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**POTATO PREFERENCES:
A PRELIMINARY EXAMINATION**

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SUMMARY

Consumer preferences for a certain taste, consistency, or color in a potato, or even preferences for potatoes from specific production localities, may prejudice their reactions to new types of potatoes deviating from traditionally established norms. Two simple taste tests were conducted in Lima, Peru to determine whether tasters could: (1) differentiate between potato varieties grown in a traditional Andean highland area, and those produced experimentally in a lower, hotter and more humid zone where potato culture is not practiced, and (2) express preference for one or the other. Results were a preference for highland potatoes. Subsequent interviews with tasters revealed why, and demonstrated the strength of this preference. Although one potato may be preferred over another, this does not necessarily mean that the less preferred potato was considered "poor" in taste or that it cannot be marketed.

SUMARIO

La preferencia de los consumidores por un sabor, consistencia, o color de papa, o aún por la papa producida en lugares específicos, puede influir sobre sus reacciones ante tipos de papa diferentes de los tradicionales. En Lima, Perú, se llevaron a cabo dos estudios simples de degustación para determinar: (1) si los probadores podían distinguir las variedades de papa cultivadas en un ambiente tradicional andino, de aquellas producidas experimentalmente en un lugar de menor altitud, más caliente y húmedo donde generalmente no se cultiva papa, y (2) expresar su preferencia entre unas y otras. Los resultados mostraron el 100% de preferencia por las papas andinas. Subsiguientes entrevistas con los probadores revelaron el por qué y demostraron la fuerza de su preferencia. Aunque una variedad de papa puede ser preferida sobre otra, esto no significa necesariamente que las menos preferidas tengan mal gusto o no sean comerciáveis.

* Siert Wiersema, Roy Shaw, Donald Berrios and José Luis Rueda, CIP-Lima, helped design the tests and obtain materials for them. Comments on an earlier draft were appreciated from Roger Rowe, Gregory Scott, Douglas Horton and Robert Rhoades. I am indebted to nutritionist Hilary Creed de Kanashiro of the Institute of Nutritional Investigation (IIN-Lima), who allowed me to join in the Los Laureles group in order to learn about urban potato consumption. Finally, the women of the Los Laureles community must be thanked for their willingness and enthusiasm in cooperating with the experiment. I do, however, accept sole responsibility for the ideas and conclusions, presented in this paper.

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I. INTRODUCTION

Human taste preferences are among the most difficult aspects of human behavior to interpret and understand. Taste preferences are learned, not inherited, along with a set of food traditions, beliefs and customs, collectively known as food habits. Because food habits have emotional connotations, they are often particularly resistant to change. Resentment is a common reaction to attempts to force a change in food habits. We have all, at some time, rejected a food because of its taste. Yet another person may have found the taste quite acceptable. Probably every person has altered voluntarily some aspect of his or her food habits under the influence of a change in situation such as a move to another town or country, or a change in purchasing power. The alteration, however, is usually within a range of acceptable possibilities, and occurs gradually over a period of time.

Individuals involved in agricultural development are concerned with supplying a greater amount of food to people at affordable prices. This food, however, must be affordable and acceptable. New foods, introduced without consideration of people's food habits, can be rejected, despite their nutritive qualities, ability to produce in great quantity or adaptability to new production zones. Some of the new maize varieties introduced in Central America have been rejected by farmers for home consumption because they could not be made good into tortillas, the traditional form in which maize was consumed. Certain new rice varieties have also been rejected by traditional Asian rice farmers for their own consumption because they did not taste or cook as well as traditional varieties. In Kenya red-skinned potatoes are preferred over improved white-skinned potato varieties.

In the realm of potato investigations at the International Potato Center (CIP), the acceptability of potato varieties by consumers is an important research area. This paper, the result of a brief study in Peru, discusses some aspects of potato taste, preference and acceptability. The study is part of a larger research project on potato consumption in the tropical developing world. The present report deals specifically with the potential acceptance of potatoes currently being produced at CIP's research station in San Ramon, and area in the Peruvian montaña, the hot, wet, eastern slopes of the Andes between 400 and 1000 meters elevation. This preliminary investigation of potato consumption preferences can aid current investigations concerning the adaptation of the potato to new environments. It also indicates areas for further examination of human consumption behavior in response to potential increases or changes in potato production.

II. BACKGROUND

The impetus for examining potato taste preferences developed during a series of informal surves on potato consumption and production in the San Ramon area. Two research problems were identified.

1. Several informants stated that potatoes produced on CIP's San Ramon experiment station and in nearby on-farm trials tasted "bad" and that people did not like to eat them. Yet, further interviews revealed contradictory opinions attesting to the "eatability" of potatoes grown experimentally at San Ramon. Additionally, it was evident that someone was eating the potatoes produced on the station and in on-farm trials. How could the reality, extent and importance of a "bad" or undesirable taste, be measured? What implications could this have on the efforts to grow potatoes in other humid tropical areas of the world?

2. Informants had difficulty relating tastes or preferences of potatoes when it was necessary to rely on the memory of a taste to answer questions. The investigation had to come closer to the actual eating experience for more accurate determination of people's preferences and opinions.

Most Peruvians (both rural and urban, it has been claimed) prefer potatoes produced in the Andean highlands to potatoes produced elsewhere, such as the winter crop from irrigated coastal valleys like Cañete, two hours south of Lima. Although casual empiricism seems to support this, no one has yet explained why or established that Peruvians could really differentiate between potatoes produced in different agroecological zones merely by tasting them. As CIP is attempting to extend the ecological range of potato production, here then was an opportunity to test for taste and preference differences. Could Peruvians really taste a difference and would potatoes grown in a new area such as San Ramon be acceptable? Where CIP social scientists had been advocating an on-farm approach for semi-automatic evaluation of investigations, here was an opportunity to introduce consumer taste preferences as an element for consideration.

Potato tubers from seven different varieties recently harvested in San Ramon obtained from CIP agronomists, were to be compared with tubers of some of the same varieties but produced in the traditional potato growing zones in the Andean highlands. Two simple taste tests were used. The first compared two of the same varieties grown both in the highlands and in San Ramon. The second compared San Ramon varieties with each other to determine differences and which, if any, tasted best. Los Laureles, a section of the Lima pueblo joven or urban shanty town known as Famplona, was selected as the location for the taste tests. The participants were women who attend a regular maternal and infant health clinic (control de niño sano). Potatoes are a staple food item among this group of low-income families.

III. THE FIRST TASTE TEST -- APRIL 2, 1980

1. Procedure

Fifty tubers, averaging 2-3 inches in diameter, were selected from the San Ramon harvest of the following varieties: Cuzco, Anita, Desiree, Rosita, Mariva, Caipiro and Revolución. All had been harvested on March 19 at 110 days maturity. These were placed in cold storage for one week.* For the first taste test, 35 tubers were selected from each of two varieties, Mariva and Revolución, and the remainder were stored at room temperature in the dark along with the other varieties removed from cold storage.

Three kilos of Mariva, recently harvested in the highlands, were purchased at a Lima market for comparison with the San Ramon Mariva. Tubers of the Revolución variety, grown in the highlands, were unavailable, so, on advice of potato vendors in the market, the variety Yungay was selected as the second variety grown in the highlands. It was similar in physical features to the San Ramon Revolución.

The four potato samples were identified in the following manner:

Variety	Location Produced	Identification Letters
Mariva	San Ramon	MR
Mariva	Highlands	MS
Revolucion	San Ramon	RR
Yungay	Highlands	YS

These were washed and boiled with skins in four separate pots. Average cooking time was 25 minutes. Water was drained and potatoes taken to Los Laureles. Elapsed time between cooking and eating was two hours. Potato tasting took place in two trials.

The first trial compared MR with MS. Ten women were each given a plastic plate pre-marked into two sections, labelled 1 and 2. A half or whole potato (depending on size) of each sample was placed on each section of the plate. Each woman was also given two cards, one with one star, and the other with two. They were instructed to try the potatoes and place the card with two stars on the side of the plate containing the potato they preferred. After making their

* This was not intentional, but occurred due to a misunderstanding. The potatoes were removed shortly before the test and this fact probably accounted for the sweet taste reported later. Despite this accident it was decided to proceed with the tests, as the participants were already assembled, and this was an ideal opportunity to promote open discussions about the potatoes while they were being consumed.

selections, the choice of each woman was recorded on a card, along with age, place, of birth and number of years lived in the locale. After recording preference, the reasons for this preference were recorded on the back of each card.

The second trial was conducted in the same manner using RR with YS. Before beginning either trial, it was explained to the group that they would be sampling potatoes produced in different parts of Peru to determine which tasted best. No mention was made of either highlands or San Ramon. Potatoes had been peeled and cut following cooking to prevent any visual recognition of place of origin. Following the two trials, the origins of the potatoes were identified and this led to a discussion among the participants about why they had reacted the way they did to the four samples.

2. Results

Table 1 gives the age, birthplace and number of years of residence in Lima of the women who sampled the potatoes. Average age was 35. Average number of years of residence in Lima was 18. Contrary to the presumption that all people who live in the pueblos jovenes come from the highlands the group was representative of most of Peru's regions: north coast, central coast, south coast, central highlands and Amazonian rainforest. All were from the Lima's lower socioeconomic strata. In both trials, 100% of the women said the highland potatoes, MS and YS tasted better than varieties produced in San Ramon. Reasons for this choice are listed in Tables 2 and 3. Table 4 presents the results of the nutritional analysis completed on all four potato samples as compared to standard food composition tables.

3. Discussion

It is neither fair nor accurate to state that the above results prove definitely that potatoes produced in the highlands taste "better" than those grown in San Ramon, since several biases were inadvertently included in this test. First, as mentioned earlier, the potatoes from San Ramon were placed in cold storage prior to the test. Because of difficulties in retrieving them from the cold storage, they were removed only two hours before they had to be cooked. Those tubers purchased in the market were not placed in storages. It is well known that tubers in cold storage accumulate sugar. This probably accounted for the "sweet taste" of the Mariva grown in San Ramon which was not present in the highland Mariva. Additionally, cultural practices, which influence tuber taste, vary greatly from experiment station to commercial producer. Potatoes grown on the experiment station at San Ramon for experimental purposes are heavily fertilized and heavily treated with pesticides and/or fungicides, which can negatively influence tuber taste. Such potatoes might not compare favorably with organically produced tubers of the consumer-oriented farmer. Potatoes in experiments are also often harvested immature. A commercial grower may not do so.

Table 1. Age, Birthplace, and Years of Residence in Lima of Participants in the First and Second Taste Tests.

Informant Number	Age	Birthplace	Years in Lima
+ 1	34	Ica (Ocucaje)	13
2	10	Lima (City)	10
+ 3	44	Tumbes	25
+ 4	38	Loreto (Yurimaguas)	17
+ 5	35	Lima (City)	35
+ 6	40	Lima (Canta)	20
7	40	Chincha Alta	20
8	39	Ayacucho	25
9	25	Ayacucho	3
*10	48	Trujillo	24
**11	30	Ayacucho	8

+ Also participated in test 2. In addition, another woman, age 35, from Ayacucho also participated in the Second Taste Test.

* Participated in trial 1 only, test A.

** Participated in trial 2 only, test A.

Table 2. Results of Trial 1, First Taste Test.

Informant N°	Mariva (San Ramon)	Mariva (Sierra)
1	"it has an aftertaste, but I would buy it if it were cheaper than others"	"more floury"*
2	"I do not like it"	"I like it more"
3	"not very good"	"floury, dry, good flavor, even if it were more expensive, I would buy it before the other one"
4	"good for frying or making <u>papa a la huancaína</u> (a popular Peruvian dish utilizing slices of cold boiled potato)"	"floury, not very good for frying, better for stews, has a better taste"
5	"also good, good for frying"	"more floury, better for making <u>puré</u> "
6	"sweet"	"not sweet, floury, can be used for all types of dishes"
7	"not very good, can be used for frying, <u>puré</u> or soup"	"floury, great taste, can be used for stews, <u>ajiaco</u> (Peruvian dish using hot peppers), soup, or all by itself to eat"
8	"sweet, good for frying or making <u>papa rellena</u> (stuffed potatoes)"	"floury, good for <u>puré</u> , everything, but not good for frying, 'sticky'"
9	"has a smell like fertilizer"	"more floury, more tasty"
10	"good for making <u>papa a la huancaína</u> , <u>papa rellena</u> , or <u>cau cau</u> (dish utilizing cow's stomach and potatoes in stew)"	"better taste, floury, good for soup, or just like this (boiled) no more, or in <u>sancochado</u> (a soup with beef, potatoes, carrots)"

* The term harinosa or "floury" is the most frequent adjective used in Peru to describe the consistency of potatoes. The more "floury" a potato, the better it is, though "less floury" potatoes are used for certain preparations requiring a more waxy consistency.

Table 3. Results of Trial 2, First Taste Test.

Informant N°	Revolución (San Ramón)	Yungay (Highlands)
1	"slightly acid, leaves an aftertaste in the mouth"	"more floury, better"
2	"more or less"	"great"
3	"loose, seems like it has water, like watery pota- toes, sweet taste"	"drier, smooth, not very floury, a bit gummy"
4	"does not have any taste, watery, rancid"	"more floury, I always like floury potatoes, nice"
5	"very watery, useful only for frying"	"more floury, has a nice flavor"
6	"has different taste, very rooty"	"floury"
7	"slightly sweet, has a little odor, rooty, better for frying or puré"	"floury, great taste, better to eat plain or in stews"
8	"watery, sweet"	"not sweet, better taste"
9	"watery, good for frying"	"has a great taste"
10	"watery, rooty, tastes like <u>papa criolla</u> (pota- toes produced on coast) those from the highlands are better, one can tell by the taste of these and the smell of fertilizers"	"more floury, the land itself gives it a good flavor"

Table 4. Nutritional Analysis of the Four Potato Samples Tested Compared With Values From Standard Peruvian and USA Food Composition Tables.

Variety	Mariva (Highland)	Mariva (San Ramon)	Revolución (San Ramon)	Yungay (Highland)	White Potato (Collazos) ¹	White Potato (USDA) ²
(Calculated for 100 gr. fresh weight, raw)						
Water %	72.0	80.4	83.0	76.4	74.5	79.8
Protein gr.	2.3	1.8	1.8	2.5	2.1	2.1
Fat	0.1	0.1	0.1	0.1	0.1	0.1
Fiber gr.	0.6	0.6	0.6	0.6	0.1	0.5
Ash gr.	1.0	1.0	1.0	1.2	0.6	0.9
Nifex ³	24.1	16.3	13.6	19.3	22.6	16.6
Dry Matter %	28.1	19.6	17.1	23.6	25.5	20.2

¹ Collazos Ch., Carlos et. al. La Composición de los Alimentos Peruanos, Ministerio de Salud, Lima, Peru, 1974.

² USDA - Handbook N°8. Composition of Foods. Washington, D.C., 1963.

³ Nifex is the carbohydrate material, in grams, calculated by subtracting from total dry matter, the fat fiber, protein and ash.

Another factor influencing the taste of the potatoes is that CIP scientists are still working to produce varieties adapted to growing conditions of San Ramon. Although promising clones have been selected, these are not yet available in quantities sufficient for conducting a tasting test. Therefore, the varieties used in the test were ones normally grown either in the highlands or on the coast during the cool season, which are currently being used in agronomic trials at San Ramón. It is possible that potato varieties adapted to San Ramón conditions could also taste better than ill-adapted varieties.

However, despite these biases, the taste trials stimulated an insightful discussion afterwards among participants, concerning their reasons for reacting the way they did to the samples and about potato preferences in general. Their comments are summarized below.

a. The most important observation made was that the potatoes from San Ramon did not taste "bad," nor were they unacceptable for consumption (every single scrap of potato was consumed). They simply tasted different or not as good as highland potatoes. It is very interesting that the potatoes which tasted best, the two highland samples, were also those with the better nutritional quality. The highland Mariva had 8.5% more dry matter and 0.5 grs. more protein than the Mariva grown in San Ramon. The highland Yungay had 6.5% more dry matter and 0.7 grs. more protein than the Revolución produced in San Ramón. This would seem to indicate that for these participants, a good-tasting potato, a more "floury" potato, is also one that is nutritionally superior.

b. The "ideal" type of potato for these Peruvian consumers is high in dry matter content, giving it its "floury" taste. This taste is sought out in potatoes and those which come nearest to the "ideal" type of "floury" taste the best. However, along with this "ideal" type is a recognition that certain potatoes should be prepared in certain ways. For boiling, as was done in the experiment, the preferred potato is one that is "floury." For frying, however, a less "floury," more aguachenta or "watery" potato is desired since they normally absorb more oil. These same "watery" potatoes are not usually prepared by boiling. The women's comments support this, since they indicated that the San Ramón potato was more appropriate for frying, or even puré than for boiling to eat alone. It seems likely that potato preference according to taste is greatly influenced by the appropriate cooking technique.*

* It is significant to note from the nutritional analysis that the values for the highland samples correspond closely to those of Collazos et.al. for the average Peruvian white potato, while the San Ramón Mariva values are close to those for the average USA white potato. In other words, while San Ramón experimental potatoes do not conform to the nutritional and taste standards of Peruvian highland grown potatoes, which form the "ideal" for many Peruvian consumers, they could be very suitable for areas where consumers do not have a highland potato for comparison and are used to potatoes with a more watery or waxy consistency with a nutritional value similar to that of USA potatoes.

c. Although the comments regarding the two highland samples, MS and YS, were quite similar, the comments regarding the two varieties from San Ramon were dissimilar. None of the women mentioned that Mariva was watery, but rather the general comment was that it was a bit sweeter than the highland Mariva, and that it did not taste as good. Most women pointed out that boiling it was not the best way to prepare it and that other means should have been employed. But for the Revolución, six of the participants stated that the potato sample was "watery." Two further mentioned that the Revolution was raizado or "rooty," a comment not elicited by anyone in the first trial. This seems to indicate that perhaps different varieties respond differently to the environmental conditions of San Ramon and that in terms of human preference some varieties are going to be more acceptable for consumption than others.

d. A few of the women noted a smell in the San Ramon potatoes. When questioned further about this, the explanation was that the smell comes from too much químicos or fertilizers and pesticides used in potato production. Such potatoes with similar smells come from the highlands also, the women noted, since químicos are often utilized abundantly there as well. One woman made an interesting comment with which the rest of the women agreed. She stated that "San Ramon potatoes taste like those potatoes we call papa criolla, grown further south on the coast, in a place called Cañete." Such potatoes were recognized by the group as also being inferior in taste to the potatoes produced in the highlands, however, the potatoes from Cañete are readily consumed by the populations of Lima and elsewhere, particularly when highland varieties are scarce or expensive.

e. Many women noted that the skins of the uncooked San Ramon samples were thin and in many samples peeling off. This indicated to the women that the potato had been harvested too early, and that they would not store well in their houses. Women shop for potatoes that have little or no damage to the skin so that they will run less risk of losing potatoes due to spoilage before they can be consumed. These women stated that they simply cannot afford to lose potatoes which have gone bad. For this reason the women do their marketing several times a week, in small amounts, to reduce storage losses in the kitchen.*

f. One of the women participating in the trials, sells potatoes and other tubers and vegetables in the market nearest Los Laureles at

* "Immature skin" does affect storability, but in terms of weeks, not days which is usually the length of time potatoes are stored in Los Laureles homes. It is interesting, however, that the women associated immature skin with potatoes that could potentially go bad and consider this a negative factor in terms of potato selection in the market.

Ciudad de Dios. She said that because of the combination of characteristics: taste, wateriness, and skin quality, she would have to sell the potatoes from San Ramon as papa segunda or "second class potatoes," and thus at a lower price. How low? Perhaps as much as 20 soles cheaper than the best (white) potatoes from the highlands.* Would they still sell? Yes she believed so, but because of the skin, they would have to sell quickly or else the vendor might incur a loss.** To other women in the group, I posed the following question: "If MR and MS were both on sale at the market for the same price, which one would you buy?" The answer was unanimous for the MS. However, when I asked the following question: "If the MR were 20 soles less expensive than the MS, which would you buy," All but one woman responded that they would buy the MR, because they must always be aware of the need to purchase the most food possible on the least amount of money. If potatoes can be obtained at a lower cost, more money will be available for other items, among which might be additional foods. It appears that preference is the overriding factor determining purchase when price differences are minimal, but when price differences are great, then the lesser preferred but cheaper item may be purchased. There seems to be a threshold, though, where the taste of an item may be so bad that no matter what the price, it will not be purchased.

g. On the whole, the group agreed that although the San Ramon samples tasted different, or not as good, they were still acceptable as a foodstuff, and if they could be produced at a price that would be cheap enough to cause preferences to be put aside in favor of economics, then they would surely consume them. To the people of the pueblos jóvenes a cheaper potato, particularly in times of seasonal scarcity and soaring prices, would be a most welcome addition to the market.

IV. THE SECOND TASTE TEST - APRIL 5

The second taste test was scheduled for a Saturday morning, market day for the women of Los Laureles. Since many questions had arisen during the first test about purchasing habits, it was decided to first visit the market to observe how potatoes are selected for purchasing, and then conduct the taste test. Six of the original 10 women participated.

* At the time of the taste test, the price of the best white potatoes from the highland was 80 soles in the market nearest to Los Laureles.

** Potatoes that "go bad" in the market are usually sold at half or less than normal prices and are purchased as papa picada or papa malograda. Though often purchased as animal feed, they are also bought for human consumption particularly by the poorer people. Such potatoes are also purchased by food vendors in the market, who use them to make cau cau, a typical dish made of cubed potatoes and cow's stomach.

1. Procedure

Thirty tubers from each of the following varieties, produced in San Ramon, were used in the test: Cuzco, Anita, Desiree, Rosita and Caipiro. These had been stored in a dark, cool place since their removal from cold storage the week before.* Before initiating the test the six women were accompanied on their walk to the market and observed as they selected and purchased potatoes. We also noted prices and varieties available that day were noted and discussions about consumer preferences were held with vendors. Following this, the potatoes were prepared for the test in the home of one of the women.

Fifteen tubers from each variety were boiled and the rest were peeled and then fried. Whereas boiling time averaged about 20-25 minutes, frying the potatoes took at least half an hour and sometimes longer with a few varieties. These were then sampled by the six women, an assorted group of children, and myself. After sampling each variety, the conclusions were discussed as a group. This time, everyone knew that the varieties were all from San Ramon. The boiled potatoes were sampled first and then ranked according to preference. The procedure was repeated with the fried potatoes. Comments and the discussion were recorded.

2. Results

Results of the rankings are in Table 5. Cuzco was the preferred variety both boiled and fried. Interestingly, the Rosita, deemed the worst of the boiled potatoes, moved up to second place with frying. Desiree occupied an unfavorable position in both rankings and it was generally agreed that this potato tasted "immature." This evaluation was even more interesting when compared to the comments made concerning the appearances of the raw potatoes. In an examination of physical characteristics prior to cooking, Desiree had been selected as the best due to its larger, more uniform size, and the fact that its skin seemed the least broken.

Table 5. Potato Rankings

	Boiled	Fried
Liked best1	Cuzco	Cuzco
2	Anita	Rosita
3	Caipiro	Anita
4	Desiree	Caipiro
Liked least5	Rosita	Desiree

* This period of time allowed a diminishing of the "sweet taste," reported from potatoes previously cooked shortly after removal from cold storage.

3. Discussion

As with the first taste test, it is illuminating not only to discuss the results from the test itself, but to include comments made in the discussions during the test and observations made during the market visit.

a. The most obvious result from this experiment is the great variety in taste among potatoes produced in San Ramon. Not all varieties responded the same way to the tropical lowland environment, at least in terms of taste variables. Some, like the Cuzco, appear to have taste qualities which make them stand out above the others. It seems that one cannot, at this point, generalize about the taste of all potatoes produced in San Ramon.

b. The fact that there is variety in taste among the different potatoes, to the extent that in the experiment some were acceptable and others were totally unacceptable, could be the reason behind the variety of opinions in San Ramon regarding the taste of the potatoes produced locally. Enrique Grande, head of CIP's San Ramon experiment station, believes that variety in the consumer quality of the potatoes produced at the station accounts for both good and bad comments. Potatoes harvested at the station are given to people who work there and to members of the local cooperative. By chance, one family may get potatoes which taste good, while others may receive a collection of experimental varieties which are less acceptable in taste.

c. Potato tastes can improve with frying. The Rosita moved from fifth place to second place in preference when fried. But frying adds to the cost of the prepared food since the oil is rather expensive for these people (300 soles/liter). However, frying is an easy method to add a significant quantity of calories to potatoes.* A question for further study would be whether it is more economical to fry potatoes to increase their energy value or to purchase high energy foods with the money needed to improve the potatoes.

d. The tastes of different potatoes (and the origins of the potatoes they like the best) are well-known among pueblo joven residents in Lima, and these preferences account for an important portion of the

* A nutritional comparison of boiled versus fried potatoes is given below:

<u>Potato Preparation</u>	<u>Calories</u>	<u>Total Protein (grams)</u>
100 grams boiled potatoes	76	2.1
100 grams fried potatoes (from raw)	268	3.6

Source: Church and Church Food Values of Portions Commonly Used. 1976, p. 83.

decision-making when buying potatoes. The exercise in going to the market with the women before actually conducting these taste tests demonstrated this. Potatoes of at least fifteen varieties were on sale that morning with prices ranging from 40 soles for papa tercera (small white potatoes less than 5 cm. in diameter) to 100 soles for some types of papa huayro and 110 soles for the papa amarilla.* Women did not automatically buy the cheapest potato on the market, but rather shopped around for the types of potatoes desired (some of several kinds for different purposes) and tried to meet their potato preferences in the most economical way. Taste, consistency, "floury-ness," physical quality of the skin, and size were the most important qualities in selecting potatoes for purchasing.

e. The trip to the market, as well as the discussion following the experiment concerning the quantity of potatoes consumed during a week, raised the possibility of a plausible motive governing, at least in part, the consumption of potatoes among the residents of Los Laureles, who have a long walk to the market via a hot dusty route. They could take the bus, but this would add 40 soles to the cost of marketing. A woman can carry only so much from the market at a time, and potatoes are heavy, for the amount of food involved. Other food items such as rice or noodles represent more food per volume weight as brought from the market. It appears that roughly the same amount of potatoes are purchased per week, regardless of the total number of persons in the family. It could be that a limiting factor is the weight of the potatoes and the amount that a woman can carry per week. This could also be true for women in other locations as well.

V. SUMMARY AND RECOMMENDATIONS

The results and discussions presented above support the following summary statements:

1. When compared with highland potatoes, San Ramon potatoes always ranked second place. But this does not mean that potatoes from San Ramon are "bad." They taste different. An analogous example would be the difference in taste between steak and hamburger. Steak tastes better than hamburger to most people, but more hamburger is still consumed largely because it is cheaper. Hamburger, like San Ramon potatoes, is not as good as steak, but this does not mean that it tastes "bad."
2. Not all potatoes produced in San Ramon taste the same. Participants noted distinct differences between the varieties tested. It is possible that in the future, varieties will be found which produce very

* Papa huayro refers to native Andean varieties with purplish skins and creamy flesh. Papa amarilla also designates native Andean varieties but these are smaller, with deep-set eyes and bright yellow flesh.

acceptable potatoes for both local consumption and export to Lima. However, as these tests show, it is important to evaluate the experimental materials not only for resistance to disease, production, size and shape, but also in terms of the acceptability of the taste and consistency.

3. There seems to be an "ideal" type of potato for the Lima population; one with the optimum "flouriness" in terms of taste and consistency. All other varieties, both existing and potential, are measured against the quality and acceptability of this ideal type. New varieties which approximate this "ideal" type will have a far greater chance for popularity among consumers and therefore among growers. It would be wise to incorporate evaluations of any new varieties against the variety(ies) deemed "ideal" by the intended consumers, not only here in Peru but elsewhere as well. Though this area has not been fully explored yet, it is quite likely that strong preferences for certain varieties or types of varieties also exist in other developing countries as well, even where the potato is a relatively new introduction. This is an area worthy of further research.

4. Potato preference is an important part of the decision-making process in buying potatoes. Consumers shop for potatoes that taste good within the limits of their budgets. They will buy different potatoes for different preparations. Potatoes of many different tastes and sizes are sold in the Lima markets with prices conforming to the quality of each. It seems probable that for the right price, potatoes such as those from San Ramon could be marketed, particularly if the price were considerably lower than that of other potatoes.

5. Preparation methods modify the taste of potatoes and make them more acceptable for consumption as well as improving their nutritional quality in some cases.

6. Potatoes produced in San Ramon may be similar in taste to papa criolla, the coastal potatoes produced during the cool season, which are commonly consumed in Lima when supplies from highlands run out or become too expensive. It would be interesting to compare San Ramon produced potatoes with coastal potatoes in a future experiment.

7. The weight of raw potatoes may be a limiting factor in the decision to purchase potatoes, thus limiting the total consumption of potatoes per family, when they must be carried a great distance from the market to the household.

8. The results in Table 4 concerning the nutritional values of potato samples in the first taste tests showed that there was a 10% increase in water content of potatoes produced in San Ramon and a decrease in total protein and calorie content per 100 grams fresh weight. Though this is significant nutritionally, it must also be evaluated in light of the

potential benefit of being able to raise two to three crops of potatoes per year in those areas with climates and growing conditions similar to San Ramon.

9. An important consideration of both sets of taste tests is that the tubers utilized were from existing Peruvian and European varieties. They were not developed specifically for the production constraints of humid tropical areas such as encountered in San Ramon, and were being utilized to test for favorable agronomic techniques. CIP is currently working to develop materials which will produce well under these conditions, but at the time of these tests, they were not available in sufficient quantities to be included. Further tests are planned for 1982 when enough experimental materials will be available.

As a final note, it is necessary to reemphasize that acceptance is an important part of new food development. It has been shown here that people can readily determine differences in potato variety tastes, and that varieties can change in flavor and nutritional quality when the production zone is changed. New potato varieties destined for developing countries, or being selected by scientists in developing country agricultural programs, should be evaluated for their acceptability to the potential consumers. Any new potatoes must be within a range of acceptability, for their price, if they are to be consumed in any great quantity.