulumani	January	1	1	60	25	36.000
"	"	April	--	1	10	5	9.000
"	"	May	1	--	17	8	14.000
"	"	TOTAL	1	3	87	38	59.000
"	Coripata	January	4	7	442	195	334.000
"	"	February	6	3	303	32	379.000
"	"	March	3	8	257	123	203.000
"	"	April	2	5	339	56	463.400
"	"	May	3	7	355	20	270.500
"	"	June	1	8	490	145	383.000
"	"	TOTAL	16	10	2.186	571	2.036.900
"	Coroico	February	1	--	10	--	7.000
"	"	TOTAL	1	--	10	--	7.000
"	Irupana	January	--	1	69	--	36.000
"	"	TOTAL	--	1	69	--	36.000
"	TOTAL 6 months		18	9	2.234	534	2.028.400
9. Buen Retiro-Potosí	Chulumani	February	1	--	--	12	6.000
	TOTAL 6 months		1	--	--	12	6.000
10. Cañaviri-La Paz	Chulumani	May	1	--	--	11	6.600
"	TOTAL 6 months		1	--	--	11	6.600
11. Caracato-La Paz	Coripata	May	--	1	1	57	30.000
	TOTAL 6 months		--	1	57	--	30.000
12. Challapata Oruro	Chulumani	January	--	1	--	7	3.700
"	"	February	1	1	--	12	5.500
"	"	March	--	1	--	6	3.000
"	"	April	1	1	--	62	33.000
"	"	May	--	1	--	5	2.500
		TOTAL	2	1	--	92	47.700
"	Coripata	April	--	1	--	4	2.000
"	"	May	--	3	--	12	5.500
"	"	June	1	--	--	5	2.500
"	"	TOTAL	1	3	--	21	10.000
	TOTAL 6 months		3	3	--	113	57.700

DESTINATION	ORIGIN	MONTH	SPORADIC MERCHANTS	PERMANENT MERCHANTS	No DRUMS	No CESTOS	VALUE $
13. Charagua-Santa Cruz	Coripata	February	--	1	40	--	20.000
"	"	March	--	1	40	--	22.000
"	"	April	--	1	30	--	16.000
"	"	TOTAL	--	1	115	--	58.000
	TOTAL 6	months	--	1	115	--	58.000
14. Charazani La Paz	Apolo	March	2	--	20	--	12.000
"	"	April	2	--	45	--	37.000
"	"	June	2	--	18	--	8.600
"	"	TOTAL	4	--	83	--	57.600
"	TOTAL 6	months	4	--	83	--	57.600
15. Chihuana-Chuquisaca	Chulumani	March	1	--	--	3	1.500
"	TOTAL 6	months	1	--	--	3	1.500
16. Chilcobija-Potosi	Chulumani	February	1	--	--	18	9.000
"	"	May	1	--	--	8	4.000
"	"	TOTAL	2	--	--	26	13.000
"	TOTAL 6	months	2	--	--	26	13.000
17. Chocaya-Potosi	Coripata	April	1	--	--	8	5.400
"	TOTAL 6	months	1	--	--	8	5.400
18. Chocloca-Potosi	Chulumani	April	1	--	29	--	18.000
"	TOTAL 6	months	1	--	29	--	18.000
19. Chuquiago La Paz	Chulumani	March	1	--	--	2	2.000
"	"	May	1	--	--	2	1.000
"	"	TOTAL	2	--	--	6	3.000
"	TOTAL 6	months	2	--	--	6	3.000
20. Caiguari-Chuquisaca	Chulumani	January	1	--	--	25	12.000
"	TOTAL 6	months	1	--	--	25	12.000
21. Camargo-Chuquisaca	Chulumani	May	1	--	--	20	10.000
"	"	June	--	1	10	--	10.000
"	"	TOTAL	1	1	10	20	20.000
"	Coripata	March	1	--	37	15	26.000
"	"	May	--	2	16	--	10.000
"	"	June	--	2	30	--	29.000
"	"	TOTAL	1	4	83	15	65.000
"	TOTAL 6	months	2	4	93	35	85.000
22. Camiri-Santa Cruz	Chulumani	January	--	1	30	--	16.000
"	"	March	1	--	43	--	21.000
"	"	April	3	--	54	--	35.000
"	"	May	--	1	40	--	32.000
"	"	June	--	2	70	--	50.000
"	"	TOTAL	3	2	237	--	154.000
"	Coripata	January	1	3	230	--	120.000
"	"	February	1	3	150	--	74.000
"	"	March	2	3	140	--	73.000
"	"	April	1	4	142	210	109.000
"	"	May	1	2	160	--	120.000
"	"	June	2	3	255	--	193.000
"	"	TOTAL	4	6	1.077	210	689.000

DESTINATION	ORIGIN	MONTHS	SPORADIC MERCHANTS	PERMANENT MERCHANTS	No.DRUMS	No.CESTOS	VALUE $b.
Camiri-Santa Cruz	Coroico	March	--	1	15	--	10.000
"	"	April	--	1	--	10	5.000
"	"	TOTAL	--	2	15	10	15.000
"	Irupana	March	1	1	80	--	40.000
"	"	April	--	2	80	--	39.000
"	"	May	--	2	90	--	61.000
"	"	Total	1	3	250	--	140.000
"	TOTAL 6	months	9	7	1.579	220	998.000
23.Caracollo-Oruro	Apolo	May	1	--	--	15	6.000
"	"	TOTAL	1	--	--	15	6.000
	Chulumani	January	1	--	--	1	500
"	"	March	--	1	--	3	1.500
"	"	TOTAL	1	1	--	4	2.000
"	TOTAL 6	months	2	1	--	19	8.000
24.Cochabamba-City	Coroico	June	1	--	--	1	600
"	TOTAL 6	months	1	--	--	1	600
25.Colquechaca-Potosí	Chulumani	June	--	1	--	27	16.800
"	"	TOTAL	--	1	--	27	16.800
"	Coripata	May	--	1	--	9	4.500
"	"	TOTAL	--	1	--	9	4.500
"	TOTAL 6	months	--	1	--	36	21.300
26.Colquiri-La Paz	Chulumani	January	3	3	15	55	37.500
"	"	February	2	2	--	28	13.600
"	"	March	2	--	--	26	12.000
"	"	April	1	1	--	105	47.500
"	"	May	--	2	--	41	25.500
"	"	June	1	--	--	30	12.500
"	"	TOTAL	8	5	15	285	148.600
"	Coripata	January	1	2	--	28	13.600
"	"	February	1	1	--	40	19.000
"	"	March	1	1	--	78	32.000
"	"	May	--	2	--	146	59.000
"	"	April	2	--	--	45	26.300
"	"	TOTAL	2	3	--	337	149.900
"	Coroico	April	2	--	--	15	7.000
"	"	TOTAL	2	--	--	15	7.000
"	TOTAL 6	months	12	8	--	637	305.300
27.Cuevo-Chuquisaca	Coripata	February	1	--	20	--	10.000
"	TOTAL 6	months	1	--	20	--	10.000
28.Culpina-Chuquisaca	Cajuata	April	--	1	48	--	24.000
"	"	TOTAL	--	1	48	--	24.000
"	Chulumani	January	--	1	15	--	7.000
"	"	February	--	3	67	--	36.000
"	"	March	1	2	136	--	64.000
"	"	April	1	--	13	--	6.000
"	"	May	--	1	29	--	15.000
"	"	June	--	1	17	--	120.000
"	"	TOTAL	2	6	277	--	248.000

DESTINATION	ORIGIN	MONTH	SPORADIC MERCHANTS	PERMANENT MERCHANTS	No.DRUMS	No.CESTOS	VALUE
"	Coripata	January	--	2	61	--	29.00
"	"	February	3	5	246	6	153.00
"	"	March	1	5	205	11	114.000
"	"	April	--	3	121	--	82.500
"	"	May	2	5	177	3	154.500
"	"	June	1	3	119	--	133.400
"	"	TOTAL	7	7	929	20	666.400
"	Irupana	March	1	--	30	5	16.000
"	"	TOTAL	1	--	30	5	16.000
"	TOTAL 6 months		9	9	1.284	25	954.400
29.EMUSA-La Paz	Chulumani	January	1	1	--	15	7.000
"	"	March	1	--	--	33	16.000
"	"	April	1	--	--	18	9.000
"	"	June	1	--	70	10	40.000
"	"	TOTAL	3	1	70	76	72.000
"	Coripata	January	1	--	34	--	17.000
"	"	TOTAL	1	--	34	--	17.000
"	Coroico	March	1	--	--	6	3.000
"	"	TOTAL	1	--	--	6	3.000
"	TOTAL 6 months		5	1	104	82	92.000
30.Entre Rios-Tarija	Coripata	January	1	--	3	--	1.400
"	TOTAL 6 months		1	--	3	--	1.400
31.Escoma-La Paz	Apolo	April	2	--	2	36	19.300
"	TOTAL 6 months		2	--	2	36	19.300
32.Escorani-Oruro	Chulumani	January	1	--	--	7	3.000
"	"	March	--	1	--	8	2.000
"	"	TOTAL	1	1	--	15	5.000
"	Coripata	January	1	--	--	18	9.000
"	"	May	--	1	--	8	4.000
"	"	June	1	--	--	4	2.000
"	"	TOTAL	2	1	--	30	15.000
"	TOTAL 6 months		2	1	--	45	20.000
33.Estación Arenal-Oruro	Chulumani	January	1	--	--	5	2.000
"	TOTAL 6 months		1	--	--	5	2.000
34.Estación Central-Oruro	Chulumani	April	1	--	--	9	4.500
"	TOTAL 6 months		1	--	--	9	4.500
35. Eucaliptus-La Paz	Chulumani	January	3	--	--	28	14.000
"	"	February	1	--	--	3	1.500
"	"	May	1	1	--	20	[illegible]
"	"	TOTAL	4	1	--	51	25.500
	TOTAL 6 months		4	1	--	51	25.500
36.Huanuni-Oruro	Chulumani	January	1	--	--	4	2.200
"	"	February	1	--	--	3	1.500
"	"	March	2	--	--	23	11.500
"	"	May	1	--	--	2	1.000
"	"	June	--	--	--	6	3.200
		TOTAL	5	--	--	38	18.400

DESTINATION	ORIGIN	MONTH	SPORADIC MERCHANTS	PERMANENT MERCHANTS	No.DRUMS	No.CESTOS	VALUE $l
Huanuni-Oruro	Coripata	March	1	--	26	--	13.000
"	"	May	1	--	--	1	500
"	"	June	1	1	1	1	1.400
"	"	TOTAL	3	1	27	2	14.900
"	Coroico	February	--	1	--	1	500
"	"	April	--	1	--	1	500
"	"	TOTAL	--	1	--	2	1.000
"	Irupana	March	1	--	20	--	10.000
"	"	TOTAL	L	--	20	--	10.000
"	TOTAL 6	months	7	1	47	42	44.300
37.Huari-Oruro	Chulumani	March	--	1	--	23	12.000
"	"	April	--	3	--	55	26.000
"	"	May	1	--	--	7	2.400
"	"	TOTAL	1	3	--	85	40.400
"	TOTAL 6	months	1	3	--	85	40.400
38.Iruna-Oruro	Chulumani	February	1	--	--	4	2.000
"	"	May	1	--	--	5	2.800
"	"	TOTAL	1	--	--	9	4.800
"	TOTAL 6	months	1	--	--	9	4.800
39.Iscayachi-Oruro	Chulumani	June	--	1	12	--	12.000
"	"	TOTAL	--	1	12	--	12.000
"	Coripata	January	1	--	7	--	3.000
"	"	TOTAL	1	--	7	--	3.000
"	Coroico	January	1	--	5	--	2.500
"	"	TOTAL	1	--	5	--	2.500
"	TOTAL 6	months	2	1	24	--	17.500
40.Kami,Empresa-Oruro	Chulumani	January	2	--	--	143	71.600
"	"	February	1	--	--	200	80.000
"	"	March	1	--	--	2	1.000
"	"	TOTAL	2	--	--	345	152.600
"	Coripata	May	--	1	--	200	30.000
"	"	TOTAL	--	1	--	200	30.000
"	TOTAL 6	months	2	1	--	545	182.600
41.Lahuachaca-La Paz	Chukumani	January	1	--	--	6	3.000
"	"	TOTAL	1	--	--	6	3.000
"	TOTAL 6	months	1	--	--	6	3.000
42.Llallagua-Potosí	Chulumani	January	5	4	--	66	31.500
"	"	February	5	1	--	64	29.600
"	"	March	1	2	--	10	5.000
"	"	April	5	2	--	73	38.500
"	"	May	2	1	--	40	26.400
"	"	June	1	2	--	32	15.500
"	"	TOTAL	12	9	--	285	146.500
"	Coripata	January	6	--	--	43	20.500
"	"	February	1	--	--	6	3.000
"	"	March	3	3	--	42	21.000
"	"	April	--	1	--	3	1.500
"	"	May	2	3	--	62	29.600
"	"	June	1	1	--	21	12.400
"	"	TOTAL	11	5	--	177	88.000

DESTINATION	ORIGIN	MONTH	SPORADIC MERCHANTS	PERMANENT MERCHANTS	No.DRUMS	No.CESTOS	VALUE $D.
Llallagua-Potosí	Coroico	January	1	--	--	4	2.000
"	"	February	1	1	--	20	10.000
"	"	March	--	1	--	5	2.500
"	"	April	1	1	--	15	7.600
"	"	TOTAL	3	2	--	44	22.100
"	Irupana	February	1	1	--	10	5.000
"	"	March	1	--	--	10	5.000
"	"	April	--	1	--	12	6.000
		TOTAL	2	2	--	32	16.000
"	TOTAL 6 months		23	10	--	527	266.600
43.Larke-Potosí	Chulumani	June	--	1	--	3	1.500
"	"	TOTAL	--	1	--	3	1.500
"	TOTAL 6 months		--	1	--	3	1.500
44.Mineros-Santa Cruz	Chulumani	February	--	1	--	9	4.500
"	"	March	1	--	--	20	10.000
"	"	April	1	--	--	40	20.000
"	"	TOTAL	1	1	--	69	34.500
"	Coripata	March	1	--	--	20	10.000
"	"	May	--	1	--	10	5.700
"	"	June	--	1	--	20	12.000
"	"	TOTAL	1	2	--	50	27.700
"	Coroico	June	--	1	--	20	13.000
"	"	TOTAL	--	1	--	20	13.000
"	TOTAL 6 months		2	2	--	139	75.200
45.Montero-Santa Cruz	Chulumani	January	3	1	--	52	26.000
"	"	February	--	2	--	35	16.500
"	"	March	--	6	--	106	52.300
"	"	April	2	2	5	35	19.000
"	"	May	2	1	--	38	19.000
"	"	June	1	2	--	88	46.000
"	"	TOTAL	"	8	5	354	178.800
"	Coripata	January	--	1	--	5	3.000
"	"	February	--	1	--	8	4.500
"	"	March	2	1	--	47	23.000
"	"	April	1	2	--	53	28.500
"	"	May	2	4	7	167	88.000
"	"	June	3	3	--	88	57.500
"	"	TOTAL	8	6	7	368	204.500
"	Coroico	January	--	1	--	19	11.000
"	"	February	3	1	--	71	35.000
"	"	March	2	1	--	39	19.500
"	"	April	2	2	--	70	35.000
"	"	May	1	--	--	15	7.000
"	"	TOTAL	5	4	--	214	107.500
"	Irupana	January	1	--	--	10	3.500
"	"	February	--	1	--	8	5.000
"	"	June	--	1	--	15	3.500
"	"	TOTAL	1	1	--	33	12.000
"	TOTAL 6 months		18	9	12	969	502.800
46. Morococala-Oruro	Chulumani	May	1	--	--	3	--
"	"	June	1	--	--	4	2.300
"	"	TOTAL	2	--	--	7	2.300
"	TOTAL 6 months		2	--	--	7	2.300

DESTINATION	ORIGIN	MONTH	SPORADIC MERCHANTS	PERMANENT MERCHANTS	No.DRUMS	No.CESTO	VALUE $b
47.Oploca-Potosí	Chulumani	February	--	1	2	--	4.500
"	"	March	1	--	--	4	2.000
"	"	April	1	--	--	20	10.000
"	"	TOTAL	2	1	2	24	16.500
"	Coripata	March	1	--	--	6	3.000
"	"	TOTAL	1	--	--	6	3.000
"	Irupana	January	1	--	--	4	2.800
"	"	TOTAL	1	--	--	4	2.800
"	TOTAL 6 months		31	1	2	34	22.300
48.Oro Ingenio-Potosí	Chulumani	February	--	1	--	4	1.600
"	"	June	--	1	--	10	6.000
"	"	TOTAL	--	1	--	14	7.600
"	Coripata	January	--	1	--	7	4.000
"	"	TOTAL	--	1	--	7	4.000
"	Irupana	April	--	1	--	4	2.000
"	"	TOTAL	--	1	--	4	2.000
"	TOTAL 6 months		--	1	--	25	13.600
49.Oruro-City	Chulumani	January	15	18	--	576	289.150
"	"	February	24	19	5	673	316.320
"	"	March	12	20	--	489	270.100
"	"	April	12	20	5	609	310.700
"	"	May	13	22	--	806	395.800
"	"	June	6	14	35	435	276.200
"	"	TOTAL	67	36	45	3.588	1.858.270
"	Coripata	January	5	11	--	446	213.200
"	"	February	4	5	--	105	52.440
"	"	March	5	9	--	265	128.000
"	"	April	8	13	--	430	216.300
"	"	May	8	13	17	435	235.000
"	"	June	8	8	--	242	141.400
"	"	TOTAL	29	30	17	1.948	985.340
"	Coroico	January	5	2	--	66	34.000
"	"	February	3	1	--	52	25.000
"	"	March	3	2	--	72	33.000
"	"	May	1	--	--	12.5	6.000
"	"	June	2	1	--	18	11.500
"	"	TOTAL	14	6	--	220.5	109.500
"	Irupana	January	--	1	--	77	37.000
"	"	February	1	2	--	70	32.000
"	"	March	1	3	--	44	21.500
"	"	May	--	1	--	12	6.000
"	"	June	2	--	--	11	5.000
"	"	TOTAL	4	6	--	214	101.500
"	La Paz	April	1	--	--	12	5.800
"	"	TOTAL	1	--	--	12	5.800
"	TOTAL 6 months		88	41	62	5.982.5	2.942.410
50.Patacamaya-La Paz	Coripata	February	1	--	-	3	1.200
"	"	TOTAL	1	-	--	3	1.200
"	TOTAL 6 months		1	--	-	3	1.200
51.Pazña-Oruro	Chulumani	April	--	1	--	4	2.000
"	"	May	2	--	-	11	4.800
"		June	1	--	--	5	2.600
"	"	TOTAL	2	1	--	20	9.400
"	Coroico	April	--	1	-	9	4.500
"	"	TOTAL	--	1	--	9	4.500
"	TOTAL 6 months		2	1	--	29	13.900

DESTINATION	ORIGIN	MONTH	SPORADIC MERCHANTS	PERMANENT MERCHANTS	No.DRUMS	No.CESTOS	VALUE $b.
52.Potosí-City	Chulumani	January	10	13	400	107	293.000
"	"	February	6	10	347	46	204.700
"	"	March	10	13	295	112	229.200
"	"	April	7	10	241	60	158.900
"	"	May	2	4	62	23	58.200
"	"	June	2	5	71	33	68.500
"	"	TOTAL	37	29	1.416	381	1.010.500
"	Coripata	January	17	14	911	74	464.600
"	"	February	6	8	452	64	288.904
"	"	March	7	14	378	101	251.100
"	"	April	6	17	694	52	400.100
"	"	May	10	7	657	108	483.100
"	"	June	7	7	265	27	232.700
"	"	TOTAL	47	31	3.257	426	2.120.904
"	Coroico	January	--	2	28	--	14.000
"	"	February	1	2	47	23	52.000
"	"	March	1	1	30	3	17.600
"	"	April	--	2	37	2	127.000
"	"	May	--	2	30	--	22.000
"	"	June	6	2	83	22	84.200
"	"	TOTAL	8	11	255	50	316.800
"	Irupana	January	1	2	64	36	52.000
"	"	February	1	1	44	--	21.000
"	"	March	2	1	26	20	21.500
"	"	April	2	2	169	--	104.300
"	"	June	--	1	6	6	10.000
"	"	TOTAL	6	7	300	62	208,800
"	Suri	April	1	--	--	60	30.000
"	"	TOTAL	1	--	--	60	30.000
"	TOTAL 6	months	76	39	5.228	980	3.688.604
53.Pozo-Tarija	Chulumani	February	1	--	7	--	2.800
"	"	TOTAL	1	--	7	--	2.800
"	TOTAL 6	months	1	--	7	--	2.800
54.Pulacayo-Potosí	Chulumani	January	1	--	--	3	1.600
"	"	TOTAL	1	--	--	3	1.600
"	TOTAL 6	months	1	--	--	3	1.600
55. Puerto Acosta-La Paz	Apolo	January	3	2	197	155	161.600
"	"	February	2	2	43	20	29.100
"	"	March	3	2	107	91	130.500
"	"	April	3	2	102	136	92.580
"	"	May	1	1	202	--	63.000
"	"	June	2	--	44	71	55.000
"	"	TOTAL	10	2	695	473	531.780
"	Cajuata	April	2	--	--	--	10.000
"	"	TOTAL	2	--	--	20	10.000
"	Coripata	April	--	1	15	--	7.000
"	"	TOTAL	--	1	15	--	7.000
"	Cochabamba	February	1	--	--	20	10.000
"	"	TOTAL	1	--	--	20	10.000
"	TOTAL 6	months	13	3	710	513	558 780
56.Ouechisla-Potosí	Chulumani	March	1	--	110	17	70.000
"		TOTAL	1	--	110	17	70.000
"	Coripata	January	-	1	--	80	40.000
"	"	April	1	--	77	--	60.000
"	"	TOTAL	1	1	77	80	100.000
"	TOTAL 6	months	1	1	187	97	170.000

DESTINATION	ORIGIN	MONTH	SPORADIC MERCHANTS	PERMANENT MERCHANTS	No.DRUMS	No. CESTOS	VALUE $b
57.Quime-La Paz	Chulumani	January	2	--	--	14	7.000
"	"	TOTAL	2	--	--	14	7.000
"	Coripata	January	1	--	--	5	2.500
"	"	February	1	--	--	12	1.600
"	"	TOTAL	2	--	--	17	4.100
"	TOTAL 6 months		4	--	--	31	11.100
58.Rio Mulato-Potosí	Chulumani	January	1	--	--	23	10.000
"	"	February	--	1	--	4	2.000
"	"	March	1	--	9	--	4.500
"	"	April	2	--	--	19	9.500
"	"	May	1	2	9	9	11.600
"	"	TOTAL	4	3	18	55	36.600
"	Coripata	May	1	--	--	7	3.000
"	"	June	--	1	--	4	2.200
"	"	TOTAL	1	1	--	11	5.200
"	TOTAL 6 months		4	4	18	66	41.800
59.Rosario-Potosí	Chulumani	January	1	--	--	4	2.000
"	"	February	1	--	--	12	6.000
"	"	March	2	--	20	2	11.000
"	"	April	2	--	--	19	9.000
"	"	TOTAL	5	--	20	37	28.000
"	Coripata	February	1	--	--	4	2.000
"	"	May	2	--	--	28	13.500
"	"	TOTAL	3	--	--	32	15.500
"	TOTAL 6 months		7	--	20	69	43.500
60.San Lucas-Chuquisaca	Chulumani	January	1	--	8	--	4.000
"	"	February	--	1	12	--	7.000
"	"	May	--	1	--	22	11.000
"	"	TOTAL	1	2	20	22	22.000
"	Coripata	January	--	1	12	--	6.000
"	"	TOTAL	--	1	12	--	6.000
"	Coroico	February	1	--	10	--	5.000
"	"	TOTAL	1	--	10	--	5.000
"	TOTAL 6 months		1	2	42	22	33.000
61.Cerdas-Potosí	Chulumani	January	2	--	--	13	7.000
"	"	March	1	1	--	44	20.000
"	"	April	2	2	--	60	28.500
"	"	June	1	--	--	25	16.000
"	"	TOTAL	5	2	--	142	71.500
"	Coripata	January	2	1	--	61	32.000
"	"	February	--	1	--	27	13.000
"	"	March	1	1	--	43	21.700
"	"	April	1	2	--	29	11.500
"	"	May	1	2	--	19	9.800
"	"	TOTAL	4	5	--	179	88.000
"	Coroico	March	--	1	--	5	2.600
"	"	April	1	--	--	4	2.200
"	"	TOTAL	1	1	--	9	4.800
"	TOTAL 6 months		8	5	--	330	164.300
62.Sevaruyo-Oruro	Chulumani	May	1	--	--	5	2.500
"	"	June	--	1	--	18	9.000
"	"	TOTAL	1	1	--	23	11.500

DESTINATION	ORIGIN	MONTH	SPORADIC MERCHANTS	PERMANENT MERCHANTS	No. DRUMS	No. CESTOS	VALUE $b.
Savaruyo-Oruro	Coripata	June	--	1	--	8	4.000
"	"	TOTAL	--	1	--	8	4.000
"	TOTAL 6 months		1	1	--	31	15.500
63. Santa Fé-Oruro	Coripata	January	1	--	--	50	20.000
"	"	April	1	--	--	16	23.000
"	"	May	--	1	--	57	24.000
"	"	TOTAL	1	1	--	123	67.000
"	TOTAL 6 months		1	1	--	123	67.000
64. Santa Cruz-City	Apolo	April	--	1	--	18	8.000
"	"	TOTAL	--	1	--	18	8.000
"	Cajuata	April	1	2	--	55	35.000
"	"	TOTAL	1	2	--	55	35.000
"	Chulumani	January	11	9	24	528	276.900
"	"	February	8	7	--	234	117.300
"	"	March	4	12	17	361	188.900
"		April	3	7	--	278	134.200
"	"	May	5	7	--	284	138.500
"	"	June	6	10	--	336	208.000
"	"	TOTAL	31	19	41	2.001	1.053.800
"	Coripata	January	3	3	--	93	46.000
"	"	February	1	3	--	59	30.000
"	"	March	3	5	20	111	65.000
"	"	April	2	6	--	109	56.300
"	"	May	2	12	--	302	151.700
"	"	June	7	7	2	261	150.500
"	"	TOTAL	16	17	22	935	499.500
"	Coroico	January	5	2	--	114	54.500
"	"	February	--	4	--	30	40.000
"	"	March	3	2	--	94	67.000
"	"	April	1	4	--	154	77.000
"	"	May	1	--	--	20	10.000
"	"	June	2	3	--	105	61.000
"	"	TOTAL	12	9	--	567	309.500
"	Irupana	January	--	1	--	25	12.000
"	"	February	--	2	--	40	20.000
"	"	June	--	1	--	20	10.000
"	"	TOTAL	--	4	--	85	42.000
"	TOTAL 6 months		50	24	63	3.661	1.947.800
65. Sucre City	Chulumani	May	1	--	--	6	3.000
"	"	TOTAL	1	--	--	6	3.000
"	Coripata	February	2	--	10	--	5.000
"	"	March	--	1	6	--	3.000
"	"	April	1	--	5	--	5.000
"	"	May	--	1	12	--	12.000
"	"	June	2	--	27	--	15.200
"	"	TOTAL	4	2	60	--	40.200
"	TOTAL 6 months		5	2	60	6	43.000
66. Tablachaca-La Paz	Chulumani	January	1	--	--	15	7.000
"	"	TOTAL	1	--	--	15	7.000
"	TOTAL 6 months		1	--	--	15	7.000

DESTINATION	ORIGIN	MONTH	SPORADIC MERCHANTS	PERMANENT MERCHANTS	No. DRUMS	No. CESTOS	VALUE $b.
67. Tarija-City	Chulumani	January	3	--	48	58	59.000
"	"	February	1	3	91	6	59.000
"	"	March	2	3	96	80	104.000
"	"	April	2	1	109	70	58.000
"	"	May	1	2	75	45	34.800
"	"	June	--	2	30	--	22.000
"	"	TOTAL	9	8	449	259	336.800
"	Coripata	January	3	3	113	130	112.400
"	"	February	4	4	194	214	254.500
"	"	March	4	2	154	266	203.000
"	"	April	4	4	379	124	344.800
"	"	May	7	9	326	383	431.800
"	"	June	7	5	293	375	487.500
"	"	TOTAL	23	11	1.459	1.492	1.834.000
"	Coroico	January	1	1	35	65	60.000
"	"	February	2	1	35	79	70.000
"	"	March	1	4	70	120	71.600
"	"	April	1	1	5	20	20.000
"	"	June	1	--	18	25	20.000
"	"	TOTAL	7	8	163	309	241.600
"	Irupana	April	1	--	--	22	20.000
"	"	TOTAL	1	--	--	22	20.000
"	TOTAL 6	months	30	15	2.071	2.082	2.432.400
68. Tojo- S. Cruz	Coripata	April	1	--	8	--	4.000
"	"	TOTAL	1	--	8	--	4.000
"	TOTAL 6	months	1	--	8	--	4.000
69. Toledo-Oruro	Chulumani	January	1	4	--	40	18.100
"	"	February	--	2	--	20	10.000
"	"	March	2	4	--	39	19.500
"	"	April	1	5	--	65	34.000
"	"	May	3	3	--	19	8.000
"	"	June	1	1	--	14	7.100
"	"	TOTAL	6	8	--	197	96.700
"	Coripata	February	1	1	--	8	4.000
"	"	March	--	2	--	6	3.000
"	"	April	--	1	--	3	1.660
"	"	May	--	2	--	22	11.000
"	"	June	4	1	--	22	11.500
"	"	TOTAL	5	4	--	61	31.160
"	Coroico	January	--	1	--	3	2.000
"	"	May	1	--	--	8	4.000
"	"	June	--	1	--	7	3.200
"	"	TOTAL	1	2	--	18	9.200
"	Irupana	February	--	2	--	16	4.500
"	"	TOTAL	--	2	--	16	4.500
"	TOTAL 6	months	10	7	--	292	141.460
70. Tupiza-Potosí	Chulumani	January	--	4	--	88	46.500
"	"	February	2	1	10	53	30.000
"	"	March	1	5	--	121	83.000
"	"	April	2	2	25	49	38.500
"	"	May	--	5	--	92	51.000
"	"	June	3	2	--	83	45.100
"	"	TOTAL	7	8	35	486	294.100
"	Coripata	January	3	2	--	91	46.500
"	"	February	6	3	24	146	79.900
"	"	March	4	1	60	110	103.500

DESTINATION	ORIGIN	MONTH	SPORADIC MERCHANTS	PERMANENT MERCHANTS	No.DRUMS	No.CESTOS	VALUE $b.
Tupiza-Potosí	Coripata	April	4	2	37	68	54.420
"	"	May	3	1	7	61	33.500
"	"	June	3	4	--	91	46.100
"	"	TOTAL	16	7	128	567	303.920
"	Coroico	January	--	3	--	32	16.100
"	"	March	--	1	--	20	9.500
"	"	April	--	1	--	20	60.000
"	"	TOTAL	--	3	--	72	85.600
"	Irupana	February	--	1	--	9	4.000
"	"	May	--	1	--	62	30.000
"	"	TOTAL	--	2	--	71	34.000
"	TOTAL 6 months		23	11	163	1.196	717.620
71.Umanata-La Paz	Coripata	April	1	--	--	3	1.500
"	"	TOTAL	1	--	--	4	1.500
"	TOTAL 6 months		1	--	--	4	1.500
72.Uyuni-Potosí	Chulumani	January	3	3	29	79	46.000
"	"	February	3	3	60	107	84.750
"	"	March	--	1	--	20	10.000
"	"	April	--	2	--	30	13.000
"	"	May	1	2	--	30	14.900
"	"	June	--	1	5	13	6.600
"	"	TOTAL	4	10	94	279	175.250
"	Coripata	January	1	5	94	169	98.000
"	"	February	2	5	42	86	166.600
"	"	March	2	2	--	49	24,100
"	"	April	2	4	38	105	73.100
"	"	May	4	6	197	124	130.200
"	"	June	--	6	25	121	76.000
"	"	TOTAL	10	11	396	654	568.000
"	Cajuata	April	--	1	30	21	38.000
"	"	TOTAL	--	1	30	21	38.000
"	Coroico	March	1	--	--	15	7.500
"	"	TOTAL	1	--	--	15	7.500
"	Irupana	April	1	--	10	--	9.500
"	"	TOTAL	1	--	10	--	9.500
"	TOTAL 6 months		16	11	530	969	798.250
73.Villa Abecia-Chuquisaca	Coripata	June	1	--	10	--	8.000
"	"	TOTAL	1	--	10	--	8.000
"	Coroico	March	1	--	3	--	1.600
"	"	TOTAL	1	--	3	--	1.600
"	TOTAL 6 months		2	--	13	--	9.600
74.Villamontes-Tarija	Chulumani	February	--	1	20	--	12.000
"	"	May	--	1	40	--	32.000
"	"	TOTAL	--	2	60	--	44.000
"	Coripata	January	1	1	132	--	60.000
"	"	February	1	1	110	--	52.000
"	"	March	--	1	60	--	29.000
"	"	April	--	1	30	20	26.000
"	"	May	--	1	40	--	30,000
"	"	June	--	1	90	--	60.000
"	"	TOTAL	2	1	462	20	257.000

DESTINATION	ORIGIN	MONTH	SPORADIC MERCHANTS	PERMANENT MERCHANTS	No.DRUMS	No.CESTOS	VALUE $b.
Villamontes-Tarija	Irupana	March	1	1	40	3	21.600
"	"	April	--	1	30	--	16.000
"	"	May	--	1	30	--	21.000
"	"	TOTAL	1	2	100	3	58.600
"	TOTAL 6 months		3	3	622	23	359.600
75.Villazón-Potosí	Chulumani	January	3	3	300	4	154.000
"	"	February	2	1	169	--	83.000
"	"	March	2	1	148	--	70.000
"	"	April	--	2	48	8	37.600
"	"	May	3	2	185	9	109.000
"	"	June	--	1	36	--	27.000
"	"	TOTAL	9	6	886	21	480.600
"	Coripata	January	12	10	1.222	4	325.000
"	"	February	9	10	819	15	435.000
"	"	March	8	8	777	4	476.000
"	"	April	9	13	991	100	527.500
"	"	May	14	13	1.182	16	811.000
"	"	June	9	6	633	3	511.000
"	"	TOTAL	38	19	5.624	142	3.085.500
"	Coroico	April	1	1	--	19	11.800
"	"	June	--	1	38	--	28.000
"	"	TOTAL	1	2	38	19	39.800
"	Irupana	January	1	--	39	--	20.000
"	"	February	1	--	20	--	10.000
"	"	March	1	2	122	--	73.400
"	"	April	--	1	26	--	13.000
"	"	June	1	--	35	--	26.000
"	"	TOTAL	4	3	242	--	142.400
"	Caranavi	March	1	--	27	--	22.000
"	"	TOTAL	1	--	27	--	22.000
"	TOTAL 6 months		42	20	6.797	182	3.780.300
76.Viloco-La Paz	Chulumani	January	--	1	--	5	3.000
"	"	February	1	1	--	8	3.800
"	"	March	1	--	--	2	1.000
"	"	April	1	1	--	11	5.600
"	"	TOTAL	3	1	--	26	13.400
"	Coroico	May	--	1	--	7	3.500
"	"	TOTAL	--	1	--	7	3.500
"	TOTAL 6 months		3	1	--	33	16.800
77.Warnes-Santa Cruz	Chulumani	January	--	1	--	40	20.000
"	"	March	--	1	--	16	8.000
"	"	May	--	3	--	52	26.000
"	"	June	1	--	14	--	7.000
"	"	TOTAL	1	3	14	108	81.000
"	Coripata	January	--	1	--	10	5.000
"	"	March	--	1	--	21	10.000
"	"	May	1	1	--	40	24.000
"	"	June	1	--	--	20	13.000
"	"	TOTAL	2	3	--	91	52.000
"	Coroico	February	--	1	--	10	5.000
"	"	April	--	1	--	20	10.000
"	"	TOTAL	--	1	--	30	15.000
"	TOTAL 6 months		4	2	14	229	148.000

DESTINATION	ORIGIN	MONTH	SPORADIC MERCHANTS	PERMANENT MERCHANTS	No. DRUMS	No. CESTOS	VALUE $b.
78. Yacuiba-Tarija	Chulumani	March	--	1	14	--	6.000
"	"	May	1	--	12	--	9.500
"	"	June	1	--	40	--	30.000
"	"	TOTAL	2	1	66	--	45.500
"	Coripata	January	2	5	515	30	289.000
"	"	February	2	4	365	--	269.450
"	"	March	1	4	458	--	221.000
"	"	April	1	1	60	--	28.000
"	"	May	1	4	500	--	349.000
"	"	June	2	5	668	--	495.000
"	"	TOTAL	9	6	2.590	30	1.669.450
"	Irupana	March	--	1	113	--	60.000
"	"	April	--	4	310	--	154.000
"	"	May	--	1	100	--	68.000
"	"	TOTAL	--	4	523	--	282.000
"	TOTAL 6	months	10	7	3.179	30	1.996.950
79. Iscayacgi-Tarija	Coripata	June	--	1	10	--	10.000
"	"	TOTAL	--	1	10	--	10.000
"	TOTAL 6	months	--	1	10	--	10.000
80. Reforma Espíritu Santo-Potosí	Coripata	May	1	--	17	--	8.500
"	"	TOTAL	1	--	17	--	8.500
"	TOTAL 6	months	1	--	17	--	8.500
81. Telamayo-Potosí	Irupana	March	1	--	--	6	3.000
"	"	TOTAL	1	--	--	6	3.000
"	TOTAL	6 months	1	--	--	6	3.000
82. Caiza-Potosí	Chulumani	March	1	--	10	--	5.000
"	"	TOTAL	1	--	10	--	5.000
"	" TOTAL 6	months	1	--	10	--	5.000
83. Puna-Potosí	Coroico	March	1	--	29	--	15.000
"	"	TOTAL	1	--	29	--	15.000
"	TOTAL 6	months	1	--	29	--	15.000

TOTAL of sporadic merchants, January-June, 1977 = 565

TOTAL of permanent merchants, January-June, 1977 = 156

TOTAL = 721.

APPENDIX 16

ORIGIN AND DESTINATION OF COCA

COCHABAMBA - CHAPARE
January-June, 1977 1/

COCA MERCHANTS COCHABAMBA-CHAPARE

DESTINATION	MONTH	SPORADIC MERCHANTS	PERMANENT MERCHANTS	No DRUMS	VALUE $b.
1.Aiquile-Cochabamba	January	5	2	114	-
"	February	3	3	143	-
"	March	7	4	221	-
"	April	9	6	395	-
"	May	14	10	669	-
"	June	11	8	428	-
	TOTAL 2/	37	12	1.969	-
2. Antofagasta-Oruro	January	1	-	10	-
"	February	1	-	10	-
"	March	1	-	10	-
	TOTAL	1	-	30	-
3. Anzaldo-Cochabamba	January	1	-	4	-
"	June	1	-	5	2.500
	TOTAL	1	-	9	-
4. Arani-Cochabamba	January	1	-	2	-
"	April	1	-	2	-
"	May	-	1	2	-
"	TOTAL	2	1	6	-
5. Arque-Cochabamba	April	1	-	2	-
	TOTAL	1	-	2	-
6. Atocha-Potosí	January	1	-	4	-
"	February	-	-	-	-
"	March	-	-	-	-
"	April	3	-	211	-
"	May	-	-	-	-
"	June	7	1	292	153.200
	TOTAL	10	1	507	-
7. Ayopaya-Cochabamba	January	2	-	3	-
	TOTAL	2	-	3	-
8. Azurduy-Chuquisaca	April	1	-	4	-
	TOTAL	1	-	4	-
9. Bella Vista-Sta.Cruz	March	1	-	7	-
"	April	1	-	13	-
"	May	1	-	6	-
"	June	2	-	14	5.600
"	TOTAL	2	-	40	-
10. Betanzos-Potosí	January	1	-	10	-
"	February	-	1	5	-
"	March	1	2	41	-
"	Abril	-	1	35	-
"	May	-	2	72	-
"	June	1	-	9	4.500
	TOTAL	3	3	172	-
11. Bolivar-Oruro	January	-	-	-	-
"	February	1	-	8	-
"	March	1	-	3	-
"	April	3	-	41	-
"	May	8	-	267	-
"	June	2	1	24	12.000
	TOTAL	15	1	343	-

1/ Source Cuerpo de Infanito, National Directorate for the Control of Dangerous Substances, Cochabamba - La Paz.

2/ The totals for merchants refer to the total number of merchants of each type who operate in each locality. They do not represent the sum of the columns. The numbers appearing to the right of each month indicate the number active that month.

DESTINATION	MONTH	SPORADIC MERCHANTS	PERMANENT MERCHANTS	No DRUMS	VALUE $b.
12. Arani-Cochabamba	April	1	-	5	-
	TOTAL	1	-	5	-
13. Bustillos-Potosí	April	1	-	18	-
	June	-	1	40	20.000
	TOTAL	1	1	58	-
14. Camiri-Santa Cruz	January	2	1	60	-
"	February	2	2	100	-
"	March	3	3	190	-
"	April	1	5	246	-
"	May	5	5	519	-
"	June	11	6	803	433.400
	TOTAL	23	28	1.918	-
15. L. Cahuana-Potosí	May	1	-	5	-
	TOTAL	1	-	5	-
16. Calazaya-Oruro	January	1	-	5	-
	TOTAL	1	-	5	-
17. Capinota-Cochabamba	January	3	4	50	-
"	February	-	3	10	-
"	March	2	319	19	-
"	April	3	3	56	-
"	May	1	5	70	-
	June	3	3	61	30.000
	TOTAL	8	5	266	-
18. Carangas-Oruro	April	1	-	6	-
	TOTAL	1	-	6	-
19. Catavi-Potosí	February	1		29	-
"	April	1	-	47	-
	TOTAL	1	-	76	-
20. Cercado-Cochabamba	March	-		-	-
"	April	1	-	1	-
"	May	1	-	32	-
	June	3	-	29	16.450
	TOTAL	5	-	62	-
21. Chaguarani-Oruro	January	1	-	4	-
"	June	1	-	2	1.000
	TOTAL	1	-	6	1.000
22. Challapata-Oruro	January	1	-	10	-
"	April	3	-	9	-
"	May	4	-	14	-
"	June	1	1	21	11.450
	TOTAL	8	1	54	-
23. Chipare-Cochabamba	April	1		4	-
"	June	-	1	50	20.000
	TOTAL	1	1	54	-
24. Caqui-Potosí	January	1	-	4	-
	TOTAL	1	-	4	-
25. Chayanta-Potosí	March	1	-	22	-
"	June	1		4	2.000
	TOTAL	2	-	26	
26. Chuqui Chuquisaca	March	1	-	15	-
"	May	1		1	

DESTINATION	MONTH	SPORADIC MERCHANTS	PERMANENT MERCHANTS	No DRUMS	VALUE $b.
27. Cliza_Cochabamba	January	1	2	14	-
"	February	-	2	8	-
"	March	1	2	13	-
"	April	4	2	42	-
"	May	3	3	69	-
"	June	2	2	48	33.200
	TOTAL	5	5	165	-
28. Cochabamba City	January	2	2	16	-
"	May	1	1	110	-
"	June	3	2	39	20.750
	TOTAL	5	5	165	-
29. Coleha-Potosí	April	1	-	30	
"	June	1	-	20	9.800
	TOTAL	1	-	50	-
30. Colomi-Cochabamba	April	1	-	60	-
"	May	2	-	88	-
'	June	1	-	18	9.000
	TOTAL	2	-	166	-
31. Colquechaca-Potosí	January	1	-	20	-
"	March	2	2	81	-
'	April	1	-	21	-
"	May	1	-	10	-
'	June	1	1	147	88.500
	TOTAL	3	2	279	-
32. Colquiri-L.P.	April	2	-	26	-
"	May	3	-	40	-
"	June	6	-	91	44.900
"	March	1	-	15	-
	TOTAL	8.12	-	172	-
33. Comarapa-Sta. Cruz	January	1	2	21	-
'	March	2	1	12	-
'	May	1	1	14	-
'	June	3	1	26	15.200
	TOTAL	4	3	72	-
34. Cotagaira-Potosí	March	1	-	10	-
"	May	1	1	140	-
"	June	-	1	100	50.000
	TOTAL	2	1	250	-
35. Culpina-Chuquisaca	June	1	-	30	15.000
	TOTAL	1		30	15.000
36. El Torno-Sta. Cruz	January	1	1	10	-
'	February	-	1	5	-
"	March	-	1	3	-
"	April	-	1	4	-
"	May	-	1	6	-
'	June	-	1	6	3.900
	TOTAL	1	1	34	-
37. Epizana Cochabamba	April	1	-	1	-
	TOTAL	1	.	1	-
38. García-Oruro	January	1	-	10	-
	TOTAL	1	-	10	-

DESTINATION	MONTH	SPORADIC MERCHANTS	PERMANENT MERCHANTS	No DRUMS	VALUE $b.
39. Guadalupe-Potosí	April	1	-	4	-
	TOTAL	1	-	4	-
40. Huacareta-Chuquisaca	January	1	-	8	-
"	April	1	-	10	-
"	TOTAL	2	-	18	-
41. Huanuni-Oruro	June	-	1	10	6.000
	TOTAL	-	1	10	6.000
42. Huari-Oruro	January	2	-	1"	-
"	February	1	-	23	-
"	April	4	4	426	-
"	May	-	1	10	-
"	March	-	1	20	-
	TOTAL	7	5	538	-
43. Independencia-Cochabamba	January	787	2	58	-
"	February	1	2	21	-
"	March	-	1	10	-
"	April	4	1	30	-
"	May	7	1	41	-
"	June	5	-	51	25.160
	TOTAL	18	4	215	-
44. Kami-Cochabamba	January	1	-	2	-
	TOTAL	1	-	2	-
45. Lahuachaca-La Paz	May	-	1	12	-
"	June	1	1	26	8.500
	TOTAL	1	1	38	-
46. La Paz-City	January	3	2	277	-
"	February	1	2	155	-
"	March	5	2	453	-
"	April	5	3	700	-
"	May	5	4	504	-
"	June	12	3	1 015	457.800
	TOTAL	24	4	3.104	-
47. Llallagua-Potosí	January	5	5	287	-
"	February	3	5	216	-
"	March	7	8	570	-
"	April	18	9	1.086	-
"	May	14	11	972	-
"	June	14	7	867	423 700
	TOTAL	52	12	3.998	-
48. Llica-Potosí	January	1	-	5	-
"	March	1	-	3	-
"	TOTAL	2	-	8	-
49. Machacamarca-Oruro	June	1	-	30	16.500
	TOTAL	1	-	30	16.500
50. Mamani-Oruro	March	1	-	7	-
	TOTAL	1	-	7	-
51. Maragua-Potosí	May	1	-	22	-
"	June	2		23	7.500
	TOTAL	2	-	45	-

DESTINATION	MONTH	SPORADIC MERCHANTS	PERMANENT MERCHANTS	No DRUMS	VALUE $b.
52. Mendoza-Oruro	May	1	-	3	-
	TOTAL	1	-	3	-
53. Mineros-Sta. Cruz	January	13	5	175	-
"	February	10	2	128	-
"	March	19	-	204	-
	April	1	3	50	-
"	May	4	8	160	-
"	June	11	4	195	104.800
	TOTAL	45	15	912	-
54. Mizque-Cochabamba	January	3	1	27	-
"	February	-	1	6	-
"	March	1	1	11	-
"	April	3	2	31	-
"	May	5	3	68	-
"	June	5	1	73	33.800
	TOTAL	14	4	216	-
55. Mojocoya-Chuquisaca	January	1	-	14	-
	TOTAL	1	-	14	-
56. Monteagudo-Chuquisaca	January	2	6	199	-
"	February	4	2	104	-
"	March	4	5	170	-
"	April	2	5	111	-
"	May	5	4	201	-
"	June	7	2	185	92.500
	TOTAL	11	23	854	-
57. Montero-Sta. Cruz	January	43	19	602	-
"	February	35	18	558	-
"	March	35	28	744	-
"	April	23	22	548	-
"	May	59	25	1.195	-
"	June	65	27	1.371	600.400
	TOTAL	192	39	5.058	-
58. Moromoro-Santa Cruz	January	1	-	10	-
	TOTAL	1	-	10	-
59. Muyupampa-Chuquisaca	January	1	1	21	-
"	February	1	1	26	-
"	April	-	4	70	-
"	May	4	3	281	-
"	June	6	3	287	144.800
	TOTAL	9	5	685	-
60. Oruro City	January	13	10	1.069	-
"	February	3	6	180	-
"	March	11	15	970	-
"	April	16	14	940	-
"	May	23	15	1.397	-
"	June	20	12	1.009	399.200
	TOTAL	57	19	5.565	-
61. Padilla-Chuquisaca	January	1	1	15	-
"	March	2	1	21	-
"	April	3	1	76	-
"	May	1	5	95	-
"	June	2	3	137	60.300
	TOTAL	8	7	343	-
62. Pampatambo-Potosí	January	1	-	21	-
	TOTAL	1	-	21	-

DESTINATION	MONTH	SPORADIC MERCHANTS	PERMANENT MERCHANTS	No DRUMS	VALUE $b.
63. Pocoata-Potosí	May	1	-	67	-
	TOTAL	1	-	67	-
64. Pojo-Cochabamba	January	3	3	18	-
"	February	3	2	13	-
"	March	2	3	10	-
"	April	3	3	16	-
"	May	3	3	12	-
"	June	3	3	21	13.200
	TOTAL	13	5	107	-
65. Poopó-Oruro	January	1	-	3	-
	TOTAL	1	-	3	-
66. Poroma-Chuquisaca	April	1	-	5	-
"	May	1	-	5	-
	TOTAL	1	-	10	-
67. Portachuelo-Sta. Cruz	February	-	1	10	-
"	April	-	1	10	-
"	May	-	1	20	-
	TOTAL	-	1	40	-
68. Potosí City	January	13	4	751	-
"	February	-	1	64	-
"	March	18	6	1.049	-
"	April	17	9	1.165	-
"	May	26	7	1.335	-
"	June	12	8	800	407.950
	TOTAL	68	11	5.164	-
69. Pto. Fernández-Sta.Cruz	January	6	1	65	-
"	February	4	1	54	-
"	March	5	1	70	-
"	April	2	4	58	-
"	May	2	6	129	-
"	June	6	2	108	50.000
	TOTAL	20	6	484	-
70. Punata-Cochabamba	January	6	9	154	-
"	February	3	8	60	-
"	March	3	4	68	-
"	April	12	11	313	-
"	May	11	14	402	-
"	June	12	13	445	206.750
	TOTAL	36	16	1.442	-
71. Quillacollo-Cochabamba	January	2	3	20	-
"	February	-	2	4	-
"	March	-	2	14	-
"	April	2	1	10	-
"	May	1	4	39	-
"	June	3	2	36	18.000
	TOTAL	7	4	123	-
72. Mina Quioma-Oruro	January	-	1	12	-
"	February	-	1	6	-
"	March	1	-	12	-
"	April	-	1	12	-
"	May	1	1	24	-
"	June	1	1	26	15.300
	TOTAL	2	1	92	-

DESTINATION	MONTH	SPORADIC MERCHANTS	PERMANENT MERCHANTS	No DRUMS	VALUE $b.
73. Ravelo-Chuquisaca	January	2	1	21	-
"	February	2	1	24	-
"	March	4	-	49	-
"	April	1	6	181	-
"	May	3	1	68	-
"	June	3	-	26	13.250
	TOTAL	10	7	367	-
74. Saavedra-Sta. Cruz	May	1	-	10	-
	TOTAL	1	-	10	-
75. Sacaca-Potosí	January	11	1	257	-
"	March	1	1	25	-
"	April	2	-	21	-
"	May	1	-	3	-
	TOTAL	15	1	306	-
76. Saipina-Sta. Cruz	June	1	-	2	1.500
	TOTAL	1	-	2	1.500
77. Salinas G.M.-Oruro	June	1	-	1	500
	TOTAL	1	-	1	500
78. San Lucas- Chuquisaca	June	1	-	18	7.800
	TOTAL	1	-	18	7.800
79. San Pedro-Potosi	January	2	2	25	-
"	February	2	-	18	-
"	March	7	3	80	-
"	April	2	2	14	-
"	May	7	3	179	-
"	June	4	3	30	15.750
	TOTAL	21	4	419	-
80. Santa Cruz City	January	15	6	217	-
"	February	6	4	78	-
"	March	7	11	185	-
"	April	4	9	146	-
"	May	11	15	467	-
"	June	25	11	562	317.110
	TOTAL	63	16	1.645	-
81. Santa Fé-Oruro	January	1	-	1	-
"	April	1	-	2	-
	TOTAL	2	-	3	-
82. Sayayi-Cochabamba	January	1	-	1	-
	TOTAL	1	-	1	-
83. (Villa)Serrano-Chuquisaca	January	1	-	1	-
"	March	-	1	20	-
"	April	-	1	108	-
"	May	1	1	36	-
	TOTAL	2	1	165	-
84. Sucre City	January	6	10	453	-
"	February	2	6	118	-
"	March	6	10	387	-
"	April	7	14	700	-
"	May	11	14	800	-
"	June	9	12	490	244.825
	TOTAL	38	16	2.990	-

DESTINATION	MONTH	SPORADIC MERCHANTS	PERMANENT MERCHANTS	No DRUMS	VALUE $b.
85. Zudañez-Chuquisaca	January	-	1	14	-
	TOTAL	-	1	14	-
86. Tacopaya-Cochabamba	February	1	-	5	-
	TOTAL	1	-	5	-
87. Sopachuyo-Chuquisaca	May	1	-	48	-
"	June	1	-	4	2,000
	TOTAL	2	1	52	-
88. Puerto Suarez- Sta. Cruz	May	1	-	10	-
	TOTAL	1	-	10	-
89. Tarabuco-Chuquisaca	January	-	4	145	-
"	February	-	1	27	-
"	March	-	3	51	-
"	April	1	3	87	-
"	May	1	4	126	-
"	June	-	2	66	26,900
	TOTAL	2	8	502	-
90. Tin Tin-Cochabamba	January	-	3	36	-
"	February	-	1	13	-
"	March	-	1	6	-
"	April	-	2	18	-
"	May	1	2	26	-
"	June	1	2	10	6,800
	TOTAL	1	3	36	-
91. Tiraque-Cochabamba	May	1	-	10	-
	TOTAL	1	-	10	-
92. Tolapalca-Oruro	January	1	-	2	-
"	March	1	-	1	-
"	May	1	-	1	-
	TOTAL	1	-	4	-
93. Torrecillas-Sta. Cruz	January	-	1	9	-
"	February	-	1	4	-
"	March	-	1	3	-
"	April	-	1	8	-
"	May	-	1	14	-
"	June	-	1	5	2,500
	TOTAL	-	1	43	-
94. Totora-Cochabamba	January	11	8	99	-
"	February	4	1	14	-
"	March	4	5	36	-
"	April	9	7	127	-
"	May	8	7	95	-
"	June	6	8	72	47,925
	TOTAL	32	9	443	-
95. Tujal-Sta. Cruz	April	1	-	2	-
	TOTAL	1	-	2	-
96. Tupiza-Potosí	January	1	-	1	-
"	February	1	-	1	-
"	March	2	-	37	-
"	April	2	1	37	-
"	May	9	1	341	-
"	June	7	2	398	201,800
	TOTAL	18	2	815	-

D E S T I N A T I O N	MONTH	SPORADIC MERCHANTS	PERMANENT MERCHANTS	No DRUMS	VALUE $b.
97. Ucuni-Potosí	January	1	-	1	-
"	March	1	-	25	-
"	April	1	1	59	-
	TOTAL	3	1	85	-
98. Umala-La Paz	June	2	-	16	8.200
	TOTAL	2	-	16	8.200
99. Uncía-Potosí	March	2	-	26	-
"	April	1	-	10	-
"	May	5	-	126	-
"	June	1	-	20	12.500
	TOTAL	7	-	182	-
100. Uyuni-Potosí	January	1	-	11	-
"	February	1	-	16	-
"	May	5	-	122	-
"	June	4	-	107	50.000
	TOTAL	8	-	256	-
101. Vallegrande-Sta. Cruz	January	1	1	66	-
"	February	3	2	67	-
"	March	1	-	23	-
"	April	2	2	60	-
"	May	5	2	165	-
"	June	4	2	97	52.450
	TOTAL	14	2	498	-
102. Veintilla-Potosí	February	1	-	2	-
"	March	1	-	7	-
	TOTAL	2	-	9	-
103. Vila Vila-Potosí	January	1	-	2	-
"	April	1	-	6	-
"	May	1	-	6	-
	TOTAL	2	1	14	-
104. Villazón-Potosí	January	1	-	1	-
"	April	1	-	14	-
	TOTAL	2	-	15	-
105. Vinto-Cochabamba	January	1	-	2	-
"	March	1	-	1	-
"	April	1	-	1	-
	TOTAL	2	-	4	-
106. Vitichi-Potosí	May	10	1	383	-
	TOTAL	10	1	383	-
107. Walomisa-Potosí	June	1	-	3	1.600
	TOTAL	1	-	3	1.600
108. Warnes-Sta. Cruz	January	2	1	19	-
"	February	-	2	2	-
"	March	2	1	22	-
"	April	1	3	47	-
"	May	2	4	61	-
"	June	1	4	91	49.400
	TOTAL	8	7	242	-
109. Yacuiba-Tarija	June	1	-	25	12.500
	TOTAL	1	-	25	12.500

DESTINATION	MONTH	SPORADIC MERCHANTS	PERMANENT MERCHANTS	No DRUMS	VALUE $b.
110. Yamparaez-Chuquisaca	May	1	-	1	-
	TOTAL	1	-	1	-
111. Yapacaní-Santa Cruz	January	13	3	143	-
"	February	5	2	72	-
"	March	5	3	97	-
"	April	3	1	23	-
"	May	9	1	109	-
"	June	14	2	176	90,650
	TOTAL	34	5	620	-
112. Yura-Potosí	May	1	-	1	-
	TOTAL	1	-	1	-

Total of merchants: SPORADIC (Less than four months) : 989
PERMANENT (Four months or more) : 119
TOTAL :1,208

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ALCALDIA MUNICIPAL DE COCHABAMBA

1977 Departamento de Ingresos, septiembre, Cochabamba

ADUANA AGROPECUARIA DE COCHABAMBA

1977 Recaudación por impuestos a la coca, gestiones 1966-76, octubre, Cochabamba.

ADUANA AGROPECUARIA DE LA PAZ.

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