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A. PROFILE OF THE NORTH WEST

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PART I

A. PHYSICAL GEOGRAPHY

Structure and Tectonics

Geological Origins

Minerology

Hydrology

Temperature

Soils

# PROFILE OF THE NORTHWEST

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## PHYSICAL GEOGRAPHY

### Structure and Tectonics

The Northwest peninsula of Haiti is a broad anticlinal arch whose crest tends East-West and is slightly concave Southward. Cutting diagonally across the arch are smaller anticlinal and synclinal structures that trend North-Northwest. There is extensive faulting associated with both the arch and the smaller structures.

There is evidence for extensive folding in this area during both late eocene and late miocene time. The early eocene was a period of limestone deposition in a shallow sea that covered the present area of the Northwest peninsula. Uplifts, folding and erosion followed during the late eocene. In the early miocene the sea again covered the peninsula. A sequence consisting primarily of marl with some limestone and siltstone was deposited. In the late miocene, extensive folding and uplift occurred throughout Haiti giving the island its present shape. The anticline arch of the Northwest peninsula was formed at this time. During the Quaternary there was a general uplift of the area with a result that marine terraces are formed at elevations of almost 500 meters.

### GEOLOGICAL ORIGIN

The principal features of the geological formation of the Northwest is an underlying igneous formation on which has been overlaid by cretaceous limestone or eocene limestone followed by upper eocene deposits and finally miocene rocks and detritus. The whole has been unevenly covered by quaternary alluvium and limestone terraces probably pliestocene in origin. Several tectonic actions have produced at least three foldings in the Northwest area and an uplift in recent times has produced very high terraces capped by limestone.

The most important activity with respect to the present morphology and the most important in the tectonic history of the Northwest was the folding and crumbling of rocks during miocene and pliestocene time. The tectonic features of the entire Northwest are the results of this folding.

Along the east side of the Plaine de l'Arbre the strike of the miocene beds parallels the mountains of Terre Neuve. Some of the folding in the mountains of Terre Neuve probably took place in miocene times. In the mountains of Terre Neuve the foldings were accompanied by intrusions of quartz diocite and grandorites.

Emerged coastal terraces are a most striking feature of the South coast of the peninsula. At Petit Paradise and Baie de Henne 5 terraces with an altitude from 5 to 95 meters rise along the sea. Between Bombardopolis and Mole St.Nicolas 8 terraces rise from 200 to 400 meters above sea level. Most impressive is a mesa called La Plateforme, a table land capped by limestone (200 plus meters).

### Minerology

The Northwest contains one of the most interesting mineral histories in Haiti. In the area of Terre Neuve at the end of the century, a consider-

able body of copper ore was found in association with soils containing 1 to 2% of copper per ton. Unfortunately, the total estimated reserves have been below the requirements of large scale exploitation. Over the years a considerable quantity of malachite is thought to have been removed and exported from nearby deposits along faults.

There is a quality of clay in the Northwest near Jean Rabel which could be used to produce bricks. Whether this clay can be sun baked and used for road surfacing or housing is not known at present. It may well be that it could provide one of the primary materials for compressed brick.

#### Hydrology

The hydrology of Northwest Haiti is part of a general scheme of climate of the North coast of all the Greater Antilles. Rainfall and winds are governed by the movements of Atlantic pressure areas which determine the onset of the counter-trades (alizees) or North-East-South West winds maxima in April or May. Fronts developing during the winter over Florida and the Atlantic coast of the U.S, bring cold winds out of the North and the winds and rains of the "Norde" which usually begin in December. The third and most random element to play a role is the occasional hurricanes which developing in the Southern seas will sometimes, after passing by or over Puerto Rico, turn to the East and ravage the North coast of Hispaniola. The most violent of these were in 1900, 1909 and 1955.

The patterns of the Alizees have been charted since the early turn of the century and there is a definite cyclical repetition of 25-30 years<sup>1</sup>

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<sup>1</sup>This has produced low rainfall at the bottom of the cycle (1910, 1940, 1970) and high rainfall at apex years 1925 and 1955. The cycle is now in the rising phase with the next apex estimated for 1985.

If the evidence of Puerto Rico, where readings have been perhaps better recorded than elsewhere, we are in a secular movement as well. Since 1940 Puerto Rico records a not random downward trend in rainfall.

Northern front patterns are random but as is well known to Florida orange farmers about one year in five is a intensely cold one. In fact, in the last five years, two have been very severe. These cold front reduce temperature and bring storms and rains along the North coast. Their direction permits a rainfall activity in almost a counter sense to the alizees which because of the lie of the Northwest coast move almost parallel to the coast.

The only local weather phenomena are convectional summer storms of short duration but which generate violent winds.

The two massives of the Northwest, one bisecting the peninsula from North of Gonaives in the Northwesterly direction to Mole St. Nicolas, and the second, an extension of the Massive du Nord whose mountains lie East of Anse a Foleur and Port de Paix and provides a shield of some 1000 meters which collects rainfall to the East and North from the alizees. The total effect is to leave the Southwest area almost a true desert.

The rain water collected in the two massives flows through a series of valleys and ultimately onto the alluvial plains of the North coast. Most of it is lost into the oceans. There is some lateral and vertical drainage below miocene marl, and the sandstone/<sup>or</sup> shale above the limestone formations of the upper eocene. To the South, upward movement through miocene formations topping (up to 600 meters) of hardpan gave birth to numerous springs. A drilling program in the Plaine de l'Arbre has produced some favorable indications at depths of 500 feet or less. The results, although preliminary, estimate dynamic reserves at 29 million M3

Unfortunately, the capacity of the drills available did not produce any exploration below the hardpans. As in the general Northwest lower eocene is underlied by igneous rocks this area could be worthy of some exploration. Much of the water trapped and filtering through the limestone is undoubtedly lost at lower levels to the ocean. From the Plaine de l'Arbre to the Mole there are a number of large springs or oasis. Some of these waters are at a temperature of about 40 degrees C. At the assumed increment of heat over average temperature a source at least 800 meters plus an indicated increment for cooling on its use to the surface. This is about the lower level of the lower eocene limestone above the ironstone bedrock. This oasis is about 8 kilometers from the sea coast and near the western edge of the Plaine de l'Arbre. At one of these springs bubbles rise through the water. Although the gas was not identified, it was not H<sub>2</sub>S. All but one of the springs lie along a break in the surface features and a geological contact (aluvium/miocene) suggest strongly that they issue from a fault zone.

There are some indications that at the sea line on the Southwest coast that a reserve of ground water exists at no great depth. This can be witnessed at Petit Paradise where a large number of coconut trees thrive at the sea coast line area.

The "Trois Rivieres" <sup>is</sup> basis/of particular interest. Water flowing from the mountain catch basins of the alizees provides a considerable run off from this area which on the average exceeds 1800mm of rain per annum. There are already 8 irrigation projects along this valley, the largest 87 hectares and the smallest 10 hectares for a total of 675 hectares.

Jean Rabel has had irrigation systems of one sort or another since



colonial times. One <sup>is</sup> presently being rehabilitated under the USAID/  
DARDNR PDAI program.

The coast from Port de Paix with its well system to Anse a Foleur benefits from the flow of numerous small rivers with very likely some potential for hydro-electric power development. It has a situation to benefit it from the alizees and rainfall is very rarely below 1,200 mm in drier years and more often 1500-1800mm . Since the basic run off is supplemented from the mountains its underground potentialities could well warrant research. It has been since colonial times a prime cacao area but according to reports is severely rat infested. The longtime presence of this crop indicates a confirmation for at least 1,500mm of rainfall.

The Baie des Moustiques appears to be something of a lost cause. The Riviere des Moustiques which is the principal source of free flowing water yields only about 10-50l/s. The water table, however, is not deep but is something of an unknown quantity for it becomes very salty as it approaches the ocean.

During the rainy season the plain is subject to sudden runoffs from its water shed. If trenches were built by a bulldozer at 180 degrees to the slope and proceeded by trenches to catch and divert initial floods to lower levels, enough water might be saved to permit a single crop on these lands. However, these crops would have to be limited to salt tolerant or resistant crops. Red beets, carrots and cabbage could <sup>be</sup> possibilities for research as there is a large market demand for these crops and they transplant rather well and could make the trip by water to Port au Prince. Salt resistant forage crops could be another possibility. For example, the "mutton pré salé" of Brittany raised on similar lands are famous.

It is as indicated above a marginal plain but research by a multidisciplinary team might find a farm management system and crops which would make it economically productive. Its main asset is that it gives on a bay with an anchorage and transport costs would be minimum.

Mole St. Nicholas which was referred to earlier has a very considerable potential if the present use of the river of the same name were a bit more organized. With only 362 families and 950 inhabitants the flow of water is estimated at 300/400 l/s and it is not all used at present: only about 125 hectares are irrigated.

As a footnote to hydrology the author will add some brief remarks. Water not only enters the soil from rainfall, sub-soil infiltration, runoff and irrigation. Infiltration is a two way street except that the character of the soil in the particular case will naturally retain a certain percentage called AWC or available water capacity. In almost all studies of the Northwest the question of evaporation is raised and it gives generally a false impression of the effect of this phenomena on the vegetation and the crops of the area.

In general what is presented are average estimated ETO figures compared with rainfall and the deficit is taken as the difference. In the first place ETO is not the evaporation which takes place over bare ground or in the case of the Plaine de l'Arbre about 10-20 percent ground cover. It is what would be extracted if 12 to 15 inches of grass full ground cover were present. When trees have a water source in roots at or within the capillary shield of the water table under dry weather conditions the ETO will come from depth and not from the surface, in fact dry upper layers of the soil will protect the water soil content only a few inches below the surface and if it is bare ground ETO will be near to ETO multiplied by 0.3. Hence, the importance of

clean weeding among citrus or other tree crops under minimum rainfall conditions. Young citrus clean cropped in the Plaine de l'Arbre would normally require only 50 percent of ETO, five year trees 60 percent and fully mature trees 70 percent.

Along a sea coast (Port de Paix) where winds are off the ocean a correction of ETO diminishing as distance from the ocean increases is very relevant. For example, off the Pacific ocean, California at 5 kms from the sea an annual ETO of 1030 mm was registered; at 40 km, 1150mm; and a coastal valley at 120 km was 1330mm. Again total figures with regard to their relevancy for agriculture are deceptive because during the critical "hot" period, i.e. high insolation of July/August/September, ETO difference between the coast and the coastal valley was 30-40mm each month hence almost the entire 120mm(plus) difference was concentrated in the critical crop months. Also the difference between the 5 km observation station and the sea would have been greater. Fundamentally this is because ETO water is 15 percent over ETO land 100 and as the winds pass over water they collect moisture content.

Shade and windbreaks also have a diminishing effect on ETO as does, of course, large irrigated areas. Where deficits (apparent) are small in monthly terms these corrections suggested can be very relevant in computerizing irrigation requirements.

Also in many studies the typical shallow soils of the Northwest are noted as poor reservoirs after the rainy season. This is correct but underlying hardpans tend to form upper sub-soil passages for horizontal drainage in which from say 800 meters to 150 meters may transit with a considerable time lag from the last rains. This has been particularly noted in the Sahel where mango trees in favored position with regard to this vertical underground flow will be growing in areas where the ETO rainfall calculation

indicate that it is impossible to do so. In Upper Volta 13.0-13.5 N. Lat, with a rainfall of 800mm or less a single heavy rainfall in March called La Pluie des Mangues is sufficient to guarantee a plentiful crop. This is because the rains from a wide collection area pass along an underground ironstone foundation covered by a relatively shallow soil and underground water irrigates the roots of the mango trees planted along its slope.

This phenomena can produce some astonishing results. At Daborra, Upper Volta, a small dam intended to irrigate 100 hectares in a 600-800mm rainfall (80 percent effective) area in a year which yielded only slightly more than 700mm rainfall had fallen below the intake line as expected. What was not expected was that the lake behind the dam diminished hardly at all stabilizing only two-three meters below the intake valve. This was observed from aerial photos. On inspection the author discovered that the dam had provided a seal along the ironstone and a vast underground lake not subject to evaporation had been created. The local village people had wells as far as 100 meters back from the lake surface and were hand irrigating tobacco and vegetables. Water level in the wells corresponded to the lake exposed water.

The agricultural economist who has the responsibility of translating data from hydrologists, agronomists and other technicians would do well to observe the ecology and where this does not fit the data, ask why it doesn't. How did 1,300.00 bananas get themselves produced in 1945/46 in an area with only 1000mm average rainfall (Port de Paix production)?

The Israeli mission for Jean Rabel 1966/67 states that "le total d'eau apportee droit atteintre 18,000m<sup>3</sup>/ha/an (pluie plus irrigation)". They enjoyed a major success with the banane mosquée (2,200 regimes/ha) using a weekly water input (rain plus irrigation) of 375m<sup>3</sup>, e.g.: 37.5mm),

or 1,960mm annual rate.

The over use of water in irrigation is a great vice because its cost is the opportunity cost of its alternate use.

Not much is said of alternate water use methods which should be researched for areas like the Plaine de l'Arbre. Hot dry areas like this if protected from winds by tree wind breaks can be high economic yield regions even when water is relatively expensive per M3. Drip and trickle or other similar (osmosis method) can reduce ETK irrigation requirements for young orchards and can reduce ETK requirements by as much as 60 percent in sandy soils on clay soils it be less, e.g.: from ETK to equals 30pc ETO.

The author would like to make the point that results of studies to date in terms of potential water reserves and their location and the possible economic impact implied warrant more precise estimates in specific micro-climates context and further selective drilling experience to confirm under ground structure. Environmental variables indicate a potential for extensive fruit production and for seasonal market vegetable production for other islands. The region's relative immunity from freezes (one in five years for Florida) and from hurricanes, (one in five years for Puerto Rico, Dominican Republic and outer islands), make it an important reserve area in disaster years in the Caribbean



## Temperature

The temperature patterns vary widely from sub-region to sub-region. In general they fall into three categories: North Coast, Inland Valley, and South Coast patterns.

### North Coast and Inland Valley

Insolation plays the major role as an independent variable but for the North Coast and Inland Valley the major modifier of temperature is the wind vector whose direction is constant but as discussed above its weight is random.

Nevertheless on average the average minimum and average maximum are only different by about 10 degree C for the North Coast and Inland Valley with average max. at or about 31 degree C and min. at or about 20 degree C. However, extremes occur and temperatures at Aubert a few kilometers inland from Port de Paix have been recorded at 10 degree C. This condition is brought about by the "Norde" which blowing between November and March capture the cold front temperature from Florida and reach velocities of 21.6 km/h ur.

The Inland Valley variation is largely governed by the effect of altitude and winds passing downward off mountains of 1000 meters. This is illustrated by the difference between average minimum and maximum at Port de Paix and Basin Bleu which are less than 2.4 degrees C at the minima and 3.4 degrees C at the maxima.

This latter condition is of considerable interest because of the effort in Haiti to produce tomatoes for the table for export and locally for paste. This is because 75 degrees F (23.8 degrees C) is maximum night temperature for fruit formation and Bassin Bleu average minimum (night/September) is 20.3 C or 68.5 F which is about mid-range between 60 degrees F and 75 degrees F and close to the optimum of 65 degrees F. This is also

a period when ETO, ETK for tomatoes and average monthly rainfall are more or less in equilibrium. In the Jacmel "Island area" under peasant cultivation and Israeli agronomist technical supervision using NVF tomato varieties very satisfactory outputs (15 tons/ha) have been achieved at less favorable temperature range.

This is interesting because it is a private enterprise operation. The buyers provide seeds and fertilizers and pick up of entire crop at the field for gourdes 300/ton. This enterprise is producing tomato paste. It is also labor intensive and only ties up the field for 80 days because of use of 4-6 weeks pre-transplant from irrigated nursery. It is reasonable to predict 15 tons/hectare for this time and region and this could increase to 25 tons with proper fertilizer, compost and eel worm (neomtodes) control and another 30 days picking in field, because of favorable temperature conditions.

#### South Coast

The pattern of the South Coast sub-region is an average between Mole St.Nicolas (23.7 degree C min. average and 28.2 degrees C max average) and Gonaives (26.7 degrees C min. average and 28.5 degrees C max. average monthly temperature) diurnal variance min-max is 10 degrees C to 12 degrees C. The major independent variables are easterly winds off the Gulf of Gonaives and insolation (3000 plus hours annually). The vegetation is perhaps the best guide to the physical geography of the area including temperature given the lack of long term local climatic observation. The vegetation is similar to southern Arizona with a predominance of Palo Verde, Mesquite and cacti including opuntia. Since the opuntia (opunta ficus-indicia var inermis) cacti rarely does well above 500mm of rain a year its widespread presence, but failure to develop intensive cultures, probably means that the region's rainfall is close to 500mm-600mm. It is also sensitive to salts, hence its



local presence or absence is also a guide for salinity. It has a not unconsiderable forage value in Mexico (Sonora) and border states when planted 2m x 2m its eatable palms contain 90-93 percent water, 1.4 to 2.5 nitrogenous matter, 0.17 to 0.20 percent of fat, and 5.6 to 11 percent of fiber. It yields 100-150 tons a hectare of wet forage weight. It contributed to no small degree to the survival of bush cattle in the old days of the West.

It might be interesting to do a research project on aloes (aloe-vera). This heavy waxy leaf is very much in demand today for sun and skin creams. It grows wild on Aruba. The indicated 500mm to 600mm rainfall with probably some additional runoff is almost right for this valuable desert plant. The plant's root system effectively traps every drop of water and its leaves restrict loss from evapotranspiration.

### Soils

In a report of this in size it is futile to attempt more than a general reference to soils. Since soils are formed as a result of the evolution of their source materials under different climatological conditions (Mohr and Van Baren).

As indicated in the geology section the soils of the Northwest are recent and even in the plains the alluvium does not extend to any great depth. Only along the bottom of valleys and in natural depressions do soils go below a meter in depth with the exception of the coastal shelf where soils of two and three meters were noted.

Most soils are a mixture of evolved limestone and marly clays underlay by relatively impermeable miocene marls. While finer particles are formed on interface lines closer to the mountains particularly on the South coast there are also heavy marland limestone blocks and large gravel channels. PH measurements are relatively high.

On the inland Valley and Northern coast there is an encouragingly high level of organic matter which is missing on the South coast. This plus a high level of clays indicate a farmable AWC but also a high level of rain runoff when slopes are over 5 percent.

Very few regions present a salt problem except for limited areas, an exception to this is the Plaine des Moustiques where it is a major constraint to development.

The fact that soils are shallow is modified by a high clay content and hence a high water retention. Also trees and other plants of the crop mix are naturally shallow rooted. As an aside, Queen Isabella of Spain on inspecting a shipment of plants brought to Spain by Columbus is said to have remarked to him that his plants were like his colonists, they had all shallow roots.

Obviously as a practical matter there will be a considerable variation between areas and even from plot to plot. However, as a practical matter the soils of the Northwest can be said to present no obstacle to reasonable levels of output when sufficient water is present. The only general soils deficiency remarked was a generally low level of potassium (K<sub>2</sub>O) which can be easily compensated by muriate or sulphate of potassium.

When and if a more satisfactory level of composting practice is present this can also be a source of additional K<sub>2</sub>O. It is, however, a must for high levels of output of bananas and coffee and a caveat to planner with regard to these crops. In the event that a mixed coffee-plantain solution would be attempted an initial treatment of one ton of sulphate of potassium per hectare would be a minimum for satisfactory outputs to be achieved.

#### General

The other variable of temperature is world temperature cycles which are thought to be random with relation to time but having a close correlation of the acceleration or deceleration of the earth. For example, after

the "little ice age" of 1550 to 1850 with a drop of 1.5 degrees C in world temperature there was a declination until 1900 with a world temperature increase of 0.6 degrees C from 1880. As of 1900 an acceleration pattern began and by 1965 relative to 1880 an average temperature decrease of 0.4 degrees C was registered.

Such very short cycles are thought by some scientists to be indicative of a changing point from inter-pluvial to a pluvial swing. However, this is not indicated by the present evidence of a longterm trend ( secular) of non random drier weather in Puerto Rico or for that matter in the Sahel. Nevertheless, the most relevant point for effects of temperature are short run cycles. Colder water temperatures are one of the variables associated with dry years. Below normal sea surface temperatures in the Atlantic region are not , of course the only variable but Hastenrath observed a highly significant Lag-relationship between low-level radisone temperatures in the winter and subsequent rainfall during april-July a major crop growing season in Haiti.

If acceleration continues it may be a negative influence on Caribbean rainfall expectations. This is an area which requires further research. As it has not been explored in the Litterature with regard to influence on tropical rain fall patterns.

**B. SETTLEMENT**

**1. Origins**

**2. Settlement Patterns**

Settlement Origins

Colonial Period

The period of Spain's domination of the Northwest came to an end in the early 1600s. This was a deliberate act to prevent the "high trade"<sup>1</sup> which was providing an increasing commercial importance to the Western Hispaniola in violation of Spain's legal monopoly of trade. As early as Columbus' second voyage in 1493 he brought in cattle, pigs and horses along with smaller courtyard birds and animals. At the time vast areas of the country which had been under cultivation for the estimated 600,000 indian population was going back to grass and bush. Settlers followed the policy of the Ohio River valley. They left animals free to graze and grow on their own and harvested them periodically for smoked meat and hides demanded by the "high trade" from England, France and Holland. On their small farms they cultivated tobacco and collected ginger, roucou and cacao which were also in demand by this commerce. The rich land of the valleys also provided cassava for bread and vegetables for a pot luck subsistence economy. The extent of this trade was far from negligible. Sixteenth century trade figures from Amsterdam show that trade from the coastal cities of Hispaniola were valued at 800,000 florin per annum.

After destruction by Governor Ovando of all of Spain's cities in what is Haiti today the area was left open to all comers and soon contained an important number of English and French hunters who continued to supply the "high trade". All attempts by the Spanish to suppress them

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1. The "high trade" refers to vessels whose expeditions were given for the high seas only. The Bahamas permits this type of expedition of a ship today.

were unsuccessful,

Official French possession of "La partie française de St. Domingue" did not occur until 1697 with the Peace of Ryswick which gave them permanent possession. In fact, however, this part of the island already had over 7,000 European colonists and a very large floating population of sailors/bucaneers.

As the great drive of the early French colony was for sugar, only a small coastal area of the Northwest participated in this important production. However, with the discovery in 1734 of a means of extracting a good quality indigo from the native "indigo Batard" the land around Port de Paix began to participate in this important production (10 million livres p.a., official figure). However, the "high trade" continues to be present and Bryan Edward's notes that "the greatest part of the indigo leaves the island to Jamaica as contrebanded" and the same was probably true for the cacao which only showed an official export of 120,000 livres.

Except for sugar development the major French immigration to the island does not begin until after the peace of 1763. This is also the greatest period of concentration of black ivory from Africa. Two hundred and seventy four vessels were engaged from the Guinee coast bringing in 79,000 not including those who arrived as contrebanded. This was also the period when the vast expansion in the coffee industry took place. Until that time, as already noted, the Northwest was a relatively quiet area of small planters, many of those with roots into the earliest colonial period. There were around Jean Rabel a few prosperous sugar factories and at St. Louis du Nord a center for cacao production and general farming which includes coffee but it was not in any sense a major crop production area of the colony. Fishing is a major preoccupation with

considerable development off the South coast and the rich banks off Tortuga island. Fishing turtles and shell are an interesting addition to this business. There is also a trade with the Bahamas, particularly the import item of dried conch on strings of 100 which are still an item of trade. The occasional Yankee ship with flour and other items carries off the surplus molasses and purchased ship stores.

It is important to note that the French colonial coffee development was an "open sky" plantation. This required destruction of the forest by many hands and the freshly imported "bossales" were adequate to this purpose. It was an almost entirely masculine activity at least in the early stages of its development resembling more a logging operation than a farm. It can be clearly stated that this is the beginning of the erosion problem on the weather (North) side of the Northwest. It is also a major shift in the nature of the population from a rather stable small planter mixed culture to predominantly African origin population and commercial mono-culture of coffee.

#### National Period

Except for the Jean Rabel area where a well developed sugar cane culture had taken hold the hinterlands were devoid of the large developments common to other areas of Haiti. The mountains which surround the area seriously limited communications and transport by land. The "new free" found themselves in possession of isolated regions far from the control of the "new" ruler who in other areas were attempting to force the "new free" to return to the former French plantations.

If its isolation had not attracted the investment of the Department of the North around Cap Haitian, it had also avoided the tragedy of the general slave uprisings. Indeed as of 1797 even the sugar plantations were untouched and the general friendship between Governor Toussaint L'Ouverture and General Vincent the French military commander of the Northwest continued the peace until 1802, the second year of the LeClerc expeditions. At this time the French occupation was virtually limited to Port de Paix and Tortuga island so only these two were points of major conflict. As the victory of Capois La Mort at Port de Paix and Tortuga was brief and decisive his forces soon joined Dessalines in 1803 and relative quiet returned to the Northwest.

Hence the Northwest was subjected to minimum damage by the revolution. It inherited many small farms along the coast and a quantity of young open sky coffee plantations at medium altitudes. As it was a region of very old development, even before the Spaniards it had naturally evolved a multitude of fruit trees which propagated around older settlement areas and spread through the region. In brief, it was a rich relatively underpopulated region whose surplus male population had left with the revolutionary army. As its battalions were made famous by their courage and sacrifice before the guns of the General Rochambeau before Cap Haitian, it can safely be assumed that many of them did not return after the victory on January 1, 1804.

On the seacoast small fishing communities developed. Of particular interest since the colonial period, an experienced skill in trapping of the two turtle varieties continued. Already of importance during the early colonial period it was still sufficiently active in 1940/41 to provide 30,301 kilograms of turtle shell to the export market. However, inspite of annual migrations of tuna, dorados, mackerel, herring, sardines and other



species, the traditional fishing methods did not evolve into modern systems. Except for salting and drying at a primitive level no industrialization of the industry has taken place.

This does not mean that the Northwest has not produced excellent sailors who ventured with only a compass to trade in the Bahamas and elsewhere.

Settlement patterns were also effected by the state of isolation general within the Northwest. More than any other area the State land ownership is an unknown. While in theory the law of prescription by a 8-20 years continuous occupation would establish most farmers as owners, few of those who might benefit from this law have formalized their possession. In addition, inspite of occupation outside formal legal possession, the colonial principle of equal division of lands among heirs has been generally respected. However, descendents of high political and military authorities acquired prime lands in favored locations such as Jean Rabel where two or three families located in the old French plantations occupying the center of a virtually feudal system of exploitation. Holdings by important families at major centers are common to the area: the Lucas at Jean Rabel, Elysées at Port de Paix, Telson at Gros Morne, Alcindor at St.Louis du Nord are well known family names in the area.

#### Constraints to Settlement

There were three basic constraints facing the emerging settlers of the "new free". The first was water. The problem of providing water necessary for maintaining the household and if possible for a little irrigation in very dry years was the primary constraint to successful settlement in the Northwest. It had, in fact, been determinant in the colonial period so these

areas also offered the possibility of established tree cultures so important in maintaining an equilibrium of the diet in Haiti. The extension of tree culture around these springs and streams were to make the Northwest, at least an oasis, and ultimately a center of important fruit production. Where underground water is present tree culture will survive when cereals and root crops perish. It is also of great interest that the principal fruit trees of the Caribbean basin are shallow or horizontally rooted such that they will grow in mountain areas where soils are shallow and underground drainage permit their survival. Their presence in dense stands is considered by peasants to be an evidence of underground water flow. The parade of harvests is approximated as follows, varying slightly according to environment (see Table I)

Given the fact that water sources and tree crops are complimentary, it is not difficult to appreciate why primary settlement occurred in these areas.

The presence of most of these varieties of trees usually indicated a location of primary settlement dating at least to the first 25 or 50 years of the national period when choice of sites was relatively easy.

The second constraint is transport. The requirement of acquiring some money exchange has always been present and it is agreed by most anthropologists that in any event Haiti is market oriented.

Before the period of the motor car, transport over distance in Haiti was on the back of asses, horses and donkeys. Cash crops moved to ports or intermediate sites related to the ports. The steeper the gradient and the greater the distance from the market, the lower the load that a single

IMPORTANT FRUIT TREES HAITI  
 MONTHLY DISTRIBUTION OF HARVESTS (NORTHWEST)  
 (MIN-minimum period) (MAX maximum period)

FRUIT	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
VERITABLE							MAX	MAX	MAX	MIN	MIN	
ARBRE A PAIN										MIN	MAX	MAX
MANGO	MIN	MAX	MIN		MIN	MAX	MAX	MAX	MIN	MIN		
LIME					MIN	MAX	MAX	MAX	MAX	MIN	MIN	MIN
CHADEQUE	MIN								MIN	MAX	MAX	MAX
ORANGE						MIN	MAX	MAX	MAX	MAX	MIN	MIN
AVOCATOE		MIN	MIN			MAX	MAX	MAX	MAX	MAX	MAX	MIN
PLANTAIN	MIN	MIN				MIN	MAX	MAX	MAX	MIN	MIN	MIN
CORROSOL	MIN	MIN	MIN	RARE	MIN	MIN	MAX	MAX	MIN			MIN
ABRICOT	MIN						MAX	MAX	MIN			MIN
GUAVA	MIN						MAX	MAX	MIN			MIN
GRENADINE	MIN						MAX	MAX	MIN			MIN

22a

-22a-

22a

animal could carry. The economic consequences of this transport system is dramatic. The author does not have any sample run statistics for the Northwest area.

However, he owned and operated a 1000 acre habitation at 3000 feet altitude in the rural district of the 1st sector St. Louis du Sud. This region is similar to the chain of northern mountains of the Northwest with heights to 1018 meters. At 3 km as the crow flies and from an altitude to 3000 feet only coffee in decorticated form could be transplanted among crops. Among animals only chickens and turkeys were transported and fattened hogs were lead down the mountain in easy stages. Avocados, bananas and other crops were fed to chickens and hogs. The time spent for a fully loaded (60 lbs) donkey was 10 hours from the habitation to Vieux Bourg d'Aquin about 8 kms. This included resting time, readjusting load after steep descents and watering several times on the trip. Overloading could result in exhaustion or even broken legs on bad sections of the trail. The situation cited is extreme but illustrates the principle. The reason the habitation was so valuable was it encompassed a large free flowing spring in the center of the property. It also had considerable prairie area for grazing animals the year around.

The play off between constraints one and two explains the occasional development of farms very distant from market centers.

The third constraint was the "establishment". This term includes administrators, soldiers, land owners of large areas granted by the government on which the farmers had "squatted", and a multitude of parasite lawyers, surveyors, notaries, etc. The custom of conscription for military service was present even during the revolution and never ceased. The division of land, funerals, baptisms, marriages all were expensive establish-

ment interventions. The Haitian peasant found ways to deal with these constraints as Murray and other students of the Haitian peasant have detailed. However, the mere physical distance between them and the establishment and the less accessible the region had an importance which countered the advantages of other site locations. It is not unusual to find little communities on high plateaux living unsuspected by any administrative service except the Chef Section who will visit it rarely (and never eat there). There is something of the tradition of the "marron" in this type of isolated settlement.

These then were the three governing elements in early settlement patterns. Population in the Northwest was scarce and it was the area most isolated in the National period.

New elements since the occupation and the use of motor transport are the ones associated with marketing, transport and amenities.

These elements have encouraged the development of small agglomerates around the "Chef Lieux" which have been detailed in the demography section. They have also been of importance in encouraging a pattern of varying density along the single all year road penetrating the area creating a beginning of the line village formation.

The development of irrigation is also acting on settlement patterns.

A good deal had been written about La Cour or "Lakou". This settlement pattern which consists of a series of family and even extended family dwellings around a central compound. This formation is familiar to anyone who has been to West Africa. It is also common in the Northwest.

However, population pressures are being asserted here and several studies show that even while still extant that the major pattern now tends to be the grouping of daughters and their husbands around the "chief" house. Sons have

departed to other areas either to join other men's daughters or to the Artibonite, Bahamas or even Miami. This is a major change since the 1930s when Herscovitz noted that son did not like to live in the "lakou" of their wives' family. It was considered a lowering of prestige to accept this condition of working with the wife's family even if he returned to cultivate other farm parcels near his father's house. In the author's opinion this is a sign of both population pressures and the fear of migration of their sons so that they may find themselves abandoned in their old age. Murray makes the point that fathers preferred to have their daughters living in their compound as they took better care of their parents in their old age. It takes major pressure in a traditional society to effect a change like this in family settlement patterns.

There is also a big red flag here because the desire to remain around the father's "lakou" is being frustrated. The son will no longer have this impediment to emigration which may be preferable in the new context to a lower prestige situation of being attached to his wife's family.

Also since the demographic statistics clearly demonstrate a less favorable man/land ratio, the economic validity of the "Lakou" itself may be diminishing. New farming parcels will inevitably be at a greater distance, more difficult to protect, time consuming in travel and very likely marginally productive. Nevertheless, price increases, the presence of mature fruit trees, water and the pooling of resources are not negligible trump cards.

If Zimmerman's (University of Texas - Economic geography) theory of man's reaction to pressure against apparently contracting resource base

is valid then the present situation is nearly ideal for the introduction of new techniques which can prove themselves as more productive within a mixed cropping pattern. High man/land ratios have not reduced Dutch farmers to poverty.

The settlement of small fishing villages and ports is not well known. The author visited all the port cities from Anse Rouge to Anse a Foleur during the period 1941-44. At that time except for Mole St.Nicolas and Port de Paix none of these locations showed any signs of being ports. They were mere anchorages and even the port for Jean Rabel had only a few long boats to serve as lighters. Anse Rouge and Baie de Henne with small open fishing boats were much engaged in salting and drying of fish and some transport of charcoal. Often peasants would come to the shore line with sacks of sweet potatoes, eggplant or other vegetables and along the North coast it was usually possible to buy a green turtle. It may be possible, that given the fact that the Northwest received so many "Africans" during the latter years before the revolution, that among these were slaves collected from the Ewe (Minas) fishing villages which are spread all down the coast from Accra to Lagos. These men are great sailors and fish the deep far off the African coastal shelf. This would explain their preference to this type of fishing settlement and also their having the skills needed to exploit it.

#### Settlement Patterns - Urban

As best as can be seen there is very little originality introduced into urban settlement patterns since the colonial period. The only major new institution is the school which as yet touches only a minor share of the new population. It is also very likely that the school did not create the settlement pattern, it just grew up like topsie and to

date not very far at that as was discussed elsewhere.

Development of townships has been slow and this is evident in the ratio of urban to rural population (8-92) and only one township for every 405 square miles. As virtually no access roads are open to public transportation the degree of isolation of the rural producer is a major one.

These towns are hardly urban except in relationship to the primitive state of community services to the purely rural community. Bassin Bleu is fairly typical and contained less than 100 dwellings (1961). It did, however, offer as amenities two churches, corn mills, police and municipal services, a gambling house and a cock fighting pit. A large market with 41 selling units occupies a principal square and constitutes the economic focal point.

With the exception of several large landholdings around major centers the presence of minifundia has been dictated by population increase and the principle of dividing land equally among all heirs. It can truly be said to have become institutionalized even though possession is de facto and not de jure.



**C. INFRASTRUCTURE**

**1. Ports**

**2. Road Systems**

**3. Transport Orientation**

## Ports

The principal ports of the Northwest region are Anse Rouge, Mole St. Nicolas, Port de Jean Rabel and Port de Paix.

Only in Port de Paix can it be said that some port infrastructure exists. At present a small wharf is being build near the customs house which will provide at least a dock for lighters which can then reload onto ships at anchor in the harbor.

Access to this port is very poor through a narrow channel which admit only one way traffic. There is a well built customs house which could be remodeled and equipped for handling fruit and produce in transit or awaiting vessell.

When it is considered that these ports in good years are handing upwards of 70,000 tons their condition presents a regretable exhibition of economic waste. The time which is lost to ships and crews is enormous. In the Louis Berger report it was estimated that ships would lose two days in loading for every day enroute and that assumed a minimum docking facility at Port de Paix.

Because it is has no facilities for handling fruit and produce a very considerable revenue is lost to the region during its peak harvest period when for almost three months production exceeds demand for perishables. Because there are local differences in seasons between Port au Prince and the North, movement of this fruit would tend to lower prices in Port au Prince and at the same time provide a good market to Northwest region farmers. For example during this field work it was found that avocados would sell for gourdes 4.00 (US\$0.80) a sugar sack full, or about US\$0.01 a medium avocado. In Port au Prince at this time a similar fruit was selling US\$0.08. Avocados when picked green could easily make the run of two

days by motor ship to Port au Prince from Anse a Foleur which was a major surplus area. The general freight rate for non-perishables is \$0.25 sack and the price difference could permit special handling charges above this rate. The same picture exists for other foods such as breadfruit which since August have been selling at US\$0.04 for a dozen unit or about 12-15 lbs. Foods at these prices would be specially welcome on the dry coast from Mole St. Nicolas to Anse Rouge and could be unloaded for sale to charcoal and other workers. Eight hand stems of plantains were bringing a maximum of \$3.00. The whole sale price at Port au Prince for a similar stem is \$5.00 and at retail \$7.20. Planters all say they would be happy if they could get the \$3.00 maximum as under the traditional planting system they get 900-1000 stems per hectare.

The first step in permitting this important traffic is the port infrastructure and, of course, its absence is adding to the cost of the present 70,000 tons of freight now being moved.

#### Road Systems

The transportation system of the Northwest was exhaustively exposed by an IBRD study made in 1977 by Louis Berger. Hence these remarks are based on this study, plus present field work which reports some subsequent changes.

The road system can by economic cost transportation standards be classified as bad. There are only 268kms of roads in the Northwest and the interior regional communications network Mole-Port de Paix-Anse a Foleur is not passable in the rainy season. The economic cost indication for the Port de Paix-Gonaives road in 1975 was 32 and Mole-Gonaives was 40. This would compare with less than one third the economic cost on the

Gonaives-St.Marc-Port au Prince or Port au Prince-Miragoane for a similar distance. On a ton/km basis for 5-7 ton trucks the comparative user cost was estimated at an index of 2.77 over 1.00. Given the criteria shown this is probably an understatement except on the downhill side from Gros Morne to Gonaives which is not in the Northwest region.

Accessibility for Port de Paix and Mole St.Nicolas was rated as low with a medium density of trucks available (13) for the routing out of Port de Paix and for the Mole only three trucks.

Road tonnage flows showed 3,500 to Cap Haitian, 19,600 to Port au Prince and 1,000 to Gonaives from Port de Paix. From the Mole the flow was 6,100 tons to Port auPrince and 8,700 tons to Gonaives. All roads showed less than 50 ADTs (350 vehicles week) with 197 kms between 10 and 25 ADTs and 28 kms between 25 to 50 ADTs.

An inventory of all roads in the Northwest (1975) give earth - 101.9km, stone or gravel 165.4 and total 265.6 km. As compared with roads rated "good" at \$0.025 - \$0.04 t/km, bad are rated at \$0.045 - \$0.10 t/km. With these figures in mind it is not surprising that water transport dominates in moving the products of the Northwest to the market.

#### Transportation Orientatinn

Ship user costs range from 3.5 to 5.5 cents ton/km for sailboats (over 60 tons to very small 1-5 tons). For motor ships 30 to 60 tons, .0323 cents/ton/km and 100-150 tons as little as .023 cents/ton/km. Rate are highly competitive on large sack of charcoal from Port de Paix to Port au Prince costs only \$0.21 and on the return run flour and sugar are \$0.27 a sack. Higher rates prevail out of the Mole, possibly because of lack of competition from trucking; charcoal is \$0.29/sack and sugar and flour \$0.27 a sack. At Anse Rouge an important port for

charcoal the price is \$0.32/sack, flour and sugar are at \$0.37. Hence obviously prices are being determined by variables other than ton kilometer user costs. This requires research as water carriage appears to be the only short run transport solution for the region. Louis Berger's experts recommend the creation of a small shipping complex to organize freight and to add 10 motor ships of 200 ton capacity to service Port de Paix, Jean Rabel, Mole and Anse Rouge. Also the installation of minimum port facilities to reduce loading time in ports. This sized vessel would have an estimated user cost (1975) of \$0.019 ton/km. Tonnage from these ports (1975) was taken at over 50,000 tons.

There was also a trade by these ports with the Bahamas since the earliest times of the nation which has grown with the increase of Bahamian population (including tourists) and revenues. Principal cargoes are plantains (approximately 150-200,000 regimes year), mango francisque, and limes although other vegetables: corn, rice, etc. are included in ships stores and cargo. On the return are many items difficult to acquire otherwise and strings of dried conch which are traded in the mountains where fish are not available. However, because of a diplomatic incident this trade is now suspended officially.

The Louis Berger study makes a very convincing argument in favor of improving the infrastructure and the means of acquiring satisfactory vessels by present private sector cabotage. The user cost is almost 25 percent of motor transport cost and the comparative investment costs are negligible for the water transportation alternative.

The principal constraints are an absence of credit available to ship owners and lack of interest on the part of Government planners in water transportation.

The road system is in such bad shape that only a major investment

and a very considerable annual maintenance budget could convert this system from awful to reasonably good. Using a 4 wheel drive vehicle it took the field party three hours to navigate the 30 odd kilometers from Port de Paix to Anse a Foleur. The government is still delivering the mail on this same route on foot. Yet Anse a Foleur is a region which produces 4,000-4,500 150 lb sacks of cacao and 6,000 150 lb sacks of coffee a year. At this year's value of \$1.40 lb for coffee FOB this brings in export and other taxes about \$84 a 150 lb sack or about \$500,000 to the GOH. If nurseries were available with new varieties of coffee, in four years this output could easily be doubled. Cacao is held back because of the pressure from rats and Mme Sara birds. An increase of 25 percent in cacao production from one year to the next would be possible if rats and birds were effectively controlled. Since cacao is currently paying \$0.40 lb at farm gate that 25 percent is equal to an increase in farm gate revenue of \$60,000/year immediately. Coffee would also benefit by an estimated 20 percent or 1,200 bags at \$210, 150 lb bag export FOB price. Yet there is no port, roads do not make it profitable to operate any scheduled overland service. No trucks are owned in the town and they depend on the occasional truck that comes in from Port de Paix without any regular schedule. There is only an open roadstead, although at Point d'Icaque a warf would radically alter the disastrous transport situation. Also "Irish bridges" placed where the road cuts through streams and minor but regular maintenance could change this road to the bad category and permit relatively low cost transit of higher value goods, passengers and mail on a regular scheduled basis.

It is worth noting that Port de Paix has a small ship building industry and that experienced workers for shipyard repairs are available using the traditional method of "carenage" in the absence of other dry dock facilities. Hence there would be local human infrastructure, support for a water oriented transport system as recommended by Louis Berger Inc. The author of this study feels it is the only short term answer and may be the most economical long term one. This is, in part, because the Northwest is poor, at least in part because it is so poorly paid for what it does produce. Only through gaining access to markets can higher regular revenues be obtained. Port au Prince is not the only market. There is a demand for bananas, plantains, malanga, taro in Miami, Puerto Rico, Virgin Islands and other Caribbean islands. Port de Paix is half way between Puerto Rico and Miami. While massive buying in Puerto Rico would be a sometime thing, at least once every five years Puerto Rico has a blow down of its plantain crop and usually the Dominican Republic its usual supplier, is hit at the same time. Thus on an average of once every five years Northwest planters would get a windfall profit of important magnitude. It is premature to speak of the considerable demand for plantains in New York and Montreal but it is not too early to recognize that the demand is there. However, fruit carriers must reduce loading and carrying time to a very minimum. Unless the water oriented infrastructure is present, the Northwest will never have access to its natural market.

**D. INSTITUTIONS**



Government

The basic organization of government is similar to the original colonial one. There is a military commander (Colonel) who is responsible for regional defense and to support the needs for public order, justice and assist local authorities in times of disaster.

Parallel to the military administration is a civil administration headed in each of the two arrondissements (Port de Paix and Mole St. Nicolas) by a Prefet. As the next step of civil administration are the general community services under a mayor for each commune and justice under a commissioner who is responsible to the central Department of Justice for all major civil and criminal offenses. Locally for minor cases each commune has a Justice of the Peace.

There is also an Internal Revenue Service called "Contributions". This service under the Ministry of Finance collects all national taxes and account for them to Port au Prince. They are also responsible for the usufruct rights to these lands. They also take responsibilities for properties which are in the process of probate for inheritance.

The Ministry of Agriculture operates locally within the National Plan and also coordinates or directly administer agricultural development programs according to agreements with international donors or lenders. They are headed up by an Agronome de District, A supervisor maintains direct contact with several sections including topography, irrigation, home economics and the six specialists or agricultural agents who are attached to the Communes. At the next step are 30 agents including 3 who are responsible for extension services to the community councils.

Describing them by professions there are one or two senior agronomists or one senior agronomist and seven agents, three agricultural engineers, ten irrigation controllers and thirty five agronomists or

agents for general services or extension work. They are supported by 3 four wheel drive vehicles (two out of service) 1 truck (requires major overall and out of service) 2 tractors (1 out of service) as their total equipment.

There are also three engineers in the department from Public Works. Two are assigned to SEPRN road maintenance and one for all other services.

The National Bank of Credit also has a branch in Port de Paix and is open daily.

There is also a New Youth 4H type program now starting up at the commune level but which is not as yet in being.

#### Education

Private and Public Sector mix at the level of education and health.

There are 21 public and 29 private schools at the primary level (six years) and 1 public and 5 private secondary schools, as second public secondary school is now in construction in Port de Paix.

These schools are represented by 142 public and 193 private classrooms of the primary level with 8.291 students for the public schools and 5.022 students for the private schools. The teaching staff for the national primary schools is 166 and private 282 or 1 to 50 rates for the public and 1-18 for the private primary school.

There are also 13 "ecole rurale" with 2.453 students, 39 classrooms and 27 professors and 4 "ferme ecole" with 1003 students, 15 classrooms and 19 professors. These schools can best be described as "off the main road" schools for children of farmers in the more remote areas. These are for the Port de Paix arrondissement. In the Mole St. Nicolas arrondissement there are 22 "ecole rurale" supervised by HACHO.

Public Health is also a joint public - private sector venture. This area has much improved over the last twenty years.

There is a major national hospital "Hospital of the Immaculate Conception" with 129 beds outside of Port de Paix next to the cemetery. On Tortuga Island there is the private clinic of Notre Dame of the Palm Trees with 115 beds and BERACA with 29 beds. At Bonneau there is the Hospital St. Joseph with 28 beds.

Also in the Port de Paix Arrondissement, there are six dispensaires supported by the State and 4 private including one Asile de Bonneau with 38 beds.

In the Mole St. Nicolas arrondissement there is the Centre de Sante Hospital 38 beds and the Centre de Sante mixed sponsored by HACHO at Jean Rabel.

In the rest of the arrondissement there are 3 public, 3 private and 3 HACHO dispensaries located in the different communes.

There is one official family planning section at the Hospital of the Immaculate Conception. This clinic has a mobile unit which goes to St. Louis du Nord and to Saint Joseph's clinic at Bonneau. Three doctors, a nurse, seven para medics and six other staff support this effort. The prenatal, maternity and pediatric services received 6,492 consultations in the year 1976 of these 564 clients attended the family planning clinic and 370 accepted various methods of family planning.

#### Religion

The various churches play a major role in the social life of the community and many of the private schools and health centers are sponsored or directly supported by religious institutions.

The Roman Catholic church which is officially the state church has two Bishops and one or more clergy in every commune in addition to its participa-

tion in education and health. The protestant churches are also very active with the Adventiste and Baptiste churches as the major leaders in this community although many other sects are present and very active.

In the international area CARE has a major role in supporting food programs for school children. P.A.M. of the F.A.O. also has a major program for self help programs of providing food for work, particularly for erosion control and country feeder roads.

#### Private Sector

There are four football clubs sponsored by various private sector groups which play with other cities including Port au Prince.

The Free Mason's have a temple and are said to have a considerable membership.

The various voodoo cults are very active in the Northwest rural areas and aside from religious aspects also promote social dances and festivals.

The Conseil Communautaire have become the most powerful private sector group for promoting social activities and they are to be found in every rural section. They promote the construction of country roads, cap springs, support informal education, buy fertilizers and agricultural inputs, build primitive irrigation systems and also exercise a certain political influence in favor of rural community needs.

There are also some co-ops one for fishing at Mole St. Nicolas, one for irrigation at Baie de Henne and many pre coops called mutuals with only a few members who form working and marketing groups. Many of these are in the coffee and cacao productive areas.

**E. ECONOMY**

**1. Colonial**

**2. National**

## 1. Colonial

It will be assumed that the object of this section is to indicate the influence of the colonial period to the new Haitian nation.

The only major urban development was at Port de Paix with 220 houses mostly built of simple masonry. Only a few had a second story. The streets were paved in 1774 which created a drainage problem which still exists and is a source of infestation by flies and mosquitoes. During the last days of the revolution the town was fought over three times and it may be assumed suffered from this conflict as artillery was actively employed.

The population of the town of Port de Paix in 1789 was 336 whites 70 free mulattoes and blacks and 527 slaves. For the entire Parish which included the coast halfway to St. Louis du Nord to Baie des Moustiques and the Trois Riviere Valley and surrounding mountains to the borders of the commune of Gros Morne the rural population was 116 whites, 60 free mulattoes and blacks and 8,445 slaves.

The economic base at Port de Paix was six sugar mills with water power, 71 indigoteries, 82 coffee plantations. The latter with an output of 3,600,000 half kilograms a year and 2,000,000 demi-kilograms of white sugar. Indigo production, most of which was smuggled to the English colonies, is not given.

To the East was the Parish of Petit Louis which now includes Anse a Foleur and St. Louis du Nord. This area had originally produced sugar but when prices dropped this was abandoned.

The population in 1785 was 350 whites, 33 free blacks and mulattoes and 4,200 slaves. There were 60 coffee plantations and 25 indigoteries. The region was also active in ranching and food crops and 11 formal ranches are listed.

There was also an active fish production. A small sardine or anchovy called "pisquet" gather around the river mouths from August to November and large quantities were taken. There was also fishing in the Tortuga channel with the catch varying according to season. Moreau de St. Mery comments that even tuna and bonito were occasionally caught by the fishermen. This industry continues today.

Two lagoons of 300 acres each were reported as very productive of carp and other small fish. These lagoons are still fished today and the field party saw a fisherman with a string of red carps which ran about half a pound each.

Coffee production was an average of 1,500,000 demi kilograms per annum and indigo 80,000 demi-kilograms. No figures were given for cacao although this is one of the most productive cacao regions in Haiti.

To the West of Port de Paix was the Parish of Bay of Mosquitoes whose mountain is very famous for the Moka quality of coffee. There were 30 plantations and it was mentioned that one of these produced 90,000 demi-kilograms with only 25 slaves.

This Parish was followed by Jean Rabel which was even more heavily populated than Port de Paix Parish. The population included 800 whites, 400 free blacks and mulatoes and 9,000 slaves. This oasis includes the famous sugar plantation, Habitation Stanislaus Foaches with 550 slaves.

Jean Rabel was separated from the Mole and Bombardopolis by a mountain range and in colonial times communications were mostly by sea.

The Mole St. Nicolas was an important naval and military station and it is not clear how many of the white population were temporary administrators or military personnel. The population included 615 whites,

46 free blacks and mulattoes and 839 slaves. One suspects that some of these slaves were engaged in ships repairs. There are no statistics for plantations although it may be presumed that animals were raised, as well as food supplies for ships in transit.

Bombardopolis Parish is on the plateau to the East of the Mole. Its population was 600 whites, 50 free blacks and mulattoes, and 900 slaves. This area and the adjoining Port de Piment were tourist areas during colonial times with travellers coming to take the waters. There was also a lively fishing activity along the coast. The general area was active in producing animals including cattle, horses, pigs, sheeps and goats on 84 ranches. It also included 22 coffee/<sup>farms</sup> and 5 indigoterias.

As the colonial government forbade and strictly enforced laws against mining, we can find only some reports and mineralization by casual persons whose interest was largely scientific. Thus we have a report of a Spanish silver mine and the presence of pyrites of copper in the Canton de la Plate whose river flows into the Trois Riviere. Since Plata is the Spanish word for silver, the legend probably has its origin in the name given to this canton.

In the Moustique mountains Father Plumier who lived in the area during the late 1690's reported finding copper, zinc, iron, silex, geodes, quartz, maracites, and rock crystal.

In another report from the Canton de la Montague, a clay so pure is reported that it appears like platre de Paris (gypsum) and that it was used in the mountains to make drying platforms for coffee with their having to use sand.

To sum up the population at the outbreak of the French Revolution was follows:



LOCATION	WHITE	FREE B & M	BLACK SLAVES
St. Louis	350	333	4,200
Port de Paix	450	130	8,972
Jean Rabel	800	400	9,000
Bombardopolis	600	50	900
Mole St. Nicolas	<u>615</u>	<u>46</u>	<u>839</u>
TOTALS	2,815	959	23,911

RATIO Free to slave 1 to 6.3

The principal economic activity and the only one to survive the revolution was coffee with 190 plantations registered. However, as we lack details for coffee from Jean Rabel and the Mole Parishes therefore we must conclude that this is a minimum figure for the mountains around these towns had some coffee production.

The Northwest population is about 5 percent of the colonial population at this period. The tendency to populate the river vallies, and oases is already manifest. Unfortunately, we have no breakdown by sex or age. Except for those slaves concentrated around the sugar plantations at Port de Paix and those which were previously on sugar plantations at St.Louis, they were very possibly new arrivals.

If 15 to 25 per coffee plantation would be rather typical, about 4,000 were in coffee and at least as many on sugar plantations. Indigo required a very large labor force relative to coffee so the 100 odd indigo plantations were likely account for 50 slaves each, or 5,000 total. We can take the population of Port de Paix as an example, domestic labor was about on a one to one basis or 3,800 for the white and free black and mulatooe population. Another 2-3,000 were probably employed on the ranches and essentially food production farms. This accounts for 20,000 slaves. The balance of 3,800 were required for fishing, municiple and port services, maintenance

of roads, commerce, etc. What is most evident is except for the relatively small number of sugar plantations there were no large concentration on huge plantations, slaves were in small enough groups to learn how to grow and prepare the produce aimed at the market.

What was lost of the 25,000 black and freeman population to the attribution of the revolution and the high death rate on the plantations after slavery ceased with the French revolution is unknown. However, it was a general rule of thumb that field labor had to be replaced every fifteen years.

It is, therefore, a reasonable hypothesis that by 1804 the population had been declining since 1789, even without loss to the armies of Capois La Mort. A figure of 10-12000 for 1805 does not appear unreasonable. These would inherit the 200 odd coffee plantations with a production of over 6,000,000 lbs. As well must be included a great number of ranches, and even some sugar lands easily converted to food crops.

To paraphrase Dumont, "Le Nord-Ouest n'est pas mal parti".

### National Period

The national economy period begins really before the exodus of the French army. Since abolition of slavery in 1792 land possession was shifting from the French colonists to the new and old free black populations. The fundamental direction of the new leaders of the nation was to attempt to maintain production of sugar lands to provide exports and hence funds to pay the army, the administration, and imported goods. Strict laws which provided wage payment as a fixed proportion of output forced former slaves to remain on the plantations under military control. Unemployed persons in towns or simply those discovered on the roads could be picked up and forcibly assigned to one or another plantation. In essence, slavery had been exchanged for serfdom.

That at least was the theory. The practice was something else. Only Henri Christophe was successful in imposing this system until his premature death. The would-be serfs slipped off into the hills and soon sugar production became negligible and plantations almost abandoned. This was the general picture of the transition from colonial to the national economy period.

The problem was clear the "new free" Haitian wanted to be economically free, as well as, politically free. He began at this point a pattern of economic activity which with time became institutionalized. He offered his labor only if he could control his own choice of activity and his own rhythm of work. Above all his preference was to farm himself, chose to grow the crops he preferred and the leisure he desired. This placed a constraint on his economic revenues, and limited his potential fields of action but he firmly resisted organized management systems where he was paid labor with the exception that he would agree to engage himself in contracts in exchange

for land, a share of produce, or money wages. However, he could not accept a stable permanent work relationship except as will be shown below when he was able to acquire a relatively independent usufruct situation on a former coffee plantation.

The national period declared as an opener that all lands revolved to the public domain.

They then proceeded to distribute it as a reward for military and civil service to the State on the base of rank and power within the new nation. In the rest of the country this was very complex because of the previous high level of economic development. In the North West is meant land grants or privileged purchase of former french plantations which had been grouped in particularly favorable sites. All of this is discussed in detail under land tenure.

Since land owners did not plan to work their newly granted estates themselves and the new free refused serfdom a rental "in kind" evolved into the institution of the "de-moitiées"(two halves). This rental mostly turned on the collection of the half of the coffee crop whose trees had been left intact by the revolution. After this point the "two halves" becomes less clear. Cacao had to be cleaned and fermented, Cotton required a considerable labor input. Indigo, so much labor, it was simply eliminated as a crop. Also the production of "subsistence garden crops" had been the exclusive projects of the "new free", even when they were slaves. Thus in practical terms the meaning of "two halves" was only rigorously applied at the end of a serie of crops beginning with coffee and the rent diminished from this point to a token payment at the end of the series. Land was in surplus and the landlord was forced into compromises to a great extent reflecting the amount of labor input involved but also a certain institutionally established right to some food crops was a constraint on the amount

of rent effectively collected. More often the owner or his "gerant" effectively supervised and participated in the coffee harvest as much a matter of self defence as anything else. However, with this action a tendency developed to do this with other crops and in some areas, the owner alone had the right to harvest certain portions of fields.

In addition to the economic system described above many lower ranking soldiers received small grants in fee simple and this plus other purchases of other small plots led to familial organization of production names the classic "La Cour" system which has been discussed elsewhere in this exercise. On these farms a system of tree-root and cereals culture evolved with animals, particularly bovines becoming a means of retaining capital for special expenses or bad crop years. These new farms mostly in the higher altitudes also grew coffee but they planted it as a mixed crop patterns under shade. This was a remarkable innovation as well as all colonial period production had been medium altitude and "open sky" production.

Farms must have been very scattered and population very small for even in 1881 the Northwest had only 39,000 population for 2,500 km<sup>2</sup>. It is estimated that it barely exceeded 10,000 at the beginning of the national period or less than one family per square kilometers..

As during the colonial period the Northwest continues as an isolated region. With plentiful cheap fruits, plantains and other food crops it will continue to attract the trading ships from the Bahamas where these products are scarce. It will become the center of the turtle shell trade and even in the 1930's as much as thirty thousand kilos of shell will be exported in a single year (1932/33).

Almost unnoticed a 130 years will slip by as the central authorities tax all sellers and some buyers in the markets. Custom duties are imposed on export crops and imports of all goods required by the Northwest's population. Coffee and cacao production will be maintained and the revenue on their export taxes will join the rest of the flow of funds to the central government. The region, however, will remain virtually outside the national life and economy. It will benefit from no development programs. Even the principal port at Port de Paix will lack the most elemental port facilities. Roads, except for a single trail from Gonaives, produced in fact by forced labor under the U.S. Occupation, will be the only land connection to the Capital.

In the 1930's under World market crisis conditions the price of coffee and other export crops will not escape this disaster. The exports (1928) per capita valued at G37.75 will drop to G11.60 for 1940/41. No comparable drop occurred in the items most required by the Northwest's households necessities. For an index of 100 for 1927/28 the index for 1940/41 was as follows: soap 69, textiles 65, kerosene 61, and his luxury-cigarettes 105. Transport costs did not decline at all and the index for trucks was 105 and gasoline 176.

It is only when we translate the export per capita figure of G11.60 into farm gate value that we can imagine the magnitude of this disaster and profound change in orientation in the Northwest. As at this time farm gate prices were a little less than 50 per cent of export prices, so the average family had only \$1.00 per capita revenue to buy the above imports from export product sales. The peasant began to pull out the coffee trees, the cacao was left to the rats and production was oriented toward food crops.

This response was to produce the first national effort to assist the region. That is return some of the taxes they had been collecting for over a century. This was made possible by a US financial loan and a development

program under contract with the G.J. White Eng. Co. of New York.

The road from Bassin Bleu to Port de Paix was improved to all weather condition as was the road from Gros Morne to Plaisance which gave Port de Paix overland access to Cap Haitien. Dirt roads(trails) were opened from Port de Paix to economically important areas such as Mole St. Nicolas and Anse a Foleur which now could be reached by truck. In all 42.3 km were built.

The coffee industry at St.Louis du Nord received some support. Drying trays for coffee (2.530) and masonry drying platforms (1.442) were distributed or build in the sub-region. A direct contribution to replacing trees which had been uprooted or to replace old trees was made by the White's nursery with a total of 2,648.000 coffee plants and 160.000 young shade trees. Seeds for food crop and castor bean production were distributed free to maintain intercropping while the new trees were growing to producing status.

This was during the period when the Standard Fruit Company engaged a contract for banana export and the White company recognized the considerable potential of the Northwest for banana production.

A program of nurseries for the "Gros Michael" export banana was begun and in April May and September 1941, 2,400,000 young clean plants were distributed under White control. In Feb/March of 1942 an inspection for evaluation was conducted and in spite of a very dry winter 73 percent of the distribution had survived. Special spraying machines were designed and a spraying program, as well as, an on the field periodic inspection was instituted to control pests and diseases of the banana plant.

A tree planting program which was to make survival possible in the Northwest distributed 345,949 coconut trees, 663,767 limes, 443.397 sour orange, 3,152 grapefruit and 304.900 various other fruit trees which were used as well for reforestation. Also 333,800 trees were produced by direct

seeding.

By 1944 the Northwest was the second largest department in Haiti for banana export. Coffee production was in the process of restoration for example by 1961 St. Louis du Nord shipped 29,000 (60kg) sacks of coffee and 4,000 sacks of cacao (50kg) the latter 34 percent of Haiti's cacao output. At that time this was equivalent to one 60kg sack of coffee per inhabitant and about 15 lbs of cacao p.c. World market prices FOB Haiti 1961/62 for 60 kg/of coffee was \$38 and 15 lbs of cacao \$6.00 so roughly the export value added from St. Louis du Nord for these two crops was \$44.00 per capita of its population. A handsome return to the establishment for the assistance program to the subregion.

However, it seemed the fate of the Northwest to find itself caught between the hammer and the anvil. After making amazing progress with this small aid program, government practices had by 1950 virtually destroyed the banana industry. The planters shifted to plantains more resistant to pests and disease and a superior plant for intercropping. However, only 150-200,000 stems annually were exported mainly to the Bahamas island. The remainder sold in Port au Prince. High transport prices and a limited demand produced prices which did not permit a favorable exchange rate for the farmer. Until 1970 farm gate prices for plantains were only \$0.80 a stem about the same price that was paid for a stem of export bananas in 1947.

Coffee export taxes began, as well, to increase their bite as world prices rose such that the average price farm gate for a pound of coffee in the Northwest was only \$0.15 lb for the 1969/70 crop. A comparison of farm gate to FOB world prices show that for the five years from 1969/70 to 1973/74, producers received only 34.14 percent of FOB world export price. In the last year 1973/74 the return was down to 29.58 percent.



The decade 1960-70 was a particularly desperate one as hurricane Flora had ravaged the Northwest. The region was reduced to famine in many areas. Already provided with very little inter sub-regional communications areas which had food could not reach those that were starving. In many cases it was necessary to transport food to isolated villages by helicopter. Extensive foreign assistance finally closed the gap and recovery began.

As is clear from the above, the region has shown a remarkable response to well planned and directed foreign assistance when provided with the technical assistance. Agricultural inputs and effective marketing assistance.

The history of the economy to the 1970s is one of exploitation of an isolated area by many central governments who in only one case provided some returns in technical and capital assistance.

However, history repeats itself and the two crops of coffee and cacao which are raised with great success in the region are subjected to progressive taxes such that as inflation increases the farmer's real income bears a heavy tax burden if he raises these crops. As well, these crops are raised in areas where patterns of tenure tend toward share cropping within the "de-moitiee" system. Thus if the establishment system returns to him only 30 percent of the FOB value of his crop as it did in 1973/74 and he has to pay half of this in rental, he retains effectively only 15 percent. This is less than the 25 percent return allotted to croppers under the harsh "serfdom" laws which the farmer rejected over 170 years ago. The peasant has, of course, reacted natural two year jumelle (2 year) production figures were around 55 million pounds at the beginning of the 1950s. By the beginning of the 1970s it is down to less than 40 million pounds inspite of increased planting programs in the South which tend to mask the decline elsewhere.

The general picture of the national period is one of almost unrelieved isolation. Except for collecting taxes and maintaining order government services are less than minimum. Only one technical assistance program provided a welcome intervention of major effect. The level of infrastructure is so low that it contributed seriously to the suffering from the Flora disaster. The two major crops, coffee and cacao are so heavily taxed and transport costs so high that inspite of rising world prices their production steadily diminishes.

"To he that hath, it shall be given and he who hat not, even that which he hath shall be taken away."

In the beginning there was less than one family per square kilometer, in 1971 there are 18 families for the same space and the quality of that space is deteriorating. Remember, the "open sky" coffee of the colonial period had initiated erosion two hundred years before 1971.

**F. HISTORY POPULATION**

**1. Demographic Development**

**2. Population Movement**

**3. Summary**

### Demographic Development

The earliest recorded regional census was made by Dantis Fortunate in 1981 which reflects what had already been said in the settlement patterns section. The department's population was only 39,000 as of that date. Approximately 100 years later it is 234,000 or eight times the 1881 figures.

There is evidence in many studies of different areas which indicate that the rate of increase has considerably slowed in the last two generations. At present survival to the first year is at an annual rate of 6500 to 6800 per annum. The death rate is falling but is still high, possibly 15 per 1000 compared with 12 for 1000 for Port au Prince is a reasonable estimate. Tuberculosis is reported as a major problem and a principal cause of death after their early mortality in the first year.

The author constructed a log type age-sex analytical pyramid and then modified it for shorter cell breakdowns of population in order to visually observe symmetry or divergence from it. The economically active population age groups are roughly equal to that below it and over age non-economically active population. However, better health care may be playing a role and there is an impressive increase to come over the next twenty years in the female fertile age group. The fertility rate is now at almost 15 percent of females of fertile age. The combination of the increase in the fertile age group and reduction of its average age and better health conditions are an obvious red flag.

### Population Movement

There appears also be evidence of an important emigration of male and female population in the age groups 20 to 34 according to breakdown in the 1971 census. The author's estimate based on a normal shaped pyramid is 4000 for the 30-34 year cell, 3000 for the 25-29 year cell and 3000 for

the 20-24 year cell. Many of those emigrations among males probably went to the Bahamas Islands but also the opening of the Artibonite valley irrigation project between 1957 and 1959 has attracted male workers. As female emigration is indicated at close to 4000 of the 10,000 total many certainly found their way to the Cap, Gonaives, St.Marc and Port au Prince. Some of the younger males are undoubtedly among the 15,000 haitians who have gone to cut cane in the Dominican Republic or of the 27,500 now residing in Cuba, some have made the long trek to Miami.

Illiteracy has always been a barrier to emigration but this pattern is changing. Those in the 40-44 year age group (1971) who could be considered as literate were 12 percent, in the 15-19 year group it was 31 percent. Some of the emigration is interior to the department as rural residents moved to the cities. As of 1971, 17 percent of urban population had been born in the rural communes.

There is a growing interest in economic activities other than agriculture and fishing. In 1971, 21,710 economically active persons in the department found employment outside this traditional activity against 76,000 who were engaged in agriculture. Of the total 8000 were engaged in one or another form of marketing and 6,226 in industry or artisanat. The government or related community service was a close third with 6,157. One impressive item is that about 65 percent of both rural and urban economically active persons are self employed. About 30 percent of urban workers are salaried personnel and barely 10 percent of rural workers. The latter figure is probably deceptive as farm management systems in agriculture include "contracts" and "de moitie" which permit the worker the illusion that he is working for himself. Also there is a fair amount of exchange labor which does translate itself into money wages but which will not find its way into the data.

Summary

The official position on population growth in the NorthWest is given in Table II below:

TABLE II

OFFICIAL GOX POPULATION STATISTICS AND EST. 1980-1990

<u>Population North-West</u>			
<u>Date</u>	<u>Urban</u>	<u>Rural</u>	<u>Total</u>
1950	13564	154,715	168,279
1971	26689	190,800	217,489
1978	31831	200,700	282,531
(est.) 1980	33000	201,100	234,100
(est.) 1990	NA	NA	261,300
<u>Arrondissement (1980)</u>			
Port de Paix	27,900	114,100	142,000
Môle St. Nicolas	5,100	87,000	32,100
Communes (est. 1990) Per km <sup>2</sup> - 105 Port de Paix			
Port de Paix	13,918 (71)		60,200
St Louis du Nord	5,642 (71)		42,000
Bassin Bleu			20,600
Anse à Foleur			15,400
La Tortue			<u>13,400</u>
			151,200

Communes (1990 est.) - Môle St. Nicolas 62 per km<sup>2</sup>

Jean Rabel	63,600
Baie de Henne	9,200
Môle St Nicolas	19,700
Bombardopolis	<u>17,600</u>
	110,100

Communes (Region) Arrondissement Gonaïves (1990 est.)

Gros Morne	57,200
Anse Rouge	15,700

The assumptions which guided these estimates are not made explicit in the literature accompanying the statistics. They appear to be based on the death rate estimated by the UNDP expert Saint Surin who made the predictions from the 1950 census, that is 19 per 1,000. Saint Surin, however, noted his expectation that in 1970-75 that he expected a death rate of 14.7 per cent. This appears quite reasonable given the enormous change in medical and public health efforts since 1950 and that the death rate for Port au Prince in the mid seventies had dropped to 12 per cent.

The most important question, however, which must be raised about these projections is that data reveals a 14.6 per cent fertility rate and a sharply rising fertility class with a much large proportion of females in the younger age groups which traditionally yield, given an absence of effective family planning, a fertility rate closer to 17 per cent. This would bring the average for the class to 16 per cent or about 45 per 1000.

Admittedly the difference on the death rate is debatable. The author of this study believes however that the upper limit of could not exceed the 19 per 1,000 figure.

The fundamental data on the fertility rate reveals a low figure of 14.6 per cent. This is completely understandable in light of partial evidence of heavy female immigration from this class. However, the increasing younger age group (9-14), (15-19) cells will inevitably produce a higher fertility rate over the next five to ten years.

In order to clarify this discussion in absolute terms, the author has constructed two tables giving a low and what he believes is the more likely if still modest prediction of population growth from 1980 to 1990.



ASSUMED POPULATION GROWTH 1980-1990 BASED ON INCREASED  
MOVING AVERAGE FEMALES INFERTILITY AGE GROUP, INCREASING  
FERTILITY RATE

YEAR	NO FERTILE POPULATION	FERTILITY RATE	INCREASE	DEATH AT 19-1000	TOTAL POPULATION
					234.000
1980	68.000	14.6	9.932	4.486	239.500
1981	72.000	14.6	10.512	4.505	245.500
1982	74.000	14.7	10.878	4.665	251.700
1983	76.000	14.7	11.172	4.782	258.100
1984	80.000	14.8	11.840	4.900	265.000
1985	84.000	14.8	12.432	5.050	272.400
1986	88.000	14.9	13.112	5.175	280.300
1987	92.000	14.9	13.708	5.326	288.700
1988	96.000	15.0	14.400	5.485	297.600
1989	100.000	15.0	15.000	5.650	307.000
1990	Low estimate Dec 31, 1990				316.000

TABLE

ASSUMED POPULATION GROWTH 1980-1990 BASED ON INCREASED  
MOVING AVERAGE FEMALES IN FERTILITY AGE GROUP, INCREASING  
FERTILITY

YEAR	NO FERTILE POPULATION	FERTILITY RATE	INCREASE	DEATH AT 15-1000	TOTAL POPULATION
					234.000
1980	68.000	14.6	9.932	3.510	240.400
1981	72.000	14.7	10.584	3.600	247.400
1982	74.000	14.8	10.952	3.711	254.600
1983	76.000	14.9	11.324	3.819	262.100
1984	80.000	15.0	12.000	3.931	270.000
1985	84.000	15.2	12.768	4.050	278.700
1986	88.000	15.4	13.552	4.180	288.000
1987	92.000	15.6	14.352	4.320	298.000
1988	96.000	15.8	15.168	4.470	308.700
1989	100.000	16.0	16.000	4.630	322.000
1990	Modest estimate Dec.31,1990				333.200

Summary

The author raised a red flag in the section on Demographic Development.

The fact is that despite the reassuring prediction of HARZA and other experts writing on the population, the Northwest is on the cliff of a population boom. The fertility category is 48,000 in 1971, 68,500 in 1981 and 100,000 in 1990. As the low estimate, the Northwest will be 316,000 in 1991 and not 261,000 and at the modest estimate 333,200. What is worse is the year to year net increase will be between low 10,000 and modest 11,000 and rising every year thereafter. There is no assurance the 15 per 1000 death rate will held after 1990. There is a population boom on the way, yesterday.

The second red flag nobody mentions is the movement in the labor force. From 1971 to 1981 about 11,000 economically active people will leave the labor force. Unfortunately the entry over the same period will be about 30,000. From 1981 to 1991 the net entry group will add still another 12,000 to 13,000 economically active persons. With over 40,000 new jobs required it means a substantial effective investment program to provide work will be required or a desperate people will make that try for the land where the streets are paved with gold.

These data and projections also reveal a deteriorating ratio of economically active to non-economically population. Now about even in size, the growing younger population as indicated in Table III and IV and declining death rate because of better health standards has begun to take hold and will continue to grow.

If, as appears almost certain, that there will be a massive emigration of economic active age groups ex-region, the burden on these remaining will considerably increase.

It is well to note as well one stabilizing influence which was revealed during field work. At present, about 50,000 to 60,000 workdays per month are being supplied by the rural community councils in soil conservation and road building on a barter basis called "Work for Food". This is a program of the PAM/ONY/FAO. At the time of the field study the (October 1981) DARND had exhausted its stock of food and the stocks at the CARE depot were under contamination as unfit for human consumption. Hence, it was not possible to observe the work in progress, however, the evidence was very evident, a stone paved road from sea level to 800 meters had opened access to the right bank of the Trois Rivières Valley and miles on miles of dry stone contour walls which will restore to coffee production this excellent farm land and also prevent erosion into the valley below. All this was done with only the most elementary tools.

Demography if only data and statistics is a dull child. The consideration of attitudes of the population described make it a sharper knife for desecting, such that those areas of the human population which can contribute to its health become as evident as those which are negative.

There is considerable evidence that the economically active population of the Northwest region responds actively to even minimum efforts to encourage its productivity. The GJ White experience and the rapid response to the Standard Fruit banana campaign are evidences from the past. The above noted response to "Food for Work" is another. Another, this time a private sector effort at Dady in the upper Trois Rivières area was noted. Here the son of a Port de Paix commercial family with 30 carreaux of family lands was cooperating with the community council and has built 2.5 km of roads and is trying to put 110 hectares of land under irrigation. The private sector person apart from supply/some capital has agreed to a quarter crop rental payment instead of the generally prevailing half rent crop "de moitie". He is trying to

convince other land owners to follow his lead.

At Anse a Foleur, a truly abandoned area, a meeting with community council and other community leaders expressed great enthusiasm for food for work solutions for building a dock, deratisation, soil conservation, country development. Above all what was evident was that a nucleus of leadership is present even in this isolated area. Many of these leaders at Anse a Foleur had traveled, even to foreign lands and returned voluntarily to their area of origin. They had concrete suggestions to make about how to increase product and productivity.

## II. CURRENT PROFILE

### 1. Social Organization

#### A. A Pyramidal Society

The urban social life of the Northwest evolved around the church, the political and economic leader of "notables", the "milices" and special social groups like the Free Masons, the sports clubs, and a socio-mystic unit which may also include a cock fighting pit.

The towns are also the residences of the seigneurial families who have dominated the political and social life of the Northwest. Often these families will hold a position specific to the national entity as a Deputy or a Prefet. As these families are land owners of importance they are also the principle link between the rural and the urban community. Often, not to say always, there will be a commerce or export purchasing for coffee, cacao, or other commodities demanded by the World market. These units link them to the "speculators" who do the actual collection, act as bankers to the small farmer and to the leading rural "notables" the Chef de Section and the Hougan or afro religions priest. In essence, these social chains of "clients" have become virtual fiefs. The peasant who is having trouble over his land holdings or with the law in one way or another will have recourse via this chain of relationships to the ear of the powerful Lord who may or may not help but it will be the farmers only link to higher authority. It is thus a stabilizing factor in these relationships to be a big "client" is to have as they say a "piston". However, this may also, and frequently, is a matter of family relationships and marriages.

In Port de Paix the only truly urban center in the Northwest there has also evolved an aggressive middle class. Engaged in commerce, trading, agencies, smuggling and South North shipping and very often with one foot

in the rural community. Many members of this group have emigrated to the Bahamas or Miami and have a broader view on social affairs than one might otherwise expect in this small city. Many have entered the Milice (VSN) and the more aggressive and often better educated middle class members have risen to command in this institution.

Since 1958, a new chain of relationships which does not exclude a priori the first has build up around the milice or the VSN. The chef de section originally completely depended on the chief military officer who was very often very closely associated with the first chain. Over the years the requirements of higher education has directed the decedents of the seigneurial families toward Port au Prince and foreign countries often toward a technical education for which there is little demand in the Northwest. Middle class families have obtained primary and secondary educations with which to challenge or hold higher level roles in the first chain. The VSN has provided a social-political mechanism for these groups and because smaller units are present even in very small rural crossroads towns, they have become another chain which frequently has its link into the also new Community Councils. Hence today the small rural family may have links with either or both of these chains which tend to parallel one another.

Also in recent years a multitude<sup>of</sup> christian sects have appeared in the Northwest and one finds their churches almost everywhere including in the urban center. Some of these protestant church centers are providing very important social services both to urban and rural communities and have built schools and clinics which are having a major impact in education and health areas. There is some doubt in the author's mind as whether these churches

are as yet of the community although they are having an impact within it. Problems of language and the requirement of social standards of conduct somewhat more restricted than those generally practiced in the Haitian community leave a gap. Perhaps time will close it.

The Roman Church is also a powerful social fact in the urban community. While men in Haiti have always manifested a certain Jacobian trend, this has not been the case for the ladies. The importance of the church, Roman or Protestant both as a social and political force is clearly present in all social services—education, health, community activities and personal charity. In a basically matriarcal society the church has no small role and though the parish Priest or Protestant rural pastors it is clearly a third force of social organization both rural and urban.

In a sense to divide the social life into urban and rural segments in the Northwest is unrealistic not that difference and economic relationships which are more or less urban or rural do not exist. The relationship is much closer to the social organization of the feudal society, that is pyramidal in form rather than dual.

At the Apex, the bishops, the Deputy and those closely related of the great families. Then with considerable overlapping and often very close and intense inter-relationships the three principal social forces in descending scale of social and economic power until at the base is the virtually dependent small farmer, metayer and landless peasant.

The single exception to this is also of great interest. This, exception moves in the opposite direction. If one were in Europe, it could be said a survival of the druids. This exception is the Haitian adaption of the african voodoo. At the rural base the power of the Hougan (ahomean word for Hou-spirit, Gangchief) parallels all the other structures, folk

religion, social diversion via dances and cockfights, folk medicine, and the intervention of the spirit world be of the ancestral cult. While it might be denied by many, on occasion it may very well play an influence in the highest levels of the non-clergy, three other major social forces. One has only to sit around after dinner with a small glass and "baie audience" (small talk) even in the highest circles to hear tales of the vodoo to know that its power is not completely ignored or that its presence is completely absent.

The current profile of this society is one in evolution or change. New and old forces are merging and diversifying at the same time. No group is any longer completely certain of its dominance.

One is tempted after having observed this society over more than 40 years to say that the play off of power blocs and the neutralization of any single dominance is the new characteristic of this society. It is the kind of controlled chaos which could precede a democratic society. This thought is reinforced by the number of children attending school and the wider dissemination of political consciousness through the media. There is also a growing number of citizens of all social levels who have resided in foreign communities who return with a different political and social experience.



## B. ECONOMIC ORGANIZATION

### 1. The Region, relationship with the Nation

The Northwest is a unique region of Haiti. Already an isolated region under the colonial period it continued this pattern during the national period, the US occupation and into the present.

In part at least because of its minimum development and population during the early years of the nation the region never became a political force with respect to the national entity. A few families of elite regularly sent representatives to Port au Prince to defend their interests and those of the region. However, though most of its years up to the US occupation Haiti was under the "Loi de la Baionnette", and the North and the South in turn of role dominated the Government. The relation of the region to the nation was that of a satellite of little concern except as a source of tax revenue from market taxes and customs revenues from imports and exports.

At present as shown in the section on institutions minimum services for security, health, education, agriculture and public works are made available. One might say with some reluctance. On the other hand as an important producer of crops which pay heavy export taxes and a consumer of heavily taxed imports the region continues to contribute generously to the national state.

### Man-Land Relationship

The distribution of population is heavily biased toward three general areas.

1. The rectangle Port de Paix Bassin Bleu East to the Department of the North contains the principal urban centers (over 30,000 pop) and more than half the total rural population.

2. Jean Rabel and the mountains to the West contain about 25 percent of the rural population and about 3,000 urban population.

3. The Mole and the Bombardopolis Plateau about 2500 urban population and 10 percent of the rural population. That is 85 percent of the population lives on about 40 percent of the regions land area. The rest are scattered along narrow valleys, Baie des Moustiques, Anse Rouge and their most important industry is the cutting of wood and the cooking of charcoal.

This uneven man-land ratio relates directly to the supposed or perhaps best stated "available" resource base. As stated above the major determinant of settlement pattern was the availability of water. Hence the early population concentrated in the areas where numerous springs or rivers satisfied this need. These were also the principal areas of coffee and cacao production, an asset inherited from the French colony. From these beginnings a mixed culture of fruit, root crops, maize and sorgho (petit-mil) developed and dominate the present culture pattern.

The resources of these selected areas was a climate particularly favorable to coffee and cacao culture and to fruit trees in general. Native bees provided a honey substitute for sweetening and wax for candles, feeding on the "pois dous" shade trees over the coffee. While the mountain lands soils are shallow, valley lands were deep enough for plantain culture and many root crops. Mahogany and other woods on the mountains slope not suited to dry land farming provided wood for construction and cooking fuels.

The problem today is that while population is increasing at an enormous rate the means to increase production are lacking. This is the case of the highly populated areas and is not a question of inadequate resource base. It is a question of the application of the State of the Arts. Everyone of these high populated areas has a rainfall pattern of 1000mm a year or more up to

2000mm in the mountains above Anse a Foleur. What is more important the rainfall is concentrated in crop periods favorable to production of one good crop a year under dry farming conditions. In the Trois Rivieres Valley there is enough rainfall or underlying water flow for supporting banana and plantain production. In brief, the ecology and soil conditions are such that only in 1 in 5 dry years will agricultural dry farming production produce unsatisfactory yields.

What is happening is that by simple neglect and failure to introduce fresh stock of high yielding plants or providing irrigation, the region is producing about forty per cent of what might be reasonably expected as output. Equally the results of inspection of soil control efforts show that there is a surplus of labor which currently provides 150,000 man days of labor per quarter to these projects. A well informed local expert stated that this could be doubled. Also here is a region where it is not as yet too late to save excellent farm lands by soil conservation control on the hills over the river valleys. Young farm laborers have demonstrated a will to do excellent work in exchange for food.

#### Role of the Family

Production is organized around the family. About 60 percent of the highly populated areas are owned in fee simple, although essential deeds may be available, de facto ownership is generally recognized by the laws on prescription. About 25 percent of farmers, particularly in the coffee areas are on "de moitié" and about 15 percent of land is held on cash rentals. These rentals are an average of \$100/yr/carreaux for irrigated land and for dry farms prices range from lows of \$20 to highs of \$60/yr/cx. (1cx. equals 1.29 hectares);

Farmers will group for work and exchange labor. Laborers prefer payment in food to cash wages. In part this because cash payments have a tendency to be deferred according to a local authority. This is particularly true for projects of the DARNDR where delays, sometimes for months can occur.

Tools are very restricted. The use of two types of machetes, one for cutting and the other as a heavy chopping and digging tool is common. The principal field tool is the hoe. This is heavy wide digging tool with a long handle. A pick and madoch type tool and the heavy hammer are rare but widely used to dig into stony or heavy soils and break stone. Even rarer are hand made chisels and iron levers which are pointed and also used in stone work and digging. A heavy iron sickle is rare but also used for weeding and clearing light brush.

Hand cultivators, the weeding hoe, the spade and the digging trowel are unknown. An occasional worker will have a shovel and workers are familiar with its use from government road work but it is very rare on the farm. Infrequent but sometimes available is the wheel barrel which is popular but far too expensive for the average farmer.

It is particularly regrettable that the hand cultivators and weeding hoes have not been introduced as weeding places an outside limit on effective production particularly where fertilizer has been used. These two tools can increase weeding efficiency by 20-30 percent when used by an experienced operator.

Tractors are used on some of the larger farms and are particularly useful because of their efficiency for weed control and saving time when multiple cropping or in preparing land before or at the onset of rains. They are still <sup>so</sup> rare in the area <sup>as</sup> to only be worthy of mention in passing.

## Organization of Production

The settlement patterns have to a large extent dictated the crop patterns and orientatinn. At present 85 percent of the population is on 40 percent of the land area. If 40,000 population were taken for urban this would leave only 1 hectare for every 1.53 population. Inevitably a highly organized intensive culture pattern was a prerequisite to survival.

There is a tendency among agronomists and others of temperate zones to think in terms of cereals. Under tropical conditions cereals have a relatively minimum output with traditional farming systems. On the other hand when ecological conditions are favorable, as they are in the Northwest root crops and tree crops can provide a much higher calorie return. When tree crops are well assorted, that is: citrus, avocatoes, mangoes, and breadfruit supplemented by cashew, peanut, coconut and tropical chestnut only a minimum of cereals are required to provide a satisfactory vegetarian diet. Since in mixed cropping various legume crops (red beans, pinto beans, lima beans, black beans) are inter-cropped with corn and sorgho the protein requirement tends to be satisfied with only a very minimum of fish and poultry which are everywhere available in the Northwest. True the production of fish has tended to fall behind the increase in population but this is because of a lack of infrastructure and a minimum application of intermediate technology rather than a lack of fish in the fishing grounds.

Principal root crops include the African igname, the sweet potato, the so called Irish potato, the taro, the mazumbelle, the malanga and the manioc. Coupled with these are the Spanish or oil groundnut, sesame seed, cotton seed and the avocado which provide vegetable fats to the Northwest's diet.

Vegetable crops are not as well developed in the Northwest as elsewhere in Haiti. Some eggplant, tomatoes, onions, cabbage, squash, pumpkin and

leaf crops are grown but their potential both for dietary use and export to the capital are not as yet being realized.

This is unfortunate as the climatic conditions of the Northwest are most particularly favorable for these crops.

The tomato, for example, has a temperature limit which virtually prohibits its production from June to November except in the highlands in the other departments. In the Northwest the outer limit of 75 degrees F is rarely attained after August and from then to March or April in many areas temperatures are favorable to maximum outputs. The conversion to tomato paste and delivery in 55 gallon drums to canning plants in the capital presents no problem. Only small factories situated in the different sub-regions would be required to reduce the tomatoes to paste. There is also a very strong demand in the US for igname for which climate and other conditions are very favorable.

In Puerto rico, there a large factory which utilizes tropical root, plantains, sweet peppers, malanga, manioc, etc. for a line of frozen foods which are sold in the US. Haiti would be a low cost producer for these items.

Bananas and plantains which play an important role in the diet of the Northwest are of major interest because the considerable production under the traditional system is nevertheless somewhat less than 50 percent of normal expectations when more modern agricultural management systems are employed.

At present, a hectare of these two plants produce about 950 stems per hectare per annum. The FAO Israel experience showed that with irrigation and use of fertilizer that the output should be closer to 2,200 stems per hectare. Also the net weight per stem could be higher. The Northwest has had considerable experience with plantains and has practiced a primitive

policy of selection which gives them a standard regime of eight hands or more for plantains.

Inter planting has virtually controlled the Panama disease and Sikatoka is also rare. It would be foolhardy in view of these diseases to encourage mono-culture. What is needed is more aggressive selection and plants treated for banana borers before entering the plantation. A minimum spraying program would also help if production was to increase. Above all the need is for control of Nemotodes (eelworm) and supply of sulphate de potasse essential to good development of this plant. Indeed, in many areas (St.Louis du Nord - Anse a Foleur) irrigation is not necessary to raise production to 1,500-1,800/ha stems a year if the other conditions are met. A stem of eight hands is worth at least \$4.00 to \$5.00 arrived Port au Prince at wholesale and \$7.00-\$8.00 retail. Hence 1,500 stems per hectare has a farm gate value of \$4,500 at current market 2000 lbs of sulphate of potasse costs \$210 and sprays and anti-nemotodes control about \$500 per hectare. The return is clearly interesting in the light of present Haitian revenues inspite of an additional labor cost of around \$300. However, the labor is available and would provide income to those who do not possess land suitable for bananas. Gross family income (for a family of 4.5 economically active persons) would be \$4,500 less input cost of \$1,100 or \$3,400 per hectare. Such families would hardly be tempted to immigrate. On the basis of present average man land ratios 1-1.53 and extended family<sup>1</sup> of 4.5 economically active or 8 per capita would be farming a total of 12.3 hectares. This would leave 11.3 hectares for other crops for local consumptions sale and to feed the eight extended family members plus \$425 net revenue from the one hectare of irrigated plantations per capita.

<sup>1</sup> Assumes an older father and mother and three married children and their families.

B. ECONOMIC ORGANIZATION

2. Rural Sector

Land Tenure

Land tenure is undoubtedly the most disputed area in studies of Haitian sociology and anthropology. This is at least in part because in contrast to circumstances in other countries with fee simple land possession Haiti has no complete land registry system.

Several attempts to create "cadastres" have been made because of either proposed or executed irrigation projects. None of these to the best of the author's knowledge were genuinely completed.

Hence it is best to start the discussion with the origin of all types of land holdings. All land in Haiti was held during the colonial period by the grace of acts by the French Ministry of War and the Marine in favor of particular individuals or to companies formed to colonize and exploit various specific lands. Some of these acts were mere concessions given up for usufruct and for a specific time period. The lands between Mireballais and St. Michel embracing the Plateau Central were not included in the French administration until 1796.

These concessions and land grants were well known, surveyed and registered. In fact, the author studied one such cadastral survey map of Haiti which covered every property in Haiti and which included the name and race of its owner. This was prepared for General Leclerc's guidance for the Expedition of 1801-04. Colonial French surveys have been accepted in land contest contestations in Haitian courts. This is for the good reason that when the public domain of the new nation was divided among the old or new free and maps were readily available and donations or concessions by various administrations including Boyers' which ended in 1843 cite the original French plantation by the names of the owner written on these maps usually granting him the "rest". The author made a complete inventory of these maps (100s of them) and a registry for the Archives de la France de



1 'Atre Mer and the Hispanic Foundation of the Library of Congress from the former's collection and the Moreau de St. Mary collection also in these archives. He has made copies of the property maps for the Gul de Sac, Leogane Plain and Debreil. The latter as preparation for a baseline study which never got off the ground. It included 974 properties.

So let us say there is some slight exaggeration in the statement that no cadastral framework exists. If you have the base map, you only have to fill in the squares. Don't try it.' Dessalines suggested he was going to and caught it at Red Bridge in 1806.

What is more the blanks to be filled in are not so blank. The fillings are in the notary's files to be found around the country. Some of these files are intact since the colonies. In one case, the author bought over 3m<sup>3</sup> of such document for the UN of Florida Libraries (58/59). They are sitting in an airconditioned vault waiting to be classified and micro filmed. The trouble is that notary files tell the history of a land grab. It is the story of corruption and exploitation. It is also the story of thousands of false sales to peasants, the story of peasant lands acquired through usury and dubious manoeuvres by lenders, lawyers and surveyors. These archives are jealously guarded and sold or passed on in a family from generation to generation.

Murray, ignorant of the above, nevertheless notes, that among the peasants that "though individual cultivators did not take out deeds (98% of a sample of 199 "owner"), it will be recalled that the countryside is dotted with pieces of paper called gra pyes, old deeds registering large blocks of property as belonging to (usually different) ancestors. It is not clear how vulnerable such deeds would be to systematic attack; but the point is that deeds do exist."

The thing about these files as they effect land tenure is that although technically notaries are officers of the court their studies are their private property. Many deeds are generations old and even the present generation of families which deposited them with a particular notary don't know that he possesses them.

There is a famous rumor here in Port au Prince right now of a very rich man who is a miser and who may be a thief and who is accumulating a great fortune in property but to hide it he uses cover names and different notaries. As he is of considerable age and frequently ill his potential heirs, one a good friend of mine, are frantic to know if he will leave some key which will reveal these holdings. Frankly, the opinion is that if he does not then all the notaries will benefit. No one believes that the notaries will deliver up these properties to the heirs.

In a similar manner land holdings are forgotten and one fine day they are sold illegally of course -- but if the heirs suddenly decide to look for their property they will face years in court and to appeal trying to prove false sale.

In one case on my own property a citizen of the town of Aquin offered to sell me a piece of my own property on the basis of an old paper which I felt was fraudulent. Later to my surprise I found he had sold at an earlier date the same land based on the same paper to a peasant on my property who naturally enough felt he owned the land. We went to court and I lost so I went to appeal. At this point a former owner (who had lost it in loan guarantee to the Bank of Canada) appeared and gave me a note to a certain notary of Aquin who produced the copy of the court case which showed that the false papers had been challenged a generation before and condemned as worthless by the Court of Appeals. In the absence of these records we were going around once again. Presented to the Court I immediately recovered possession of my land. Unfortunately, the peasant never recovered a penny from the false seller.

One of the most interesting features of land tenure in Haiti is the protection given informally by the François Duvalier regime to the peasants.

In 1957 and 1958, the Government implemented a permit system requiring an authorization to leave one commune or even a town for another area. In effect, the administration of this system prevented towns people from collecting their half from the peasant crops. Later mass migration of families who were also substantial land owners also contributed to this weakening of the "de moitie" collections. It did not, however, restrict those who accepted to join the party or those who purchased property from departing land owners. Nevertheless, for a number of years it provided a very great support to the regime and an opposition to the return to power of its opponents who it was assumed would on return recuperate their situation. It is also fairly certain that an attempt at recovery of some very considerable properties in the mountains will never be possible. However, huge land owners like the Mangones, Cassagnols, Sams, Agusts, etc. where lands are in the plains are now back under control. In connection with a French proposal to finance and produce manioc around Port au Prince I was able to obtain pledges of 750 hectares of land with four telephone calls.

In the Northwest there are also famous names and extensive properties attached to them. The Lucas at Jean Rabel, the Telson at Gros Morne to cite just two.

There is one point on land tenure worth some discussion. This is the counting of small peasant lands and equating the results with numbers of family members and number of acres of land available for farming per family.

But there is a tendency to over report family members who are in statistical terms deceased or no longer living on the property. There is a tendency to under reporting of the total number of carreaux available.

In part this is the fault of the question: "How many children do you have, madame?"....huit". In fact four are deceased but for her they are part of the spirit family -- for her they are there. If the question is "how many of your children live in the house". This will come out alright if they did not die within the last 40 days. However, you will miss those who are dwelling in the house a few yards away who are part of the active economically family. This is usually a women place and her husband not of the family makes an important contribution to the family workforce.

Of course this is a problem that can be overcome by sociologists like Sylvain-ComHaire Young, Murray et al who live in conjunction with these families and get this kind of thing sorted out. Murray's study shows that 54 percent of farm families had more than three acres and only 21 percent had less than 1.7 acres. This does not indicate wealth but if these holders were younger families with later possibilities of purchasing or inheriting land, the picture Murray paints (as does Sylvain ComHaire for Kenscoff) is a far cry from the results of more casual studies which even in 1950 were showing families with one acre or less as over 50 percent of the farm population.

There is another category of land holdings. This is "farmers of the State". These holdings which cannot be alienated are concessions of State lands in exchange for annual money payments. This is another can of worms.

Its importance varying considerably from sub region to sub region within the Northwest region.

In the Southern sub-region which includes the Plaine de l'Arbre these lands are very extensive, very likely they exceed 40,000 hectares. A major example of these lands in this area is the Thebaud farm of 300 hectares which is developed with irrigation to the 250 hectares level.

In the Anse a Foleur-St. Louis du Nord as might expected, this area already developed in the colonial period has little land of this category. Recently the GOH made grants of land held for many years by small farmers. On the official register of the "Contributions" after the last distribution of 25 carreaux only 15 carreaux are left under rental.

In the Port de Paix - Moustique center sub-region there are several major former French plantations held by the government. One at Dady has over 1000 hectares, another 500 hectares and a third 850 hectares.

There are also quite a number of smaller farmers who hold land from the State in this sub-region. One study of 103 farmers on 3 rural sections yield: 292.43 hectares. At present GOH policy appears to be to formal granting fee simple possessions to these farmers who have held land in their families for several generations. However, this policy does not appear at present at least to apply outside the center sub-region as mentioned above.

In general several surveys made over the years and the opinions of a number of well informed persons indicate a general pattern of possession of actively cultivated farms. This is 25 percent share cropped, 15 percent leased for money payment and 50 percent owned but with a big question mark as to whether this ownership could be enforced at law. Many farmers will possess and farm land in two or more of these segments of the patterns.

In conclusion the land tenure of the Northwest resembles nothing so much as the land tenure in France after the plague. Family members, small and large land owners have migrated, peasants are occupying land they have either squattered, bought (often in fraud), inherited on the basis of an invisible deed because registries are not available and over the whole, large or small holder, it is their socio-political relationship which determines their effective possession. So it is a series of Byzantine compromises with de facto possession as a starting point and ranging out from there to the rarer valid case of de jure possession plus the socio political clout to back it up. Even at this extreme, there is the sentiment that all lands were originally acquired without benefit to the State

however legal the document conceding the land to a particular. If at the highest level, the decision is made to exercise right of eminent domain, it will occur with little more than token compensation, if that.

If this gives the impression of a description of land tenure under a feudal system with local barons and the absolute power of the monarchy modified only by traditional common law then this is a fair picture of land tenure in the Northwest.

However, the major constraint is the same today as in the early national times. What good is the legal right to possess land unless you can make it pay. This means finding someone to work it and provide a revenue to the owner.

Even the State may well hesitate to use its unquestionable rights, The disaster of the Rubber Development program predecessor of the SHAD A which acquired vast lands in the Department of the North provoked a near famine and a near revolution by destroying over a million fruit trees essential to the peoples food reserves. The author intervened in this case carrying ship loads of corn and cassava bread to the Borgne and Cap Haitian to reduce panic level prices and received the personal thanks of the President for breaking the black market contributions to the political instability which resulted from this land group. It is reasonable to assume that the lesson has not been forgotten.

Major increases in production are possible within and without disturbing the present tenure modus vivendi. It is perhaps then better to let the sleeping tiger lie.

If the approach is made directly to the small farmer and the program oriented to his mixed crop farming or to the medium sized owner farmer who can plan on a larger and more technically oriented scale of through supply/regular essential inputs and if possible some credit minimum dislocation is very probably the result.

B. Economic Organization

2. Rural Sector

b. Human Organization

The organization of man to deal with the problems of limited resources of whatever nature vary according to the various subregions of the Northwest Region.

The scarcely populated 60 percent of the region is a sub-region which has much of the principal characteristics of Arizona and Nevada. Vegetation, even the Palo Verde tree of Arizona is present, cover the land with mesquite, cactus of many varieties, and the hardest of all woods, the Gaiac or iron wood. Occasional aroyos betray underground water flows with a striking, green vegetation. Still rarer, an oasis, spring fed will reveal a small paradise of fruit trees, bananas, cereals and root crops. This is the southern subregion and in spite of the above perhaps the area with the greatest promise and medium run potential.

Three orientations have developed in this apparently unpromising area. One is a combination of fishing village, charcoal business, and stock raisers. The fishing villages, often when conditions permit have developed their own source of salt by mining the sea water in ponds. The rare springs scattered along the coast and in the foot hills provide water for man and beast. The vegetation has a holding capacity for about one head per 10 hectares but cannot carry this much because of a lack of water holes. Since about 30-40,000 hectares are easily accessible, water holes should make possible a production with a 20 percent take off by 3-400 cattle.

However goats find ample food from mesquite and shrubs. There is a numerous if uncounted population. There is evidence of selective breeding of goats as most nannies observed has two kids.

Charcoal production is important if a long run negative factor, about 40,000 to 50,000 tons come from the Plaine de l'arbre to Mole St. Nicolas. With charcoal prices at US\$4.00 an eighty pound bag and almost half of that staying in the subregion this has created an important source of buying power for food and other goods. Even at the lowest estimate of 40,000 tons this "export" product is worth \$2,000,000 or \$80.00 per capita to the southern subregion annually.

The salt industry is also not a negligible one. Concentrated around Coridon but with some production West of this village the salt ponds have made at least one local millionaire. These ponds have been closely held by individual families who have been able to provide the capital necessary to construct the ponds and the income from the ponds is hence very closely held.

The greatest debate of the subregions economy surrounds the question of water. The evidence of sub-surface water is widely evidenced by springs and trees which could not survive the climate without a subsurface supply of water. However, the FAO attempted a drilling program from which they concluded that this source was negligible if drilling and pumping were to be required. There was, however, some debate around this conclusion because the estimates of the drilling contractor were rejected by the FAO experts.

As if to give the lie to the experts a Haitian agricultural group obtained a land concession and certain advantages of the investment acts and proceeded to risk private sector money on a 250 hectare plot between Coridon and Anse Rouge.



The field party visited this experience and without prejudice to the FAO experts a year after starting 4 wells are supplying water to the 250 hectares now under development. The owners after a year experience are well satisfied. They are planning more wells and an expansion to 800 hectares.

Output results have been very satisfactory for a wide variety of crops which were grown during the first year. Corn, Millet, onions, eggplant, shallots, garlic and many vegetables crops were tested. One very successful return was made with groundnuts, that is 360 marmites for 20 marmites planted. Twelve thousand pounds of sorgho were made from a hectare in two cuttings and while not a record this is very promising. The company is having some difficulty in organizaing its inputs for seeds which correspond to the different climate condition over 3 crops cycles and claim a need for a marketing expert. The road over which they must evacuate their crops, if they are to use trucks instead of sail boats.. this road is best described as tortuous. The company does not enjoy any credit, government or otherwise and has not sought it , in any event.

There are some 30,000 to 40,000 hectares of similar lands, although with varying slopes which are not necessarily conducive to the crops this private sector venture is planting. It is obvious that these lands could produce excellent crops such as citrus for juice and cattle feed and other lands with minimum periodic irrigation would provide a level of pasture for grazing and support substantial herding. The comparaisn with the Awash Valley of Ethiopia is difficult to avoid with its excellent orange and grapefruit production and winter vegetable production for canning and export.

According to the companies records all costs on the first 250 hectares including concrete aquaducts and secondary canals, buildings, land clearance

and carrying the first crop fell a little below \$2000 a hectare.

It appears that further research is necessary before this area is written off. While a regional development plan would be necessary to obtain a realistic estimate of the population carrying capacity of these plains and the greatest cost-benefit utilization of what water is available for long-term development this private sector venture's results seem to plead more in favor of a study of this nature than the FAO reports.

In contrast to the fragile ecology of the southern sub-region the northeast subregion appears a paradise. Situated in the lee of Tortuga Island and backed up by mountains which rear up to 1018 meters, this area harvests the rains of the counter trade winds. Striking a line from the department's border with the Department of the North, in a good year rainfalls is up to 2,000 mm (80 inches) and declines to about half that above the right bank of the Trois Rivières Valley and Port-de-Paix. Here water is only a problem in very dry years.

Since the earliest colonial times this region has been recognized as coffee and cacao country. Also because the Sucrin tree is used for cover a very fine wild honey and beawax are produced. The lower slopes which benefit from run off of both surface and subsurface water produce vast quantities of citrus, breadfruit avocados and mangoes which are among the export crops of the lower altitudes. Among this plenitude of fruits are planted the many root crops of the country and the production of ignames and malaga much sought for the Miami and Bahamas markets are widely grown. Along the lower regions are a multitude of springs, particularly around Anse à Foleur, plantains of 10 to 12 hands are common and the "Gros Michel" eating banana is still in production. Two lakes fed from fresh water springs of 300 plus acres each provide carp and other fresh water fish between Anse à Foleur

and St. Louis du Nord.

From August to November the mouths of the numerous rivers and small streams are covered with the runs of the "pisquet" a small sardinelike fish, particularly on the last quarter of the moon. Tarpon of great size are attracted to them in the summer and are also caught on lines or in line nets in the evenings. In the fall and winter there are runs of the great fish migrations even bonito and tuna are caught by local fishermen. In the deeps the famous West Indian red bottom fish " Vivaneau" are brought to the surface by fishermen for the local market.

Could there be a problem here ? Yes, for man is as fertile as his environment. From Port-de-Paix to St. Louis du Nord it looks like a line village bordering the miserable road which overlooks the sea.

Another problem is that as man presses on land, hills with slopes of 45 degrees or more are attacked for wood and crop growing during the rainy season. Admittedly the soil conservation program struggles against this, but the controlling agency the DARNDR at the time of the field parties departure had only one working jeep of the three assigned to cover the whole department. Local agents did not even have bicycles. In an areas like this with high quality soils and heavy rains, soil conservation requires constant renewing and protection against man,

In the high mountains behind Port-de-Paix as noted elsewhere a food for work program was doing an excellent job but it cannot be a one shot approach. Also in this region it can have a real pay off.

This is because the situation is only beginning to degenerate and valuable soils are still there to protect by terracing.

Another problem is renewing of planting stock. Inspection of coffee in the

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At this time the price was \$1.38 pound C.I.F. New York or about \$1.30 F.O.B. Port-Au-Prince. The Government taxes collected at export was \$0.56 lb. reaction of Anse à Foleur farmers is not dissimilar to that of farmers in other countries under similar circumstances.

The Trois Rivières - Moustiques subregion is a less favored one as far as rainfall is concerned. It is true that the Moustiques Mountains in good years can reach 1200-1500 mm a year but this is rather the exception. In general it is a region of 1.000 mm to a low of 700 mm in good years, as little as 600mm in very bad ones. Dry land farming therefore is a somewhat risky one except for one rainy season crops. However as this is a major drainage area rains collected in the high mountains behind Anse à Foleur, St. Louis du Nord and the Moustiques Mountains drain into this subregion. Fruit trees particularly breadfruit and mangoes are to be found along villages and by the sides of the rivers, Sour orange and other citrus particularly the chadèque are common as is the lime tree.

At one time this was a major tobacco producing area with a private sector company giving technical assistance and buying at fixed prices. However, since the monopoly of the Regie du Tabac, this crop is no longer widely produced. It also was an area for production of the " Gros Michel " but after the departure of the Standard Fruit Co this product also declined to a small production of bananas. The plantain has now taken its place and is intensively cultivated. Essentially this is an area of small farms and small farmers. There are three major state domains of about 300 plus acres each but privately held lands are much smaller and in the irrigated areas 16-18 acres is considered a big farm.

Many families farm several "pieces" of land of less than an acre each.

An effort has been made in the principal valley to introduce irrigation. However, there is no regional organization with its own funds to promote this original effort. About 400-500 hectares of irrigated lands are served with electric pumps. Unfortunately electricity is not always available from the small production unit. A case of "For the want of a nail" and the production from these lands is uncertain although a considerable effort in canals and other investment is present. In other cases canals or pumps are inadequate to the task at hand. For example Fon-Coq has a 6 inch pump and only 10-15 hectares out of 31 hectares are in irrigation. A 10 inch diesel pump is necessary for full utilization of 800 meters of primary masonry canals and eventual full production of the project. In another case the canals were built too low relative to the surrounding lands and fill with soil after a heavy rain which has led to abandonment of the project.

In the case of a successful project (80 Ha.) there is a serious drainage problem (Tichansolme). At fond-Duroc the engineers explained that the basic study never resolved the distribution problems which involves a lower and a upper plain. Another with gravity flow has only 10 hectares irrigated out of 31 in the plan,

The above gives some details of the problem in this area which with plenty of water and even a hydroelectric possibility of 4000 Kw according to an FAO study is operating at a low output relative to capacity.

In light of this state of affairs it may appear vain to discuss future irrigation but a very important potential is present and aside from the river it appears very likely that wells could be placed in production. The valley has temperature ideal for tomatoes almost on a year around basis, particularly at Aubert and could easily make the present importation of tomatoes paste unnecessary.

If water transportation were possible it would help solve the problem of scarcity and high prices of plantains, a mainstay of diet at Port-Au-Prince. Export outside the country can also be considered as a possibility. Above all irrigation is a resource of great importance in a country where people die of hunger when there is little rainfall every five years or more often,

There is also the question of tree crop development. This requires further research, but the areas micro-climate suggests the development of the oil palm tree. These trees which were successfully grown at Damien near Port-Au-Prince and at les Cayes would have a better opportunity here in normal years and if irrigation were available would very possibly be a high producer of quality oils for human consumption and for soap. There is also evidence from other vegetation that the Aloes plant now much sought for sun creams and cosmetics could make some of the drier areas productive of revenue,

The Moustique mountains on the West border of the area were in colonial times producers of the famous Moka type coffee. A program similar to that for St.Louis-Anse à Foleur suggests itself here. The lower valley of the Moustiques Mountains is a considerable salt plain which requires a river control system to reach favorable levels of production. However, given the problems and the possible benefits it could seem to enjoy a low priority.

The Port-de-Paix subregion is an excellent example of the fact that you can come into a country like Haiti with a great idea and one shot program and obtain very little result for your time and money. A system has to be tested and found valid before it is turned over to a local group or the DARNDR for operations.

In this case, a series of small projects in excellent land held high promise but as is almost inevitable, errors in planning and execution were made, particularly in the organization of the electric pumps but these errors were never resolved. Hence the system limps along at a fraction of its reasonable output. DARNDR has the overall authority for these projects. They have put two engineers and a small staff to assist them and they understand the problems quite well. The field party found no reason to question either their competence or their good will. However, they have no direct authority over the supply of electricity for the 6 ten inch electric pumps which are at the heart of much of the system. The equipment for maintenance and improvement of the system is clearly inadequate. They have no capital improvements fund to buy pumps where they are badly needed and every sack of cement must come via the Port-Au-Prince Damien bureaucracy. If they impose a tax on the water the money would be collected by the "Contributions" under the Ministry of Finance and go to the General Funds of the GOH. Presently, as well, they share the one remaining DARNDR Department of Northwest jeep as the only vehicle available for them to monitor the system on a daily basis.

In terms of management principles any governmental authority to be efficient must relate to those who utilize their service. The further the decision making mechanism is from those it serves the less reliable it becomes. A Trois Rivières Valley authority which included local interest on its board of administration and where local people could independently make known their dissatisfaction or even collect local funds for capital improvements would provide a mechanism for these technicians to reach higher authority. As it is, the field party witnessed, the removal of the Agronome de District, the highest DARNDR official in the Department



after his having made a very strong protest at a meeting at Damien. This agronome with a Masters degree from Texas A. & M and of local origin has for a year and a half been struggling to help his district and has operated with an impressive success a Food for Work program. He is now assigned to the agricultural research division and presumably the new replacant will have learned to be a little less audible in favor of the Northwest.

DARNDR has 650 vehicles of which at any given moment a third one under minor or major repairs. The USAID under the M.I.T. program has spent a small fortune for a Puerto Rican expert who cannot speak neither french nor creole to reorganize the garage and transport services. He has produced a huge pile of documents laboriously translated into french and read by very few indeed. To the author's direct knowledge ( the garage expert had a desk in his office ), the expert spent almost 80 percent of his time there and 20 percent in the garage. " You cannot work there, it is too hot." The contractor pretends, to believe that everybody in Haiti speaks spanish, whereas at the level of the garage, barely 20 percent even speak french. The critical question of servicing the Departments where the services of DARNDR are actually taking place has simply been neglected. My recommendations to organize a regular inspection and maintenance team to maintain a continuous service in the Districts was accepted by the Minister St. Clair and this was in the progress of organization when the present Minister replaced him. This system was then abandoned, The Districts cannot obtain adequate transport and service for that transport because the District Agronomes are not high enough in the power structure, so an average of 60 percent of vehicles relate directly to personnel at Damien. Other vehicles are assigned to specific projects or technical assistance personnel and the Districts come in last. The result is that the vehicles they do get are utilized well above a desirable level and do

not get adequate inspection and lay down time for maintenance and minor repairs. It is a syndrome where inadequate material are used such that they become eventually totally unusable.

The fourth subregion is the Jean Rable - Môle St-Nicolas area. This area has been more successful than the others in obtaining government services and local leadership in the community is strong. An oasis surrounded by both the Môle and Jean Rabel by high mountains the drainage run off provides for irrigation systems which are either in the process of improvement or could easily be extended.

Considerable soil conservation in the mountains has been made and a nursery provides fruit trees to the farming community.

An important charcoal industry is also present and there is a good possibility of developing a fishing industry if the means of marketing the catch were possible.

The population problem is also evident in this region and in very dry periods this area is number one for disaster. The first logical step is to place adequate grain storage within the area. If sorghum and/or corn were purchased at harvest time from the Anse-Rouge area and brought north by the sail boats coming to load charcoal the cost of the basic grains would be minimum. As the area is very dry it should be possible to dry grain to the 7-8 percent level where it would store with minimum loss. If the corn weevil is present temperatures could be raised to kill the eggs deposited in the grain before they hatch with a simple drying oven. As in most years there is a rise of 100 percent between harvest price and end of season price, if a small corn mill were part of this unit enough earning could be achieved to make this storage unit self sufficient. Sorghum if properly dried and stored can hold for two

years experience has shown that to prevent disaster stocks must be in situ.

Some research could be justified in examining the possibilities of early sorghums which would give a satisfactory result on 600 mm of rain during short rainy season. Aloes or other similar plants perhaps even exotic cactus for house plants could be developed into an export crops. Date palms have been grown successfully at Gonaives and the upper valley of the Mole would lead itself to this crop. While it is necessary to teach hand polonization for these trees, it is not really a complicated process and the food value of the yield per tree is very high. The fruit also has the advantage of conserving very well when dried.

Again here the possibility of developing well and all that would mean in this dry climate is obvious, the only concrete evidence we have is that its geological formation is similar to Anse-Rouge and the Baie de Henne. If a drilling program is attempted in the Anse-Rouge-Baie de Henne subregion some test wells in this subregion if successful could well justify the effort and investment.

#### SUMMARY

The Northwest Region is inhabited by a population which has demonstrated an ability to produce and survive even under disaster conditions. Their willingness to participate in food for work puts to test any idea that they are lacking or unable to apply themselves to new skills. Breaking stones and laying walls on the sides of 45 degree hills in the sun is not easy work. Like most isolated peoples they appear to have a strong local attachment. The field party spoke with several emigrants who had returned to very minimum situations, even after

a long period in the U.S.A. and they were content to be back in their "pays".

Because of the physical division of the Region and the miserable infrastructure, economic organizations trends, as described above, to center around four different models and transport to be oriented to water routes. This has provided a human infrastructure now servicing the fleet of motor vessels - now serving the Bahamas- Miami route. This infrastructure conceivably would be oriented to cabotage and operations of fishing boats during the various principal fish migrations.

The region requires a long range program in order to recover from a century and a half of neglect and to provide the output needed to provide a decent living standard by haitian criteria for its growing population.

The eventual increase in coffee and cacao production would compensate the GOH in hard currency earnings for a very considerable effort in its part. Perhaps some agreement might be reached to use increased revenues from this source to support a regional development fund which would match foreign donations. This fund could pay local labor in gourdes, while conserving the hard currency advantage to the national Government. This over a long period could both support infrastructure maintenance and provide for new capital improvement. Certainly the people farming coffee and cacao will be more enthusiastic about supporting this present heavy taxation if some of the funds were being fed back as soil conservation and or improvement of infrastructure in their area.

If the estimates of increases in potential for coffee and cacao appear unrealistic in view of present exports, the country ( and this was principally the Northwest Region ) did produce cacao exports of about 2,000,000 kilograms in the 1950's. As present prices of \$2,000 a ton, the lowest in a long time and 10 percent below the floor level of the International Cacao Marketing Association,

the total value of 2.000 tons for Haiti is still a considerable sum. The Region produces 3,500.000 to 4,000.000 lbs coffee. This provides an average of \$2,000.000 or more in revenues to the national Government. The author believes that introduction of superior varieties of coffee plants already field tested at Camp Perrin could easily increase this figure by 250 percent. This implies replacing present coffee trees in poor condition by a five year replanting program. When all these replacement trees are in full production in the ninth year of the program the output would be 400 percent over present production. But, it means a strong subregional project to achieve and hold these averages. Some of the tax income must be returned to the taxpayer as a question of national policy. Fortunately as Haiti is far below its allotted national coffee export quota marketing will not present a major problem at these output levels.

This requires a five pronged project :

1. Replanting a high output coffee and cacao
2. Sustained rat control for the Region
3. Planting of flowering cover trees ( to protect coffee and increase honey and wax income for farmers)
4. Sustained technical assistance and supply of adequate imports (fertilizer and Insectides)
5. Continous program of soil - control including repair and maintenance of structures in being.

The development of irrigation by wells and small units ( Trois Rivières) should be implemented as soon as possible. Research based on the experience of the Anse-Rouge Thebaud farm should be continued and implemented possibly by resettlement of returning economic emigrants if investment funds make this possible. Models like the Taiwan-Kou Valley project are available as examples

of how this might be accomplished.

In this event a balanced subregional team which includes rural sociologists and anthropologists is a must to avoid errors and guide human development patterns within the project area.

There are at least 4,000 hectares which can be developed in the Trois Rivières area and there are 30,000 to 40,000 potential hectares in the Plaine de l'Arbre - Baie de Henne area. An area somewhat larger than that in production in the Artibonite Valley area. The author was a member of the first field party for this project with Mr. Gingrass of the USDA and Mr. Lynch for the Reconstruction Finance Corporation and the Artibonite Plain looked a lot less promising then than the Plaine de l'Arbre today because of the salt ponds spread over all the areas now producing 2-3 rice crops a year. The question is " Is the water there ? " Only adequate research can give the answer but the Thebaud Farm is present and a fact.

RURAL SECTOR

CROPS, CROPPING AND MARKETING THEM

Fundamental to an understanding of Haitian production and economy is a clearly perceived picture of the market structure, crops and cropping orientation.

The major obstacle to analysis is the persistent insistence of economists in dividing Haitian farm production into "export " and "subsistence" crops. The author in his Man and Land in Haiti in 1958 made a case for the market orientation of all Haitian production and the horticultural crop Orientation for at least 80 percent of it. This position has been supported by every anthropological study since then, including Murray's in 1977. Nevertheless, the studies made by recent economic development analysts persist in treating these categories as if they were two separate and distinct productions-one "export" oriented to the market and the other oriented to subsistence.

The Haitian farmer has always looked to the market and if some of his crops went to Europe or into the stomachs of his fellow nationals what he was concerned with was whether he could sell his produce and for how much.

Given the Haitian farmers long tradition in dealing in the marketplace it is an error not to appreciate that he studies opportunity costs in preparing his product game plan. Of course, experience has taught him that some crops will give little or no results on some "views" of his land or even in his general area. This may limit the number of crops he will attempt but for those within the parameters of choice, he has a very close idea of what returns this or that crop will yield in money terms over this or that other alternate crop.

A further element in his decision making will be the possibility of crop failure because of low rainfall or excessive heat during growing period. Also he has an historical knowledge of attacks of caterpillars, fungus or other pests.

He not only knows this in an abstract sense he has a creole word for them and knows when in the year they appear and how they affect or ignore his potential crop pattern. But like all farmers he is an inveterate gambler, if he puts aside a "piece" of land for the virtually indestructable manioc, he may give high paying shallots, onions, tomatoes, cabbage or a few plantains a try even though he knows that he will need a better than average climate to bring in his mini-bonanza.

He also knows the advantages of tree crops and how to use them in association with other crops which do not require high levels of insolation and or those which will be in danger of a blow down and can benefit from a windbreak .

Just how important is coffee in all this to him? Will he plant it, take care of it ? Just look at the price history of coffee related to the price of other crops and you have the answer. Also as mentioned above, will a few coffee trees fit into his fruit tree complex. One or another of these two elements will help him make his decision.

How about rice, cotton corn or other crops which are being extensively promoted by the GOH ?

The Artibonite River Valley is one of the next promising for rice and cotton. Indeed considerable production of these crops is always present in the valley.

However the haitian farmer will not restrict himself to mono-culture of rice or cotton. In 1980, small farmers there purchased 1,500 pounds of Grammex onion seed, enough for 750 acres. They also purchased tomatoe, eggplant, cabbage and other vegetable seeds, as well as receiving a considerable quantity free after the hurricane Allen. Something very close to 2,500 acres in the Valley were planted to these products.



Price at least in part is one explanation. With rice production at 2,000 lbs /acre and \$0.40lb. cotton at 1,000 lbs/acre and \$.0.35, they make poor competitions for onions at 15,000lbs/acre with prices from a low of \$0.10lb. to the season high of \$0.40 lb. Input costs are higher for onions. Grammex seeds are \$37.00/lband a ton of 10-20-20 fertilizer for an acre costs \$235.00. This doesn't stop the Artibonite farmer from making this investment. He is quite capable of calculating where his advantage lies.

Therefore to speak of cotton or rice as a market oriented crop "import substitute" or "export " and hence something special is trying to pretend to something which does not exist in the mind of the farmer. The farmer goes for the botton line like every other entreprenneur who wants to stay in business.

The same kind of farm plan goes on for different crops in other areas which will because of ecological conditions and price will produce different outputs, but if coffee, cacao and other "export" crops are to be seen favorably the eventual decision takes place in the market or in the ecological context of production. The idea that the farmer raises coffee, etc. for "cash" and these other crops for subsistence is a major constraint on the thinking of any planner for economic development in Haiti. The only ones for whom these "export" crops mean " cash crop" are the tax collectors at the ports, the 25 export houses and army of "speculators" that work for them. Needless to say the farmer does not give them a preference in his planting decisions.

It is well to cite specifically the major volume Haitian crops not usually specified as such in the literature. As was seen from sales of onion seeds the output of these crops has to be measured in thousands and even tens of thousands of tons. These crops are eggplant, tomatoe, cabbage, militone, ( summer squash)

igname, pumpkin, onions, beets, beans, carrots, and leaf crops. The demand for these crops is highly inelastic over certain high price levels and highly elastic at lower levels. While for fruit, it is fair to include avocados, breadfruit, mangos, and citrus as a major market crops at lower price levels. Equally, as mentioned by most reports, the demand for plantains is enormous even at high price levels.

What has been happening in the Haitian markets since the 1970's has been a general price level rise for all crops. However, some of the above crops enjoy in many favorable climates a dramatic output per acre. For example, 30,000-40,000 lbs of eggplant per hectare is not unusual.

Now varieties of NVF resistant tomatoes are producing 30,000 lb/hectare. Certain cucumbers and melons are also proving heavy producers. This phenomena is creating a competition in some areas for the more traditional maize crop with outputs rarely over 2,000-2,500 lbs/ha. under traditional culture practice.

Not very many years ago maize was an important low cost food in Haiti. A marmite ( 5½lbs) could be bought at harvest time for not more than \$0.20. In 1950, the price was half of this one. While prices for corn rise substantially between harvest, it also stores very poorly except under modern conditions for drying and fumigation. The peasant, therefore usually reserved only a small portion of this production for family consumption and seed and sold the rest at harvest time.

Now he finds he can sell almost an unlimited amount of eggplant to the Mme Sara for \$0.03 to \$0.05/lb. and by planting following the rains his production will come in over six to eight weeks. This as an early crop will yield upwards if \$2,000 /ha and in mid-season a low of \$900 cost an average of around \$1,200/ha. It will be rare indeed when maize after all the trouble of fighting caterpillars

picking, drying, and shelling yields him more than \$600-\$800/ha.

The urban family facing high meat prices buys the eggplant as a thichener for the family stew. In mid-season when prices drop to \$0.03 lb wholesale and \$0.04 to \$0.05 retail the average haitian urban family consumers more than 2lbs. a day of eggplant.

A similar pattern exists for the tomatoes hence what is being witnessed is a change in preferences which has been prompted by substitution within the haitian family diet.

The haitian farmer has followed this trend via the market and has responded to it by substituting vegetable production for cereal production in areas which are more readily adaptable to these crops.

This brings to the attention the fact that the author's figures above are highly speculative based only on his experiences and observations of the Haitian market's activities. There is a real need here for serious research which will not only produce magnitudes but relate revenue levels to preferences and the propensity to consume these products when family incomes change. That is what professional market economists call the income elasticity of demand and the levels of substitution among non-complementary goods. Here is an area of marketing for products far more important in volume and in value than "export" crops which has not been touched on. Given the present price levels for these products today (1981) this research may produce some unexpected changes in present estimates of national and per capita income. Note that the prices cited were farm gate prices and at the lower level consumer prices would be 60-100 percent greater and at the higher level 30-60 percent greater and value added is at the consumer sale price.

Much of the misunderstanding about the huge volume of these crops raised and sold is from the fact that during a normal crop harvest period eggplants for example are flowing into the markets from several thousand individual small units. When a planter arrives at the wholesale market with a ton or so he meets immediate resistance because he is trying to enter a closed market system from a single entry point and with an unfamiliar quantity. The resistance he finds from the Wholesale " Revendresse" gives the impression the market is saturated. While he is sitting there trying to sell his 2000 pounds, a dozen Mme Sara will arrive in trucks with 500 or 600 lbs each and immediately dispose of them to their habitual clients.

To test this theory in 1981 in full crop season for eggplants the author having experienced the above resistance withdrew from the market, broke the half of the shipment into 40-50 lb bushel baskets and sold them delivered to the "marché Sauvage " which sell on street corners on the main streets. Each market took 3-4 bushel with no difficulty at \$0.01 higher than the going price at the wholesale market where he had had resistance at that price. Then the rest were sent by two trips of 500 lbs on a tap tap with an employee of the farm. He sold them immediately by giving one gourde per 90 lbs off the \$0.05 price. This procedure was repeated throughout the week with no problem.

Other crops such as carrots or red beets do not present this same problem. In one case, a truck-merchant arrived with two truckloads of carrots from Don Don (5 and 7 tons) and liquidated them with no problem in a morning.

It has been said that one hundred acres in modern production of vegetables could saturate the Port-Au-Prince, market. What is more likely is that if the production from this acreage is suddenly added to the flow from other plantations all over the country a glut for a few days could well be the case.

When wholesale prices for eggplant are in the \$0.3/lb level Port-Au-Prince daily consumption is close to one Million pounds. That is , if a large one pound black beauty eggplant is selling at retail for \$0.04. One million will clear the market in a day in all Port-Au-Prince markets. That is roughly equal to the output of 25 hectares under irrigation and fertilized with chicken manure.

The other edge of the knife is that small farmers will accept as satisfactory a lower price than that at which a modern farm will consider as profitable. As was demonstrated above.,the farmer has a satisfactory (\$600 to \$800/ha) return at \$0.02/lb for eggplant.

Within and also outside these markets a web of speculators and Mme Sara (women traders) serve as collectors and intermediaries within the total natural marketing system. The farmers generally limit their marketing activities to export products-coffee, cacao, castor beans, hides or other products of minimum value like bees was and sisal whose importance vary considerably at peaks of price cycles. The speculators maintain a relationship with the small farmer often advancing small sums against future delivery of crops. They are rarely completely independent and more usually have both a commercial and financial arrangement with one of the 25 major export houses.

The women traders deal in all kinds of merchandise or crops aimed at local consumption. They must be distinguished from the farm wife trader who usually limit their business to thier own family production and will sell to the Madame Sara in their local markets. The Madam Sara however, do not limit themselves to formal markets. They will cover an area traveling with one or more animals and buy up crops or fowl according to their specialty. Many limit themselves

to chickens or other fowl and will only occasionally handle some other items often as a service to a supplier. They are in turn linked to "revendresses" who are stationed in major markets and who deal either in wholesale or retail within a particular market. The "revendresses" who are normally wholesalers will have one or more of the younger members of their families assist them to learn the trade and these assistants will retail during periods when wholesale supplies are short. Thus they will maintain their expected daily revenues by picking up the retail margin when wholesale volume drops.

It is interesting to note that 11 of the 37 official markets of the Northwest are also oriented toward water transport. As noted in the transport section of this study charcoal cargoes are an item for which coastal boats are successfully competing with truck transport. There is an important export boat trade directly from the Northwest to the Bahamas Islands. This is mostly for fruit and vegetables. About 160,000 stems of plantains and large quantities of mangos and limes are an important part of this trade. Captains of vessels buy directly from dealers in the port cities and own their own cargo.

Margins on produce vary widely mainly with reference to perishability of the item. Plantains will sell for 8-10 gourdes a stem at the local market, about 15 gourdes at Gonaives and 25 gourdes at wholesale Port-Au-Prince. This is for a stem of 7 hands which will contain about 65-70 fingers which will retail according to size (and to some extent by season) from 50 centimes a piece to 3 for 2 gourdes. Eggplant, tomatoes and other vegetables which can easily be packed will sell by the sack or bushel basket. The Mme Sara buy them up in local markets and sack them for trucking. They will often then be resold to "revendresses" and street vendors at "Marché Sauvage" (not official markets) on a standard bushel basket with about 40-50 lbs weight depending on the vegetable.

Onions are also sold this way but as they can be held longer there is a category of merchant between the Mme Sarah and the "revendresses" who store them during the high crop period and spread out his sales hoping to profit from later scarce periods. Since in recent years between crops onions have traded between \$10. and \$50. a hundred weight these hopes appear to have a basis in reality. There are also speculators of this type in corn, rice and sorghum which benefit from inter crop price swings of the magnitude of one to four at the end of stock period. There are of course loses which result in reduction of these windfall profits.

#### PRICES

The most interesting phenomena in the marketing system has been the growth of price averages for all crops sold in the interior markets. The advantage in growing these crops does not appear to have stimulated an offsetting supply to meet the shifts in demand from urban and other purchasers. Hence prices have been accelerating for many of these food crops.

There has been an increase in coffee prices but the relative rate of exchange appears presently to favor the local market crops. The more so because they operate largely outside the tax structure and for share croppers/owner divisions, it tends to escape control. Even during the colonial period these crops were considered the property of slaves and some slaves managed to buy their freedom via this route.

## SUMMARY

The micro nature of the Haitian marketing system has conditioned farmers to an extreme awareness of price. His production, to the degree that he can obtain needed inputs and subject to soil and environmental conditions, is oriented toward the market and not to subsistence. He avoids monoculture and produces a mix which ranges from almost certainty crops to those with a high percentage of risk, hoping to optimize revenues. If he holds some of his produce it will be for seed or to avoid repurchase of items of usual consumption. An exception to this is when it is financially feasible, he will also hold crops against the possibility of selling them at a later date for a better price.

The absence of the supply of agricultural inputs by the market is a critical one. No research paper on markets or otherwise mentions this defect. The Ministry does provide for some distribution of maize, sorghums and bean seeds but when the author was at the Ministry there were frequent complaints regarding an inadequacy of even this small effort. If progress is going to be made, these inputs must be included in the marketing system. The author interviewed the Agronome Gerard Boucard whose organization (private sector) is the major supplier of seeds and other agricultural inputs. They have one shop in Port au Prince and sell to three small shops in Kenscoff. They report that peasants have learned to use and do use these inputs when available and his firm do what they can with their present capital but they are too small to cover the nation even on a small basis.

Markets are supposed to be a two way street but in the case of inputs the Haitian marketing system responds poorly to the farmers' needs.

Also when seeds are available they do not necessarily represent varieties which fit his crop cycle. Often they are not resistant or tolerant to common diseases experienced by the crop in Haiti. As well only wide scan insecticides or fungicides are available. In most of the country they are just absent.



Tools common in other countries where widespread horticulture is practiced are not even offered for sale. Hand/wheel cultivation like "little giant" and weeding hoes which can normally be expected to increase efficiency in weeding, a major constraint in Haiti are simply absent. Obviously achieving widespread use of these innovations requires extension work, training and ultimately convincing the farmer of their utility. In the case of Haiti, even step one has not been taken but if it had been, the farmer would have no place to buy it.

It is interesting to describe markets and be amazed at how the products of 500,000 or 600,000 farms are distributed by a primitive wasteful micro-mechanism. One could well say, don't knock it, they had to invent it. But a system which does not supply the basic inputs needed to increase outputs, even provides the wrong thing needs some research on how to fill these gaps.

## B. ECONOMIC ORGANIZATION

### 3. The Sea

The Republic of Haiti's coast is at the center of a serie of currents some of which have been definitely associated with major fish migrations.

To the North of the region a westerly current moving along the coast is a division of the North Equatorial current. On the South at about 50 miles off the coast is another branch of this current also moving in a westerly direction which has been reinforced by the equatorial counter current which enters the Caribbean sea at the Dragons mouth off the North coast of Venezuela.

These two movements join as the North current moves around Mole St. Nicolas and takes a South Western direction.

The result is that the principal migratory fish movement have access to a long low bench which extends from the South coast of Haiti to almost Navasa Island. Fish migrating into this area have been observed and caught as far as the Bay of la Gonave and large schools of Bonito, and Tuna have been fished off Mole St. Nicolas. Fishermen on the North coast report the area from Tortuga Island to Cuba is being particularly rich fishing grounds.

Fort St. Antonio on the North East coast of Jamaica is a famous sport fishing resort.

All of these areas are within the sea land borders of Haiti.

About 750 fishermen exploit the Haitian coast. Some go out for several days carrying sour oranges and salt to preserve their catch. No ice supply is available hence modern principles of fishing in tropical waters as practiced on the West Coast of Africa is presently possible.

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of faulty measures and casual observation but given the lack of hard data it may serve at least as a guide for future research.

The general fishing season begins with the tarpon in July, this is closely followed by sardines and mackerel which reach an important catch in September. In October and November the schools of Dorados begin to invade all the waters of the coast as do Jackfish and somewhat later Tunas. These are followed in December by sailfish which used to come all the way into Port au Prince bay. Marlins are the last to move in and have been seen or hooked off Mole St. Nicolas in January. Other fish like the Carange and red snapper also are present in winter. These fishes are much appreciated by Haitians.

There is also a deep sea fishing practiced by Haitian fishermen who have learned where reef edges drop off into great depths. The principal fish they seek here is the Vivanneau a red fish which lives at such a depth that it dies from the bends in being brought to the surface. It is considered a fine eating fish and as found North or South coast wherever great depth exist.

Shrimp, crayfish and lobster are also caught off the Haitian coast. However, not in sufficient quantities as to be a potential export crop, at least at present. Also these shell fish are much appreciated in the country and sell for up to \$5.00 lb at present supply levels. It is said but the author has no proof that occasionally huge Florida lobsters and stone crabs are found at great depths. However, this depth is not regularly fished because of mechanical or technical difficulties.

One potential source of concrete data might be found in Jamaica which shares national waters with Haiti. St. Antonio on the North East Coast of Jamaica has long been an important sport-fishing port and it is possible that very precise information about migration fish are kept there. If a research program for sea fishing is contemplated this information could be a point

of departure in planning a pilot research project.

If very good information were available the Caribbean current South of Haiti could be fished all the way around to Tortuga and even North to the limit of Bahamian territorial waters. At no point is the current more than 50 miles off the Haitian coast and for a good part of the year it is right off shore. The fishing period might be long enough to make fishing an economic enterprise. When fish are in the Jeremie, La Gonave, Mole triangle, a government helicopter could report rising Tuna schools by CB radio to small boats and reduce searching time to a minimum. Such a system might be included in a research plan.

#### IV. INDUSTRY, COMMERCE and SERVICES

##### (a) Organization of markets and commerce

When one leaves the area of rural markets and the marketing of farm products one enters a completely different marketing system.

In this case the chain begins with the principal import houses of Port au Prince and for a few products local manufacturing units also located in the capital.

The major items of commerce are textiles, flour, oil, soap, cement, tinned milk, sugar, shoes and leather goods and a multitude of spices and tinned commestibles. There are also the luxury items of the people; cigarettes, beer, soft drinks, rum, whiskey and wines.

Port de Paix and Jean Rabel are the two major redistribution centers. During the dry season merchandise moves on over the mountains by truck and by sea. In November coastal vessels tend to move more and more freight as roads become virtually impossible for heavily loaded trucks. On the nights of November 4th for example the field party was held up by a river before Eassin Bleu. Eventually the four wheel drive vehicle was able to traverse the river but two heavy trucks with 350 sacks of flour each turned back to wait for the terrain to dry out before they could make their attempt the next afternoon if there was no rain.

The forty or so major stores are all relatively small only ones. Only "Georges" seemed to cover the full line of necessities. Most of these stores are owned by Lebanese who have contacts with their compatriots in Port au Prince and enjoy a line of credit in merchandise. However, more and more local people are engaging in commerce and many also have branches in St. Louis du Nord.

The local Haitian merchants dominate the Miami and Nassau trade. This trade includes a great variety of goods such as bicycles, radios,

TVs, shoes, used clothing, malt drink, condiments like Louisiana hot sauce and tobacco. US rice is also a favorite and sells a little below the price of the ODVA rice from the Artibonite. Domino sugar in cwt. sacks were also remarked in stores. A big item is used box spring mattresses which are now in common use even in the rural households. Second hand gas stoves and refrigerators are rarer but not uncommon.

The smaller towns (communes) buy from Port de Paix and Jean Rabel and one finds very small stores at these crossroad junctions with a stock of necessities. This traffic, however, grows suddenly to important dimensions during the coffee and cacao harvests and then merchants coming in truck will sell off the trucks in the local markets. They will return loaded with farm produce to resell in the urban market.

However, not all Northwest markets can be reached by road. Thirty seven official markets are recognized by the GOH in the Northwest. Only eleven of these can be reached by truck. Eleven are reached by boats and the rest (19) can be reached only on foot or by loaded animals. As a rough estimate the market road system serves more than a majority of the population as Mme Sara and most farmers will make the long trip by animal to the road markets at least occasionally. This cannot however be considered as an adequate coverage, particularly if higher levels of output are planned as this will imply a regular supply of agricultural inputs as well as minimum levels of consumer goods to encourage increased output.

INDUSTRY COMMERCE AND SERVICES

(b) Banking and Credit

The National Bank of Credit originally the National Bank of Haiti maintains a branch at Port de Paix and the BCA the lending organism of the DARNDR participates in local campaigns for promoting individual crops. This is also an occasional activity of the IDAI for cotton production.

The credit system is basically oriented toward financing the collection of the export crops and indeed at present the Bank of Canada informed the author that the GOH has requested even private banks to limit new loans to export financing.

Credit is generated via the major coffee export houses who also purchase other export crops as a secondary activity.

The intermediary between the small farmer is the speculator whose capital is supplemented by advances from the major export houses.

There is some seller credit, particularly for vehicles and by import houses to local commercial sales outlets. In general this type of credit is not monetized and consists of various trade goods which are paid for after sales, particularly around harvest times. This credit generally is the tie that binds the commercial house of the Northwest to the Port au Prince importer or wholesale house.

Personal credit is very rare and can be expensive 3-5 per cent a month for prime lenders who can furnish a land or building owner as a co-signer. Almost never will a loan exceed 25 to 30 percent of the guarantee as estimated by the lender.

There is also a loan market against property, largely practiced with small farmers who find it necessary to borrow for funerals or much more rarely a wedding or baptism. These loans usually pass via notaries who are



acquainted with private parties. After these loans are conducted as "Sales to Return" "ventes a reméré". That sale is concluded on the conditional basis that the land owner is given an option until a certain date to repurchase his property at a price agreed in advance. If the loan is not repaid by the end of the option period the sale becomes final.

Among farmers there is also a kind of barter loan which will take place in the period preceeding the harvest. At this time prices will be high and the farmer cannot or does not wish to let go his cash reserve. He then agreed to trade one sack of corn or millet now for 2 or 3 after the harvest. This type of loan will be common after a dry year when pre harvest prices reach double or more the after harvest prices. This type of loan may also be made for seed if a farmer has the bad luck to lose his seeds to rats or bad weather.

### 3. Industry, Commerce and Service

#### Industry and Activities

The most recent data on industries are found in the 1971 census. These indicate approximately 3,000 persons engaged in manufacturers, extractive construction, electricity, gas and public work. This represents a considerable increase over a 1963 which including artisan production shows an employment of only 785 workers. However, these are urban data and do not include the manufactures of forestry, including charcoal. Over 800,000 sacks of charcoal are produced in the Northwest by an unknown number of workers, mostly individual entrepreneurs who produce very small quantities.

Textiles and shoe manufacture are the most important single urban manufacture with 1,824 workers, followed by food industries (473). These two industries represents more than two thirds of all workers in manufacturing industries. A particular characteristic of manufacturers in the Northwest is its small average unit of only ten workers per unit.

There is also a small ship building and repair industry which was not noted anywhere perhaps because it is outside city limits. Upward of a hundred workers practice ships carpentry, caulking, painting and rigging. Often these workers are part time sailors. As well, diesel mechanics often ship on as engineers.

High cost and limited supply of electricity place severe limitation possibilities of manufacturers which require energy as a large component of goods in progress.

If regional projects begin to take form, the production of tomatoes paste, fruit juices and conserves, peanut butter and vegetable oil processing are immediate candidates for new industries. Fruit packing with the

production of a small cartonry factory is another good possibility.

In Puerto Rico food products suited to the taste of originally Caribbean diet consumers are processed and frozen for the New York and Montreal markets. It is a bit premature to speak of this industry but it is another future possibility. However, all future industry suffer the constraint of limited electric power, the sine qua non for future industrial development in the Northwest.

## VI. INDUSTRY, COMMERCE AND SERVICE

### (d) Services

As was discussed in the section on infrastructure the transport system is very limited. Port de Paix has a dozen home made buses built on truck frames. St. Louis du Nord has several and Jean Rabel, Bombardopolis and Mole St. Nicolas count for about a dozen more. It was not possible to obtain current figures because they are registered by the army and the Colonel at Port de Paix considers them as confidential.

The Louis Berger report did obtain some estimates about passenger traffic in 1975 and something over 40,000 passenger trips a year are made from the Northwest to Cap Haitian, Gonaives or Port au Prince. It is important to note that these include Mme Sara and other commercial travelers coming to and from other parts of the country to do business with the Northwest. Hence, it is not to be taken as an exclusive indication of travel by North West residents.

There is also an important service by coastal vessels which again according to the Louis Berger study averaged 300 calls by sailboat and 760 calls by motorboat during the year (1975) with a total tonnage of 54,000 tons.

This does not include about 50 motor vessels ranging from 30 to 150 tons which regularly service the Bahamas and Miami. These vessels provide a regular flow of passengers and freight between the different Bahamas Island and the Northwest. About 25,000 Haitian residents of the Bahamas benefit from this service. Also a very important number of Haitians are either directly transported to Miami or via the Bahamas to the USA as illegal immigrants,

This later service has recently been severely restricted by international agreement. However, there is no question but that it continues to operate albeit at a lower level.

Interviews with former passengers, with sailors and other who were engaged in this traffic indicated that it was at least in part a co-operative venture between Bahamian and Haitian shippers. Passengers were picked up along the Haitian coast after vessels had been cleared from Cap Haitian or Port de Paix and were later joined by Bahamians with faster boats off the islands. They shared the transportation fees as a regular manner of doing business. This also limited risk for Haitian boats which might be taken in US waters with the remainder of its passengers as they had already their share of the passengers fares carried by the Bahamians. The impression was given that this gave them a certain protection while cruising in Bahamian waters before making the jump across the channel somewhere between Bimini and Freeport.

Since there is a long tradition of smuggling by both Haitians and Bahamians vessels it gives some credence to the above as most of the captains know one another in this trade.

Tortuga Island has been an important source of passengers according to one report where farmers were mortgaging their farms to raise the \$1,000 paid per passenger. There is in any event no lack of candidates for these trips either to the Bahamas or the USA as enough emigrants have returned with their savings to encourage dreams of future fortunes. It is, however, of interest that the objective of these emigrants is not permanent emigration but the hope of making their fortune and returning to their homeland.

Tourism in the Northwest as such is not yet beyond the most primitive level. Only one hotel in Port de Paix furnishes comfort at a very low level and would only recommend itself to the more hardy traveller. Beaches are of the brown sand type and are not cleaned or maintained by public services. One lone cinema holds forth six nights a week with a hundred or so seats. There are three nightclubs, again only for the very venturistic tourist.

Nevertheless, the sea offers a good possibility for the development of tourist sport fishing activities. In most areas where sport fishing is interesting the fishing grounds are frequently at a considerable distance whereas excellent fishing of major game fish in season are very close to the Northwest's coast. Mention has been made elsewhere of the port St. Antonio in Jamaica and it would require only basic research for a reason to check out the possibilities in the Northwest by a professional fishing captain from Florida to give better information on the arrival and departure of the principal game fish. There are small airports at Mole St. Nicolas and Port de Paix which could bring sport fishermen to the area without suffering the incommmodity of the road system. The area is one of great physical beauty and the author who has sport fished all over the World knows no more attractive location anywhere than that of the Northwest. Also if fishing is good, sportmen will accept minimum comfort willingly. Sport fishing can also be a source of information leading to eventual commercial fishing development.

C. PROBLEMS AND PROSPECTS

## Problems and Prospects

### A. Constraints to Social and Economic Development

The Northwest is essentially an economic island with an absolute minimum of interior infrastructure. As an island, it must look to the sea as its principal means of communicating with its sub-regions and the exterior. The absence of an organized cabotage system and port facilities are the primary constraints.

This is not just an absence of motor boats or docks. It is a question of storage facilities and the human infrastructure of regular services supported by shipping agents and ships chandlers who can organize the movement of goods and passengers in and out of ports with a minimum time loss and a maximum percentage of freight and passengers to the ships capacity. It is having the means to make rapid repair of ships and engines with necessary materials and spare parts in an organized fashion. As well, it means ship to shore communications in the event of a breakdown and also just in the ordinary requirement of giving adequate notice of arrival to agents who can prepare to receive and stock cargo and/or prepare it for shipment.

No one will reasonably expect this to happen over night but it can be a goal encouraged by training and assistance to entrepreneurs who wish to engage in these activities.

Although, this may be appearing to place the cart before the horse. That is to anticipate production which is somewhere in the future. Nevertheless, the success of the eventual production will be related to the cost and efficiency with which it is moved to the market. The Louis Berger study makes it clear that there is already enough cargo and passengers for a beginning service. If so then let the service grow as a twin to the hopes for production.



The organization of human infrastructure with adequate equipment to cover the area with technical assistance for irrigation and other elements essential to successful regional management of production is seriously lacking although a base for growth is in place with considerable experience in operating under great difficulty.

One of the problems is that responsibility for technical activities is centrally directed and with, if not an absence, then with a very small local presence. Local participation and above all support effective at the highest level appears to be needed to prevent breakdowns in performance as has been discussed elsewhere in this exercise. Important activities become suddenly stopped when the cause is minor related to the importance of the activity. There is a communication problem for management in that as the system now functions, problems are not effectively anticipated, but are treated after the fact.

There are no provisions nor the means of using media for agricultural news, presenting radio programs or audio visual units for training purposes, one reason for the amazing progress made in Kenya was an excellent use of media including audio-visual units which presented cow-boy films as bracket between technical assistance film presentations. The use of radio in the absence of a literate society can vastly improve communication and build confidence between TA units and farmers.

The greatest constraint has been mentioned several times in this exercise that is a regional program supported by some fair proportion of the tax which is paid by the region to the central government. Unfortunately since this has been going on since the early 1800's there has been a cumulative effect and probably only massive exterior support can make up the difference if population growth is not going to outrun the effort for

development. It doesn't seem right, but there it is.

B. Cost and Benefits of Emigration

The principal cost of emigration to the area has been the loss of economically active persons who demonstrated their character and initiatives by moving.

This has been to some extent compensated by a flow of funds to aid their families which also demonstrates a continuous solidarity with the Northwest community.

Also some of the emigrants return and bring capital and new ideas with them.

Perhaps one of the benefits which may eventually accrue to the Northwest is that the emigration have drawn international attention the plight of the Northwest and also that of the national government.

C. Possible Areas of Short Run Economic Change and Growth

The span of time between go and crops at Thebaud farm is a remarkable demonstration of what can be done when the private sector has the possibility and the will to develop an area.

This is not dissimilar from the experience of the Entente Fund, Private Enterprise Loan and Technical Assistance Program. There the loan Fund created 400 individual loans and technical assistance aided projects via private entrepreneurs. At the end of four years there were only 5 percent of the money value of these loans in the dubious loans category. The basic secret of the success of these loans was a hard nose policy as far as feasibility analysis was concerned and that the loan funds were administered by non-nationals who could not be pressured by political or family considerations into making personal loans without a basis in economic reality. Also there was a team of top quality experts in small business (which did include nationals with US MBA's) who using an early warning system, got to the entrepreneur with help before the

problems lead to disaster.

If a development program is going to take place indirect effects will create the need for auxilliary services which can be more readily supplied by private enterprises than bureaucracy. Increased revenues also create increased needs which can be provided by small enterprise.

If water transportation becomes a fact, those associated with it will require financing. Increased movement of produce will require risk capital, equipment, storage and working funds. If fishing increases so will the need for salt and salt production operations. Communications will perhaps require local radio assembly, batteries and maintenance. Technical assistance films will require writers, actors and at least one production unit. Increased revenues can lead to demand for bicycles and bicycles to tires, tubes, spare parts and repair shops. Fruit marketing will need support from a print shop and a small box manufacturer.

A small non-profit making development bank with a technical assistance budget could work miracles in the desert of credit in the Northwest area. That is a bank which charged interest according to risk but one which would accept risk in order to support an entrepreneur's project which met reasonable feasibility tests. This might be one of the better ways to invest in technical assistance to the region. It is also possible for such an operation to be carried out by an advisory unit with actual operations vested in a local cooperative type bank. This then could leave behind a valid institution after the local bank had gained experience and enough capital and deposits.

As actual development prospects were reviewed under various sections of this study there is little point in repeating them except to note that short run priorities require being seen in the long run perspective of an overall regional development plan under some type of regional coordinating body.

Short run priorities like rat exterminating programs, soil conservation and road building under food for work, rehabilitation of the Trois Rivieres system as preliminary to development of the Trois Rivieres sub-region all are worthy short run actions. As would be the support of the agricultural department by transport and equipment by D ARNDR or directly so that it may realize its human potential. The Port de Paix D ARNDR Office has no technical library for its agronomes and engineers, all these are very immediate needs. Even resistant varieties of seeds for common vegetables consumed like tomatoes, cabbage, peas, beans, carrots, eggplants or peppers can have a good short run effect at little cost if distributed to farmers in this winter season, and they are not available.

However, the caveat is short run! Only a long range consistent effort can adequately compensate for the years of neglect which the Northwest has suffered.

Recent visits from Florida indicate an interest by that State in the future prosperity of the Northwest. The University of Florida extension service is a vast organization cooperating with small farmers in Florida. This organization operating under similar ecological conditions offers not only a technical expertise in tropical agronomy but also has an intimate experience of small farmers problems and how to solve them. It is backed up by a major agricultural college and a very extensive research library. One of its most important characteristics is its down to earth approach and recognition that the Service lives because it has been so valuable in a very practical sense to the Florida small farmer.

Since this is a State Institution it is highly possible that its assistance could be called upon by the Governor of the State of Florida.

#### IV. PROBLEMS AND PERSPECTS

##### Eventual Growth of the Regional Economy

L. Given the human initiative and desire for progress clearly evident what are the means available for implementing these desires? The description of the availability and the nature of the resources has been elsewhere described in the text.

Three distinct climate exist: the middle and highland coffee and cacao areas. The valley and plains areas candidates for specific crops and irrigation and the low hot dry areas, where water resource development could if it becomes available, become the bread basket of the Northwest.

Backing up water behind small dams, soil conservation with surrounding reforestation and a continuation of the fruit tree development critical to diet in dry years all place their demands on available resources, If rapidly growing trees can be used as wind breaks even citrus development could become a reality on a scale great enough to produce concentrates and residue animal feeds in the hot dry areas.

A major problem has been the failure of reports on the area to understand the ecological facts which govern its output.

The author has reviewed dozens of inputs which give average rainfalls and temperatures with minimums and maximums which were carefully measured but they are not organized to a pattern relative to the non-random cyclical nature of their pattern which inevitably will govern their relevance to medium or long run crop production planning.

In the Northwest, like the Egypt of Joseph is subject to long periods of dry years and long periods of wet years around a twenty-five to thirty year cycle. This does not mean that a non-random dry year cannot occur during a wet cycle period or a wet one in a dry period cycle but it does explain the erratic reports of rainfall reported by meteorologists. Example: Port de Paix 1907-1966 max annual 2,345 mm, minimum annual 360mm, St.Louis du Nord max 3,168mm,min 957mm.

These maxima and minima reported for different Northwest stations are representative only of highs and lows in the thirty year cycle. In principle, it means 15 fat years and 15 lean ones. If everyone is not prepared for the lean one which repeat themselves regularly they will be lean indeed.

If on the other hand this phenomena is recognized and crop production experts include it in planning for the types of crops and whether long production seeds or short production seeds are used in appropriate cycles, then in the lean years they will be very much less lean.

Also the role of bread fruit and avocado trees will be more appreciated if when planted in areas which will benefit from under soil drainage paths they produce crops when other crops are failing in the dry period cycle.

The need for storage will be recognized and stocks built during the fat years.

What's needed is a plan to permit flexibility of output which accepts the general ecological limitations and included a game plan which will provide for the lean years which will come, while still accepting some risks which will permit production of high value and more desirable crops in fair to good years.

What is favorable to this concept is the evidence in that the non-random wet-dry cycle is a known and that the lows of the cycle were in 1910-1944-1970. The region therefore is in the rising period of the wet cycle which may be expected to peak in 1985. Hence any program over the next ten years will enjoy the peak period of the next wet cycle. The importance of this information to a game plan should not be underestimated. Trees which become well established in the next ten years will enjoy the peak period of the wet-dry cycle. They will have their roots deep in the sub soil and be at young-mature production levels. There is time to build a permanent grain reserve stock and storage system for the lean years. There is also time to develop terraces in which will catch

and store what water does come. Short production period grains and other food plants can be tested and seeds ready for planting after the peak of the cycle is passed and risk for long maturing varieties increase.

There is also time to introduce agro-industrial activities to return the maximum value added in the region.

Agro-industrial development will see many alternatives or it is no solution at all. It is also a support factor for output which cannot be readily marketed. In Holland tomatoes which cannot reach the fresh fruit market can become tomatoes paste or chicken and cattle feed. Orange residue from concentrate production can feed cattle, become vinegar put lard on pork for eventual processing or even be used as fertilizer.

The extent of diversification of agro-industry is limited only by the imagination of the producers.

The concept of flexibility and alternate end products should be built into any plan because changing markets and preferences know no master except flexible response.

The concept of developing economics of scale should also be present and with it the objective of picking off discriminating markets. In tomatoes for example as follows: first choice to export hotel and fancy fruit markets in the other Caribbean islands during high tourist season, second choice to local high class markets, third to the low priced mass markets, finally to industry for tomatoes conserves, chili sauces, catsup and the residue to paste. Obviously only large scale production albeit on many small farms can alone organize and put such flexibility into practice.

A strong marketing unit which will constantly explore foreign markets and to sell at maximum advantage current production is also necessary. Most agricultural ventures in Haiti have failed for the want of markets at peak production periods when local markets have become saturated. The success

of the African vegetable and fruit industry is directly attributable to well organized and highly motivated marketing units.

In brief, the growth of an agriculturally based economy is a complex one. It is not enough to have qualified agronomes water or even magnificent crops. If this is faced on square one, the eventual success of the venture becomes closer to reality and to weathering the storms of what is unquestionably a high risk industry.