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TECHNICAL CONSTRAINTS IN HAITIAN AGROFORESTRY:
RESEARCH ON TOOL USE AND NEED IN TWO REGIONS

by

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SECID/AUBURN AGROFORESTRY REPORT NO. 13

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World Agroforestry Research Project
Technical Constraints in Haitian Agroforestry:
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Haiti Agroforestry Research Project

Technical Constraints in Haitian Agroforestry: Research on Tool Use and Need in Two Regions

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TECHNICAL CONSTRAINTS IN HAITIAN AGROFORESTRY:
RESEARCH ON TOOL USE AND NEED IN TWO REGIONS

Executive Summary

To study tool use and need as a factor in agroforestry production in Haiti, research was undertaken in two widely-separated areas of the country, Des Forges (near Bombardopolis in Northwest Haiti) and Vialet (near Petit Goave in the Western Department). Each site reflects conditions found in most other rural areas of the country, with Des Forges being a remote hilly location and Vialet a slightly more prosperous one near a major road to the capitol city. The methods used included observations, informal interviews, and a survey of 85 farmers. Data from these sources were supplemented by information gained from a previous sociological study of four areas, including the two tool study sites. In the tool study survey, farmers were asked about the farm tools they possessed, their perceived needs for additional ones, tool borrowing and lending practices, and related activities. They estimated the number of days each lost per season because of a lack of tools, as well as the number lost by other people in their household who did farm work.

The results of the study showed many commonalities and some differences between farmers in the two areas. Machetes, hoes and picks were the most common tools. About eight out of ten farmers commonly borrowed tools, usually from neighbors. Picks, hoes, machetes and sickles were the most frequently borrowed items. Calculations are provided based on the farmer's estimates of the number of days that they and their farming household members could gain if they had adequate tools. For the average household, these data indicate that an additional month of farm work days per year could result if adequate tools were available. Additional information is provided on cultivation patterns, perceived tool needs and current sources. Examples of what other countries have done about tool needs are briefly mentioned. Conclusions and recommendations about how tools may be increased in Haiti are provided.

REZIME KREOL

Pou étidié itilization zouti ak bezwen zouti nan agroforestri nan péyi d'Ayiti, yo té oblijé fè rechèch nan dé zone séparé péyi-a -nan Des Forges (tou pwé Bombadopolis nan Nodwes d'Ayiti) ak nan Violet (tou pwé Ti Goave nan Sudwes d'Ayiti). Chak amplasman gen minm' condition ké preské tout lot zone nan péyi-a. Des Forges nan tèt monn' é Violet ki pi pré rout Potoprins yon ti jan pli fètil. Métod ki té fè nou jwenn tout rézilta sa-yo cé observation, ti kosé ak moun-yo é yon étid sou 85 kiltivatè. Amplis dé sa, nou té pran kèk infomasyon nan lot étid sociolojik ki té fèt sou kat zone ki té genyen dé étid sou zouti. Nan étid sou zouti-a, nou té mandé ki kalité zouti kiltivatè-yo genyen, ki lot zouti yo bezwen é ki jan afè préte zouti té fèt. Yo té kalkilé kantité jou yo té pèdi pa sézon paské pa gen zouti é yo té kalkilé tou kantité jou lot moun ki travay sou tè nan kay-yo té pèdi.

Rézilta yo montré ampil diférans ak ampil bagay ki samblé ant kiltivatè-yo nan dé zone-yo. Manchèt, wou ak pikwa té plis sèvi kom zouti. 8 sou 10 kiltivatè préte zouti nan min vwazin. Yo té plis préte pikwa, wou, manchèt ak kouto-digo. Kalkil yo fèt sou kantité jou plantè-yo ak moun ki rèt lakay-yo ta genyen amplis si yo té gen tout zouti-yo. Pou mwatié kay-yo, infomasyon bay ké yo tap genyen yon mwa travay amplis si yo té gen tout zouti-yo. Gen plis infomasyon sou jan yo kiltivé tè-a ak sou bezwen zouti. Nou palé dé examp sou sa lot péyi fè pou bezwen zouti-yo. Konklizyon ak rekomansyon sou jan zouti ka ogmanté nan péyi d'Ayiti nan rapo sa-a.

I. Background

In late 1988 and early 1989, sociological data were collected from rural Haitians in four regions of the country on a range of topics (Starr, 1989). The purpose of that study was to compile information on the status of rural Haitians and their experience and attitudes relating to agroforestry. The data gathered are useful both in the management of agroforestry implementation efforts being undertaken by CARE and the Pan American Development Foundation (PADF), and in determining the longer term effects upon participating households.

That survey included a total of 258 heads of households in the Bombardopolis, Bassin Bleu, Violet and Maniche areas. It provided limited information on the possessions found in the households, including tools. Some of the information on tools obtained during that study is reported here. It became apparent, however, from the results of the initial survey as well as observations in the field and information shared by colleagues working in different regions, that tool possession and use among Haitian peasants was a topic that needed further scrutiny. Opinions about the status and use of tools in Haiti are common among development workers, farmers and others in Haiti, but reliable information about them was lacking. It is commonly recognized that the use of tools in peasant households is an important factor or variable in agroforestry and other farm production, but the topic has not been systematically examined in recent years. Some data on tools apparently gathered in the late 1970s was included in an FAO compilation of world agricultural statistics (1983). Those statistics, however, provide little information beyond indicating an almost complete reliance on simple hand tools. An improvement in the use and availability of farm tools among rural Haitians appears to be one way in which agroforestry and other crop production could be enhanced but a better understanding of this issue requires information beyond casual observations and aggregate statistics.

In consultation with colleagues working in the Agroforestry Outreach Project (AOP) in Haiti, which is funded by the U. S. Agency for International Development, a "rapid response" study was designed and implemented during the Spring of 1989. This type of study, akin to the rapid rural appraisal approach discussed by Chambers (1984:47-74;199-201) is intended to address a topic of concern in a timely way and to obtain information that can be used by policy-makers to effectively identify and respond to a problem. Such an approach seeks to maximize the acquisition of information most useful to decision-makers with the modest investment of resources. Some of the options available for this type of research are also described in the volume initially compiled by Oxfam to aid its field directors (Pratt and Boyden, 1985), but which is also of great value to development workers in general.

II. Methodology

Some of the results provided in this report are drawn from the broader sociological study previously mentioned (Starr, 1989). The methods used in collecting that data are described in detail in same document. In brief, however, following initial field work, our staff devised, translated, back-translated and field tested a comprehensive questionnaire. The instrument was devised to gather information on the characteristics of the respondent's household and farm, agroforestry efforts, farming practices, crops cultivated, perceived development needs, and other topics. CARE and PADF regional staff assisted us in recruiting five field interviewers. Each was a well-regarded long-time resident of his or her area. Each was a long-time resident of one of the four areas to be surveyed. Two came from the region of Bassin Bleu, and one each from Des Forges (near Bombardopolis), Vialet and Meniche. Bassin Bleu and Des Forges are in Northwest Haiti, an area in which CARE is responsible for the implementation of agroforestry efforts. The other areas are in regions where PADF works to disseminate agroforestry technology through local non-governmental organizations. All but one of the interviewers was trained under the direction of our team in Petionville. The other received training by our staff in his home area. Each was asked to accomplish at least fifty interviews, and was visited and monitored at least twice during the data collection phase to ensure that directions were being followed. Upon the completion of the interviews, each form was evaluated. Each interviewer was visited again to reconcile any inconsistencies. Some re-interviewing was required. In general, the data collection progressed well and most problems were promptly resolved.

For the second or rapid response study, which provides the bulk of the data reported here, two of the areas previously used in the sociological study were selected, Des Forges and Vialet. These sites were chosen for three reasons. First, they are very different areas of the country in terms of terrain, rainfall, and proximity to the capitol city. Vialet, a PADF area of responsibility, is slightly better off economically, has a higher rainfall and is near the main highway less than an hour from the environs of Port-au-Prince. Des Forges is a difficult five hour or more drive from the capitol in the Northwest region, a CARE area. It is drier, characterized by steeper slopes, lower rainfall, and is far from any commercial areas where tools may be purchased. (Figure 15 compares the distances the farmers in both areas had to walk to secure water). Similarities in the results of our inquiry would tend to reflect conditions found in many other parts of the country. In general, Des Forges reflects conditions prevalent in the great number of small remote rural areas while those in Vialet could represent the somewhat more prosperous rural areas which are favored by more rain and a paved road. The second reason for the selection of the sites was due to the availability of good local interviewers who had performed well in our previous study. Thirdly, we could draw upon data from the first study and had already gained some insights and background about the two areas.

The two interviewers were asked to complete at least thirty-five interviews with farmers. A short questionnaire with 27 questions was devised and translated, back-translated and field-tested in Vialet before final interviewing began. The interviewers were each monitored on two different occasions during the period of interviewing.

A convenience sampling approach was used. Each of the interviewers was asked to interview those who were within a hour and a half walk of their houses. They were asked to include farmers who reflected the typical range of local households and farms. Most of those selected had been previously interviewed for the sociological study.

The original Creole-language questionnaire used in is shown in Appendix A. An English translation of the form is Appendix B. The questionnaire included a number of open-ended questions which were later categorized and coded for computer analyses. Some of the responses to the open-ended questions are useful in interpreting the statistical analysis. Some useful spontaneous remarks made by farmers about the topics included in the survey are provided in Appendix E.

The questions posed included those on tool possession and use, tools needed, and patterns of borrowing and loaning tools. Farmers were asked to estimate how many days a season they lost because they did not have sufficient tools. We also asked them to indicate the number of others in their household who routinely did farm work and to estimate the number of days they lost because of insufficient tools. We also modified the question and further requested them to estimate how many more days they and their hands could work if the right tools were available. If they did borrow or lend tools, we asked them about the length of time involved in the transaction. If they borrowed tools, we asked what, if anything, they gave to the lender in exchange.

Data on other topics were also gathered, only part of which is included here. We asked each about land holdings and the general character of their land. We asked for information about the crops typically grown and how often they were cultivated. We requested estimates about the distance required to walk for water and if any irrigation was attempted. Farmers were also asked if they planted hedgerows and were familiar with the use of the "A Frame" level used to plant hedgerows. We also asked about their perceived need for either tree or other crop seeds.

III. Research Results

1. General Features

Appendix C reports the frequency distributions of many of the items. There were a total of 85 farmers surveyed, 53 in Vialet and 32 in Des Forges. They cultivated a number of crops, some twice a year. Rounding off to the nearest percentage point, eighty-two percent grew beans, nearly half of these doing so

twice a year. Some 78% grew pigeon peas; almost half of the farmers grew them twice a year. Eight percent grew sugar cane and all cultivated it according to an annual cycle. Manioc was cultivated by 22%, with nearly a third planting twice a year. A fourth grew plantains and seven percent grew bananas ("fig").

Corn and Sorghum were common crops. Ninety percent cultivated corn, 54% doing so twice a year. Sorghum was grown by three quarters of the farmers and 57% of these had two crops a year. Nineteen percent planted one season of sweet potatoes per year. Nearly a third reported growing other crops, none of which were grown by more than five percent.

Irrigation, or the watering of crops from a river or pond, was rarely practiced. Only two farmers of the 73 who responded to the question about irrigation practices reported doing so. The remainder did not irrigate and some remarked that it was not possible to do so in their locations. They depended on rain to water their crops.

Farmers responded that they had from none to six people on the farm who helped them with their work, with an average of 2.4 helpers per farm. Forty-one percent, however, indicated that they had no other person who helped them on their farm.

2. Tools Owned

Appendix D includes various graphics showing survey results. Figures 1 and 2 show the proportion of farm households which have one or more different tools. The data reported come from the previously distributed sociological survey (Starr, 1989). It includes farm households in Vialet, Des Forges, Bassin Bleu and Meniche. Figure 1 shows the proportion of households in each region which have machetes, hoes and axes. Machetes are the most common tool found, followed by hoes. Few households, in fact, do not possess at least one machete. The axe is the least commonly found of the three. The only region that has more than 10% of its households with axes is Bassin Bleu. Figure 2 shows the distribution of picks, sickles and water jugs. Regional differences in tool use observed in other parts of the country are also found in the data shown here. Picks are least often found in Des Forges, and Vialet has the fewest water jugs among the four regions. Farmers reported having some other types of farm tools but these were in such small numbers that they were not included in this statistical analysis.

3. Borrowing Patterns

Not one of the farmers interviewed indicated that they had a sufficient number of tools to accomplish his farm work. One may be skeptical of the genuine nature of such responses and speculate that few farmers would say that they had enough tools even if such was the case in the hope that they might be given some. We expect that most would say they needed something if it might be freely provided them. Interestingly, however, less than ten percent of the farmers questioned reported that they needed

seed for either tree or crop production. Only two farmers reported that they had a need for vegetable seeds. The answers to the questions about the need for seed suggest that the farmers tend to not report having a need unless such is actually the case. In fact, almost uniformly, the perceptions of Haitian peasants regarding their "needs" tend to be very modest in relation to what expatriate development workers see the peasants as "needing." For example, infant mortality rates are very high and other health problems in rural areas abound. Malnutrition is common and visible. Rural schools seldom go beyond the first few grades. As was shown in the sociological study mentioned previously, however, Haitian farmers' perceptions of their needs tend to be modest. Less than one percent of those surveyed in that study reported hunger or malnutrition as a problem. Without entering a debate about what needs are genuine and who should best determine them, it can be said that Haitian peasants tend to underestimate their needs because they have significantly lower expectations about what can be accomplished to improve their situation than do expatriate development workers. The farmers' attitudes are best understood as a rational adjustment to persisting political and economic conditions which provided little opportunity for improvement.

Seventy-eight percent of those interviewed reported borrowing tools from others. As shown in Figure 3, Des Forges farmers were significantly more likely to borrow from others than were those in Vialet. Figure 4 indicates that picks were the tool borrowed the most often in both areas. Hoes were the second most borrowed tool in Des Forges while the sickle was number two in Vialet. Recall that sickles are rare in Des Forges and that borrowing is dependent on the availability of tools. Even though machetes are found in the great majority of Haitian farm households, they also tend to be often borrowed from others. This fact helps remind us that farmers often need more than one tool of the same kind to accomplish their work.

About seven of every ten farmers reported lending tools to others. When others borrowed tools from them, it was, on the average, for over a week at a time (7.4 days). There were significant differences between the two regions in the length of time reported (Figure 5). Vialet lenders reported an average time of over nine days, and those in Des Forges between two and three days (2.4) per occasion. The reason for this difference may be because there are more tools available in Vialet. Accordingly, tools in Vialet may be borrowed for a longer period of time than in Des Forges.

Among those borrowing, relatives were borrowed from only five percent of the time and friends and neighbors 96% of the time. No one borrowed from any cooperative organizations or kombits. There were no "tool banks" in either area.

Of those who borrowed, three-fourths reported that they did not give anything to the loaner in exchange. Fifteen percent gave money and eight percent reciprocated by giving days of work on the lender's farm.

4. Production Days and Tool Availability

Figures six through nine are box charts which concern the relationship between the number of farm work days and the availability of tools. Box charts are becoming increasingly used to portray data that formerly were presented in bar charts (Wilkinson, 1988). They provide a simple graphical summary of a batch of data. The median of the data is marked by the center vertical line. The lower and upper hinges comprise the edges of the central box. The median splits the ordered batch of numbers in half, while the hinges split the remaining halves in half again. Values outside of the inner fences are plotted with asterisks. Values outside the outer fences are plotted with empty circles.

Figure 6 shows the farmers' estimates in the two regions about how many work days they personally lost per season because they did not have sufficient tools. The number of estimated lost work days per season ranged from none to 25, with a mean of 4.3 days. Those in Des Forges estimated a much higher seasonal loss (8.7) than did those in Violet (1.5). Haitian farmers customarily see the year as having two growing seasons, even though some of the crops they grow are cultivated only once a year.

The same question was posed to the farmers about other household members who help with farm work. As reflected in Figure 7, the mean for all those surveyed was 6.7 days lost, with Violet farmers estimating that their workers lost an average of 1.7 days. The farmers' estimate for their hands in Des Forges was 9.5 days.

Another question on the same issue asked farmers to estimate the number of additional days that they and their household hands could work if they had adequate tools. The results from those questions are shown in Figures 8 and 9. Des Forges farmers estimated that they could personally work an average of another 8.4 days. The number for Violet farmers was 6.5. For other workers in their households, the Des Forges farmers' estimate was an additional 8.6 days. For Violet, the estimate for other hands was 5.1. The mean number of days for the entire group interviewed was 7.5 days for farmers and 7.4 for hands.

In estimating how much more production could come from Haitian farms if those farming them were adequately equipped with tools, several assumptions must be made. For the purpose of illustration, it can be assumed that all of the additional work days estimated by the farmers would result in additional production, without reductions from the limitations of land, water, seed or other non-labor inputs. As indicated, an average of 2.4 people in addition to the farmer worked on each farm. If we use the farmer's average estimate that the farmer and his hands could each work about an additional 7.4 days, the additional amount of labor available per average household would be 7.4 days multiplied by 3.4 persons per season. If we

conservatively assume only one season per year, this would increase the number of days worked per year by 25.16. Some farm work days are more important and productive than others, such as those during planting and harvesting. On the other hand, some tasks done on the farms at present that do not require tools would be displaced and go undone when farm work with tools increases. Even if we take a conservative view that the additional days worked are of equal value to those worked during a year, that the farmer's work week entails six days, and that there is only one season per year, the provision of adequate tools to farms is seen as adding about one additional month of production during a given year. Accordingly, up to an eight percent increase in agroforestry or other farm production could be gained by providing farmers with adequate tools.

5. Preferences for Tools

The farmers see some tools as more important and needed in their work more than others. Those who said that they needed additional tools were asked to name them. If they mentioned more than one tool, which was commonly the case, they were asked to rank each in terms of its need on their farm. The results are shown in Figures 10, 11 and 12, which use a "stem and leaf" format. The stem and leaf format looks like a sideways histogram or tally but it also where the median (M) and the hinges or quartiles (H) lie in the distribution. Values outside the quartile range are separated from the inner values by a line of text, "Outside Values" (Wilkinson, 1988).

Figure 10 shows the relative rankings for the pick, the most desired tool. Of the 63 farmers who reported a need for one or more picks, the great majority listed it as having either the first or second priority. The second most desired tool was the hoe (Figure 11). Of the 45 farmers who expressed a need for that tool, most gave it their highest priority. The third most requested tool was the machete. As shown in Figure 12, of the 31 who listed a need for one or more machetes, fewer than one in five gave it their top priority. A number of other tools were listed by farmers, but only the three shown in the graphics appeared with frequency. Among those other tools mentioned were shovel, rake, digging fork, wheelbarrow, hatchet, sledge hammer, pliers and shears.

6. Tool Prices and Sources

Tools are not available for sale in most village markets or shops. Purchasing them typically requires a trip to a regional city or to the capitol. Such a trip may require a full day walk or travel by camionette each way. The price of tools is regarded as high. The tools examined here cost from seven to thirteen dollars (local currency) each, depending on the tool, whether or not it comes with a handle, and the location where it is purchased. Allowing for differences in the exchange rate, retail tool prices in Haiti are approximately 15% to 30% higher than in the neighboring Dominican Republic for the identical items. Machetes made in the Dominican Republic are commonly on sale in

Haiti. Older peasants feel that the tool supply in the rural areas is less than what it was a few years earlier because of the declining economic status or "pauperization" of rural people. Anecdotes about families who sold tools to buy food or meet an emergency are common.

A few tools are made locally, often by adding plates to worn out imported tools, or sharpening old vehicle parts. Most Haitian villages do not have craft specialists. Blacksmiths or metal-workers can be found in regional cities such as Les Cayes, Mirebalais or Gonaives, or in the capitol. No locally-made new forged metal tools have been observed, although such tools were reportedly made in years past in Port-au-Prince. Tin watering cans are made locally. Tools are imported from Brazil, Korea, Taiwan, the Dominican Republic and England. A large proportion of them are not heavy duty and wear quickly.

Tools have been awarded by the Ministry of Agriculture as prizes in various competitions. In the past, the Ministry and a number of missionary and other development efforts have provided some tools to selected farmers in specific target areas as part of projects to improve production. The Ministry has recently distributed to farmers a small number of crop sprayers provided by the Taiwanese government. At present, there does not appear to be any program to provide a significant number of tools to Haitian producers either through donation or through reduced price (subsidized) sale.

7. Hedgerow Technology

Because of a possible link between tool availability and the installation of hedgerows, we also asked farmers if they cultivated hedgerows. As seen in Figure 13, nearly half of those in Des Forges cultivate hedgerows, while only about one in ten did in Violet. The major difference between the two locations with regard to planting hedgerows had to do with the significantly greater number of sloping fields in Des Forges. The larger amount of sloping fields in Des Forges necessitated a greater use of hedgerows. Tool possession was not related to hedgerow cultivation. As indicated in Figure 14, the number of farmers familiar with the use of the "A Frame" level was identical to the proportion who grew hedgerows in each area.

IV. Resources for Increasing Tool Availability in Haiti

If an effort was to be made to decrease the farm tool shortage in Haiti and an economically-sustainable approach were to be used, the two main options would be to produce tools in Haiti or to import them from elsewhere for sale locally. If tools are to be produced locally, decisions would have to be made about whether such efforts should be accomplished by local craftspeople or by a larger enterprise, and if at least an initial subsidy is required. A thorough economic analysis of the farm tool market in Haiti and of the feasibility of different local production options would be required. The possibility of successfully competing in the local market with items imported

from established hand-tool producers in Taiwan, Korea and Southeast Asia would require particular scrutiny. Common hand tools from those sources are currently being sold for as low as two dollars each (retail price) in North America. Beyond the hand tools used by farmers, most of the "appropriate technology" tools and equipment that have been developed during the last twenty years is currently manufactured either in Europe or India (Mulvany et al., 1985; Sandhu and Sandler, 1986). The use in Haiti of much of the equipment described in the "appropriate technology" could be premature. The task of providing an adequate number of simple farm hand tools should have priority.

To understand the possibility for local farm hand tool production in Haiti, experiences from other countries can be drawn upon. Here are some brief examples.

1. Improving Tool Quality

The Kenya Rural Access Roads Program used labor intensive methods over ten years to build 15,000 kilometers of simple roads. The policy of buying tools by tender at the lowest bid resulted in poor quality tools. Specifications have been drawn up to which local or overseas bidders must conform. These have resulted in tools of good quality that seldom break and hold up well under difficult conditions of use (Armstrong, 1980).

2. Recycling Scrap Metal

Many third world countries have small enterprises which recycle scrap metal, particularly that from old vehicles. Many small operations use the metal to make a variety of goods for the local market. Haiti has a visible stock of unused scrap metal which could be recycled. Some of the metal could be used to make simple tools. The technology required to do this does not require sophisticated imported processing equipment (Vogler, 1981:37-80). Buatsi (1988:53-65) provides a good case study of the economics of a successful scrap metal foundry in Papua New Guinea.

3. Local Tool Production

Tanzanian implement manufacturers and USAID have been involved in a project to build carts and toolbars for use with oxen. Increased production has paid for the initial investment of the farmer within months. Only a small fraction of the demand has been met (Gamser, 1988:9). In Zambia, the FAO, government and national university have successfully pursued initiatives to promote toolmaking by local craftspersons, and the manufacture of hand tools by small factories. Extension efforts have led to the village-level production of tools, wheel barrows, and carts (Gamser, 1988:73).

V. Conclusions and Recommendations

1. Hand tools used for farming in Haiti are in scarce supply relative to the available labor, land and other inputs needed to establish and maintain agroforestry systems. The supply of tools in rural areas has reportedly declined over the last decade relative to the supply of labor.

2. The quality of tools tends to be poor and many break within a few months of use.

3. Almost all of the hand tools used are imported. They are regarded as costly by farmers.

4. The distribution system for tools in the country is poor. Farmers must travel to a large town to secure them.

5. Most farmers borrow tools from one another for a few days at a time. It appears that the more limited the tool supply, the less the period of the loan.

6. Each farm would gain, on the average, approximately one additional month of work days if the farmer and those who practice farming in his household had sufficient tools.

7. Axes, hoes and machetes are most commonly specified as the tools farmers need.

8. Agroforestry grantees should be aware that a lack of tools may impair a farmer's agroforestry activities. The provision of tools for farmers is not within the scope of the coming Agroforestry II Project, but assistance could be encouraged on the part of other development organizations.

9. The feasibility of an effort to locally manufacture tools in Haiti, relative to significantly increasing their importation should be examined. A study of the economics of the national tool market should be undertaken. The use of salvaged metal in the local production of tools should be included. Given the nature of the need and a good understanding of the market, farm tool production and/or importation could be a successful self-sustaining activity for the private sector.

10. Efforts to increase and improve farmer's tools in other countries have been documented in recent years. If a tool improvement project were to be designed for Haiti, several of these accounts would be useful and provide required details.

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APPENDICES

- A. Original Creole-language Questionnaire
- B. English Translation of Original Questionnaire
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(with List of Variable Labels)
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1. Kimezo rom: 30

2. Non rom: ... Location: Cocle-Bois

3. Kafite se: ...

APPENDIX A

ORIGINAL CREOLE-LANGUAGE QUESTIONNAIRE

4. Ki distans pou machin ou pou jwenn ou pou lokalizasyon ki di ou? ...

5. Ki distans pou machin ou pou jwenn ou pou lokalizasyon ki di ou? 30 min

6. Anbyan moun lakay ou ki travay pou ou? 4 moun

7. Ki zouti ou gen lakay ou? ...

- manchet
- wou
- dikwa
- foych
- coute d'igo
- kafite dlo
- arabwa
- lot

8. Saké ou gen saké zouti ou travay? ou? ... non

9. Ci ou non, ou se ou pou zouti non non lot moun? ou? non

10. Ci ou ou, ki zouti ou gen ou, ou se ou, chak ki la se pou konbyen lan? ...

11. Kisa ou bay ou pou ou pou ou? ...

12. Konbyen jou ou gen ou pou ou? ou se ou pou ou? ...

13. Konbyen jou ou gen ou pou ou? ou se ou pou ou? ...

14. Ci ou se ou pou ou? ou se ou pou ou? ...

15. Ci ou se ou pou ou? ou se ou pou ou? ...

Zouti sou Tè

1. Niméwo fom: 30
2. Non fèmié Amélie 3. Location: Croix-Desjardins
4. Kalité tè (grosè,) fon 1/2 kd
5. Ki kalité jadin ki planté é chak konbyen tan? Pwalwa, ma
afwa, pitimi afwa, pou kongo
6. Ki distans pou maché pou rivé jouin dlo pou irrigation ki pi
pré? Pagen d'la, se le lafli tonde li wouye
7. Ki distans pou maché pou rivé jouin dlo pou bouè ki pi pwé?
30 m
8. Konbyen moun lakay-ou ki travay sou tè-a? 4 moun
9. Ki zouti ou gen lakay-ou? manchet x
wou x
pikwa
fouch
couto digo
mamite dlo x
aroswa
lot
10. Eské ou gen assé zouti pou travay? oui non x
11. Ci cé non, eské ou prêté zouti nan min lot moun?
oui x no
12. Ci cé oui, ki zouti, ki moun ki prêté-ou, chak ki lè et pou
konbyen tan? afwa, pitimi, manchet, Pèle Hamman wouye
chak sezon pou you sel jou
13. Kisa ou bay ou byen fè pou sévis sa-a?
anyen moun bay pou you
14. Konbyen jou chak sezon ou pèdi pou tèt zouti ké-ou pa
genyen? 5 jou kongo
15. Konbyen jou lot moun lakay-ou pèdi chak sezon?
3a 4 jou
16. Ci ou té gen lot zouti, konbyen jou an plis ou ta travay?
mwen tap travay 4 jou anplis
17. Ci té gen lot zouti, konbyen jou an plis lot moun lakay-ou
ta travay? 3 jou anplis

18. Ki zouti ou pi bezwouin? Ci ou bezwouin plis kè yon zout ki zouti yo yé? *manchet, pile*
19. Eské moun prété zouti nan min-ou? Oui Non
20. Ci cé oui, ki zouti, chak konbyen tan é pou konbyen tan? *manchet, non*
21. Ki sa yo ba-ou ou bien fè pou-ou? *anyen yo fè nan mwen pou sa*
22. Eské ou kon fè ou bien sévi ak Niveau A pou mezuré rai vivan? *Non*
23. Eské ou kon planté ramp vivan? *Non, men mwen ta non: fè nan ane sa a*
24. Eské ou gen assé semence? Oui Non
25. Ci cé non, konbyen ou bezwouin an plis? é ki kalité? *4 manchet decena*
26. Eské ou gen assé gren pou lot jadin-ou? Oui Non
27. Ci cé non, ki gren ou bezwouin é ki kantité?

mwen pa genyen lot jaden pou mwen plan

Tools Used on Land

1. Form number: 30
2. Name of Farmer: Mme. Elibien Moise Locality: Crève - Desforges
4. Quality of land deep 1/2 "kavo"
5. What kind of crop is planted and how often? beans, corn, millet, pigeon peas - once a year
6. How many minutes do you walk to get to the nearest irrigation water? there is no water to irrigate the land - only rainfall
7. How many minutes do you walk to get to the nearest potable water? 30 minutes
3. How many people living with you work on the farm? 4
9. What kind of tools do you have?

machete <u>X</u>	hoe <u>X</u>
fork <u> </u>	sickle <u> </u>
water jug <u>X</u>	watering can <u> </u>
pick <u> </u>	other <u> </u>
10. Do you have enough tools to work with? Yes No X
11. If no, do you borrow tools from people? Yes X No
12. If yes, what kind of tools, who do you borrow from, how often and for how long? hoe, pick, machete, shovel. I borrow them from my neighbor every season for one day.
13. What do you do in exchange? nothing
14. How many days do you lose per season because of lack of tools? 5 days
15. How many days do other people living with you lose per season? 3 - 4 days

16. If you had other tools, how many more days would you work?
4 days
17. If there were other tools, how many more days would people living with you work? 3 days
18. Which tool do you need the most? If more than one, name them? hoe, pick, machete, shovel
19. Do people borrow tools from you? Yes No
20. If yes, what tools, how often and for how long? machete, hoe
21. What is given to you or what is done for you? nothing
22. Do you know how or do you ever use a "A" Frame Level to measure hedgerows? Yes No
23. Do you ever plant hedgerows? Yes No but I would like to this year.
24. Do you have enough seeds? Yes No
25. If no, how many more do you need? and what quality?
4 "mamit" of Leucaena
26. Do you have enough seeds for your other crops?
Yes No
27. If no, what seeds do you need and how many? _____

N.B. I don't have other land to plant on.

STATISTICALLY SIGNIFICANT (α = .05) REGIONAL DIFFERENCES:
A SUMMARY

VARIABLE	STATISTIC	Value	Significance
Distance to Potable Water	Mantel	44.973	.000
Own Beans	same		.004
Own Florida Peas	same		.033
Own Hamme	same	4.274	.039
Own Beans	same	10.692	.001
Own Corn	same	5.119	.024
Own Mashed	same	5.31	.021
Own Pick	same	4.011	.045
Own Pickle	same	17.92	.000
Borrow Yards	same	6.52	.004
Borrow Fries	same	7.096	.028
Days Borrowed	Mantel Test	8.5	.001
Work Days Lost	same	16.841	.000
Head Plot	Distance Lot Square	7.28	.007
Head Hoe	same	16.506	.000
Use Sprayer	same	15.545	.000
Own Hedgehog	same	15.16	.000

DF=1 for all the above except for "Borrow Fries", for which DF=2.

APPENDIX C

STATISTICAL TABULATIONS OF SURVEY ITEMS
(AND LIST OF VARIABLE LABELS)

STATISTICALLY SIGNIFICANT (= or < .05) REGIONAL DIFFERENCES:
A SUMMARY

<u>Variable</u>	<u>Statistic</u>	<u>Value</u>	<u>Probability</u>
Distance to Potable Water	Bartlett Test	44.973	.000
Grow Beans	Pearson Chi-Square	4.587	.032
Grow Pigeon Peas	same	4.274	.039
Grow Manioc	same	4.274	.039
Grow Bananas	same	10.692	.001
Grow Corn	same	5.119	.024
Own Machete	same	5.31	.021
Own Pick	same	4.011	.045
Own Sickle	same	17.92	.000
Borrow Tools	same	8.52	.004
Borrow From	same	7.096	.029
Days Borrowed	Bartlett Test	8.6	.003
Work Days Lost	same	16.843	.000
Need Pick	Pearson Chi-Square	7.29	.007
Need Hoe	same	16.508	.000
Use A-Frame	same	15.545	.000
Grow Hedgerows	same	15.16	.000

DF=1 for all the above except for "Borrow From", for which DF=2.

VARIABLE LABELS (Selected)

LOCA	LOCATION OF RESPONDENT
OTHERS	HOW MANY OTHER PEOPLE IN YOUR HOUSEHOLD HELP WORK ON THE FARM?
PIGPEAS	PIGEON PEAS (ANSWER TO: WHAT CROPS ARE PLANTED?)
SUGCANE	SUGAR CANE
BANANAS	SWEET BANANAS
SWEETPOT	SWEET POTATOES
IRLAND	DOES THE FARMER IRRIGATE HIS LAND?
POTWATER	MINUTES WALK TO POTABLE WATER SOURCE
MACHETE	DO YOU HAVE A MACHETE?
PICK	DO YOU HAVE A PICK?
HOE	DO YOU HAVE A HOE?
SICKLE	DO YOU HAVE A SICKLE?
BORROW	DO YOU NEED TO BORROW TOOLS FROM OTHERS?
FROM	WHO DO YOU BORROW TOOLS FROM?
HOWLONG	HOW LONG DO YOU BORROW TOOLS?
BORMACH	DO YOU BORROW A MACHETE?
BORPICK	DO YOU BORROW A PICK?
BORHOE	DO YOU BORROW A HOE?
BORSICL	DO YOU BORROW A SICKLE?
EXCHANGE	WHAT DO YOU DO IN EXCHANGE FOR BORROWING?
LOST	HOW MANY DAYS DO YOU LOSE PER SEASON BECAUSE OF LACKING TOOLS?
OTHRLOSE	HOW MANY DAYS TO OTHERS IN HOUSEHOLD LOSE PER SEASON?
MOREDAYS	IF YOU HAD MORE TOOLS, HOW MANY MORE DAYS WOULD YOU WORK?

OTHRDAYS	HOW MANY MORE DAYS WOULD PEOPLE IN YOUR HOUSEHOLD WORK IF THERE WERE OTHER TOOLS?
NEEDMAC	NEED A MACHETE (ANSWER TO:WHAT TOOLS DO YOU NEED MOST?)
NEEDPIC	NEED A PICK
NEEDHOE	NEED A HOE
NEEDSICL	NEED A SICKLE
BORFRMU	DO PEOPLE BORROW TOOLS FROM YOU?
FROMUOF	IF PEOPLE BORROW, HOW OFTEN DO THEY DO SO?
FROMUDAY	NUMBER OF DAYS THAT OTHERS BORROW TOOLS FROM YOU
FROMUMCH	MACHETE BORROWED FROM YOU
FROMUPIC	PICK BORROWED
FROMUHOE	HOE BORROWED
FROMUSC	SICKLE BORROWED
GIVEN	WHAT ARE YOU GIVEN IN RETURN?
HEDGEROW	DO YOU EVER PLANT HEDGEROWS?
AFRAME	DO YOU KNOW HOW TO USE AN "A FRAME" LEVEL TO MEASURE HEDGEROWS?
SEEDS	DO YOU NEED SEEDS FOR TREES?
SEEDCROP	DO YOU NEED SEEDS FOR OTHER CROPS?

NOTE: A "\$" sign after a variable name designates a categorial or qualitative variable. Those without the sign are numerical or quantitative variables. Some variables have been coded twice, once as a numerical variable and a second time as a categorial variable. The same label names are used except that categorial variables end with a "\$" sign. The dual coding procedure expands the options for statistical analysis. Only the labels for numerical labels are listed here.

TABLE OF BEANS\$ (ROWS) BY LOCA\$ (COLUMNS)
COLUMN PERCENTS

	DES FOR	VIALET	TOTAL	N
YES	93.75	75.47	82.35	70.00
NO	6.25	24.53	17.65	15.00
TOTAL	100.00	100.00	100.00	
N	32	53	85	

TABLE OF PIGPEAS\$ (ROWS) BY LOCA\$ (COLUMNS)
COLUMN PERCENTS

	DES FOR	VIALET	TOTAL	N
YES	65.63	84.91	77.65	66.00
NO	34.38	15.09	22.35	19.00
TOTAL	100.00	100.00	100.00	
N	32	53	85	

TABLE OF SUGCANE\$ (ROWS) BY LOCA\$ (COLUMNS)
COLUMN PERCENTS

	DES FOR	VIALET	TOTAL	N
NO	78.13	100.00	91.76	78.00
YES	21.88	.00	8.24	7.00
TOTAL	100.00	100.00	100.00	
N	32	53	85	

TABLE OF MANIOC\$ (ROWS) BY LOCA\$ (COLUMNS)
COLUMN PERCENTS

	DES FOR	VIALET	TOTAL	N
NO	65.63	84.91	77.65	66.00
YES	34.38	15.09	22.35	19.00
TOTAL	100.00	100.00	100.00	
N	32	53	85	

TABLE OF PLANTAIN\$ (ROWS) BY LOCA\$ (COLUMNS)
COLUMN PERCENTS

	DES FOR	VIALET	TOTAL	N
NO	78.13	73.58	75.29	64.00
YES	21.88	26.42	24.71	21.00
TOTAL	100.00	100.00	100.00	
N	32	53	85	

TABLE OF BANANAS\$ (ROWS) BY LOCA\$ (COLUMNS)
COLUMN PERCENTS

	DES FOR	VIALET	TOTAL	N
NO	81.25	100.00	92.94	79.00
YES	18.75	0.00	7.06	6.00
TOTAL	100.00	100.00	100.00	
N	32	53	85	

TABLE OF CORN\$ (ROWS) BY LOCA\$ (COLUMNS)
COLUMN PERCENTS

	DES FOR	VIALET	TOTAL	N
YES	87.50	90.57	89.41	76.00
NO	12.50	9.43	10.59	9.00
TOTAL	100.00	100.00	100.00	
N	32	53	85	

TABLE OF SORGHUM\$ (ROWS) BY LOCA\$ (COLUMNS)
COLUMN PERCENTS

	DES FOR	VIALET	TOTAL	N
YES	71.88	75.47	74.12	63.00
NO	28.13	24.53	25.88	22.00
TOTAL	100.00	100.00	100.00	
N	32	53	85	

TABLE OF SWEETPOT\$ (ROWS) BY LOCA\$ (COLUMNS)
COLUMN PERCENTS

	DES FOR	VIALET	TOTAL	N
YES	50.00	.00	18.82	16.00
NO	50.00	100.00	81.18	69.00
TOTAL	100.00	100.00	100.00	
N	32	53	85	

TABLE OF MACHETE\$ (ROWS) BY LOCA\$ (COLUMNS)
COLUMN PERCENTS

	DES FOR	VIALET	TOTAL	N
YES	93.75	73.58	81.18	69.00
NO	6.25	26.42	18.82	16.00
TOTAL	100.00	100.00	100.00	
N	32	53	85	

TABLE OF PICK\$ (ROWS) BY LOCA\$ (COLUMNS)
COLUMN PERCENTS

	DES FOR	VIALET	TOTAL	N
NO	81.25	60.38	68.24	58.00
YES	18.75	39.62	31.76	27.00
TOTAL	100.00	100.00	100.00	
N	32	53	85	

TABLE OF HOE\$ (ROWS) BY LOCA\$ (COLUMNS)
COLUMN PERCENTS

	DES FOR	VIALET	TOTAL	N
YES	62.50	77.36	71.76	61.00
NO	37.50	22.64	28.24	24.00
TOTAL	100.00	100.00	100.00	
N	32	53	85	

TABLE OF SICKLE\$ (ROWS) BY LOCA\$ (COLUMNS)
COLUMN PERCENTS

	DES FOR	VIALET	TOTAL	N
NO	100.00	58.49	74.12	63.00
YES	0.00	41.51	25.88	22.00
TOTAL	100.00	100.00	100.00	85
N	32	53		

TABLE OF BORROW\$ (ROWS) BY LOCA\$ (COLUMNS)
COLUMN PERCENTS

	DES FOR	VIALET	TOTAL	N
YES	93.75	66.04	76.47	65.00
NO	6.25	33.96	23.53	20.00
TOTAL	100.00	100.00	100.00	85
N	32	53		

TABLE OF FROM\$ (ROWS) BY LOCA\$ (COLUMNS)
COLUMN PERCENTS

	DES FOR	VIALET	TOTAL	N
RELATIVE	6.25	1.89	3.53	3.00
FRIEND	84.38	64.15	71.76	61.00
NO ONE	9.38	33.96	24.71	21.00
TOTAL	100.00	100.00	100.00	85
N	32	53		

TABLE OF EXCHANG\$ (ROWS) BY LOCA\$ (COLUMNS)
COLUMN PERCENTS

	DES FOR	VIALET	TOTAL	N
NOTHING	60.00	85.29	73.44	47.00
WORK	23.33	8.82	15.63	10.00
OTHER	6.67	.00	3.13	2.00
MONEY	10.00	5.88	7.81	5.00
TOTAL	100.00	100.00	100.00	
N	30	34	64	

TABLE OF NEEDMAC\$ (ROWS) BY LOCA\$ (COLUMNS)
COLUMN PERCENTS

	DES FOR	VIALET	TOTAL	N
NO	53.13	69.81	63.53	54.00
YES	46.88	30.19	36.47	31.00
TOTAL	100.00	100.00	100.00	
N	32	53	85	

TABLE OF NEEDPIC\$ (ROWS) BY LOCA\$ (COLUMNS)
COLUMN PERCENTS

	DES FOR	VIALET	TOTAL	N
YES	90.63	64.15	74.12	63.00
NO	9.38	35.85	25.88	22.00
TOTAL	100.00	100.00	100.00	
N	32	53	85	

TABLE OF NEEDHOES (ROWS) BY LOCA\$ (COLUMNS)
COLUMN PERCENTS

	DES FOR	VIALET	TOTAL	N
NO	18.75	64.15	47.06	40.00
YES	81.25	35.85	52.94	45.00
TOTAL	100.00	100.00	100.00	
N	32	53	85	

TABLE OF BORFRMU\$ (ROWS) BY LOCA\$ (COLUMNS)
COLUMN PERCENTS

	DES FOR	VIALET	TOTAL	N
NO	41.94	22.64	29.76	25.00
YES	58.06	77.36	70.24	59.00
TOTAL	100.00	100.00	100.00	
N	31	53	84	

TABLE OF FROMUOF\$ (ROWS) BY LOCA\$ (COLUMNS)
COLUMN PERCENTS

	DES FOR	VIALET	TOTAL	N
MONTHLY	8.33	5.71	6.38	3.00
SEASONLY	83.33	88.57	87.23	41.00
WEEKLY	8.33	5.71	6.38	3.00
TOTAL	100.00	100.00	100.00	
N	12	35	47	

TABLE OF FRMUMCH\$ (ROWS) BY LOCA\$ (COLUMNS)
COLUMN PERCENTS

	DES FOR	VIALET	TOTAL	N
NO	63.33	71.79	68.12	47.00
YES	36.67	28.21	31.88	22.00
TOTAL	100.00	100.00	100.00	
N	30	39	69	

TABLE OF FRMUPIC\$ (ROWS) BY LOCA\$ (COLUMNS)
COLUMN PERCENTS

	DES FOR	VIALET	TOTAL	N
NO	50.00	38.10	40.74	11.00
YES	50.00	61.90	59.26	16.00
TOTAL	100.00	100.00	100.00	
N	6	21	27	

TABLE OF FRMUHOE\$ (ROWS) BY LOCA\$ (COLUMNS)
COLUMN PERCENTS

	DES FOR	VIALET	TOTAL	N
NO	35.00	39.02	37.70	23.00
YES	65.00	60.98	62.30	38.00
TOTAL	100.00	100.00	100.00	
N	20	41	61	

TABLE OF FROMUSC\$ (ROWS) BY LOCA\$ (COLUMNS)
COLUMN PERCENTS

	VIALET	TOTAL	N
YES	31.82	31.82	7.00
NO	68.18	68.18	15.00
TOTAL	100.00	100.00	
N	22	22	

TABLE OF GIVEN\$ (ROWS) BY LOCA\$ (COLUMNS)
COLUMN PERCENTS

	DES FOR	VIALET	TOTAL	N
NOTHING	94.74	95.12	95.00	57.00
WORK	5.26	4.88	5.00	3.00
TOTAL	100.00	100.00	100.00	
N	19	41	60	

TABLE OF AFRAME\$ (ROWS) BY LOCA\$ (COLUMNS)
COLUMN PERCENTS

	DES FOR	VIALET	TOTAL	N
NO	53.13	90.57	76.47	65.00
YES	46.88	9.43	23.53	20.00
TOTAL	100.00	100.00	100.00	
N	32	53	85	

TABLE OF HEDGERW\$ (ROWS) BY LOCA\$ (COLUMNS)
 COLUMN PERCENTS

	DES FOR	VIALET	TOTAL	N
NO	53.13	90.38	76.19	64.00
YES	46.88	9.62	23.81	20.00
TOTAL	100.00	100.00	100.00	
N	32	52	84	

	TOTAL	MONDAYS	TUESDAYS	WEDNESDAYS	OTHERS
N OF CASES	85	54	43	45	85
MINIMUM	1.000	1.000	0.000	0.000	0.000
MAXIMUM	180.000	14.000	25.000	25.000	6.000
MEAN	27.235	3.974	4.365	6.708	1.659
STANDARD DEV	29.113	7.314	5.315	6.250	1.708

	MONDAYS	TUESDAYS	WEDNESDAYS
N OF CASES	54	43	43
MINIMUM	0.000	0.000	1.000
MAXIMUM	25.000	25.000	75.000
MEAN	7.534	7.447	7.302
STANDARD DEV	6.912	6.223	14.327

THE FOLLOWING RESULTS ARE FOR:
 LOCALS + ONE FINDER

TOTAL OBSERVATIONS: 37

POTWATER HOWLONG LOST OTHRLOSE OTHERS

	POTWATER	HOWLONG	LOST	OTHRLOSE	OTHERS
N OF CASES	37	23	32	31	3
MINIMUM	1.000	1.000	0.000	0.000	1.000
MAXIMUM	180.000	14.000	25.000	25.000	6.000
MEAN	27.235	3.074	4.265	6.708	1.659
TOTAL OBSERVATIONS:	85	1.597	5.434	5.609	1.38

POTWATER HOWLONG LOST OTHRLOSE OTHERS

	POTWATER	HOWLONG	LOST	OTHRLOSE	OTHERS
N OF CASES	85	54	83	48	85
MINIMUM	1.000	1.000	0.000	0.000	0.000
MAXIMUM	180.000	14.000	25.000	25.000	6.000
MEAN	27.235	3.074	4.265	6.708	1.659
STANDARD DEV	29.113	2.314	5.315	6.250	1.708

MOREDAYS OTHRDAY FROMUDAY

	MOREDAYS	OTHRDAY	FROMUDAY
N OF CASES	58	47	43
MINIMUM	0.000	0.000	1.000
MAXIMUM	25.000	25.000	75.000
MEAN	7.534	7.447	7.302
STANDARD DEV	6.012	6.223	14.327

TOTAL OBSERVATIONS: 53

POTWATER HOWLONG LOST OTHRLOSE OTHERS

	POTWATER	HOWLONG	LOST	OTHRLOSE	OTHERS
N OF CASES	53	25	31	17	5
MINIMUM	1.000	1.000	0.000	0.000	0.000
MAXIMUM	60.000	14.000	10.000	15.000	4.000
MEAN	14.240	3.300	1.519	1.847	0.77
STANDARD DEV	12.113	1.874	2.817	3.490	1.30

MOREDAYS OTHRDAY FROMUDAY

	MOREDAYS	OTHRDAY	FROMUDAY
N OF CASES	27	16	31
MINIMUM	0.000	0.000	1.000
MAXIMUM	20.000	20.000	25.000
MEAN	6.519	3.125	2.226
STANDARD DEV	4.053	1.901	10.526

THE FOLLOWING RESULTS ARE FOR:
 LOCA\$ = DES FORGES

TOTAL OBSERVATIONS: 32

	POTWATER	HOWLONG	LOST	OTHRLOSE	OTHERS
N OF CASES	32	28	32	31	3
MINIMUM	5.000	1.000	0.000	0.000	1.00
MAXIMUM	180.000	8.000	25.000	25.000	6.00
MEAN	48.750	2.679	8.656	9.484	3.12
STANDARD DEV	35.831	1.588	5.434	5.609	1.38

	MOREDAYS	OTHRDAYS	FROMUDAY
N OF CASES	31	31	12
MINIMUM	0.000	0.000	2.000
MAXIMUM	25.000	25.000	6.000
MEAN	8.419	8.645	2.333
STANDARD DEV	4.998	5.648	1.155

THE FOLLOWING RESULTS ARE FOR:
 LOCA\$ = VIALET

TOTAL OBSERVATIONS: 53

	POTWATER	HOWLONG	LOST	OTHRLOSE	OTHERS
N OF CASES	53	26	51	17	5
MINIMUM	1.000	1.000	0.000	0.000	0.00
MAXIMUM	60.000	14.000	10.000	15.000	4.00
MEAN	14.245	3.500	1.510	1.647	0.77
STANDARD DEV	12.119	2.874	2.817	3.690	1.20

	MOREDAYS	OTHRDAYS	FROMUDAY
N OF CASES	27	16	31
MINIMUM	0.000	0.000	1.000
MAXIMUM	20.000	20.000	75.000
MEAN	6.519	5.125	9.226
STANDARD DEV	6.958	6.801	16.528

APPENDIX D

SELECTED GRAPHICS OF STUDY RESULTS

- Figure 1: Tools in Household by Region: I
- Figure 2: Tools in Household by Region: II
- Figure 3: Proportion of Borrowers by Region
- Figure 4: Most Frequently Borrowed Tools by Region
- Figure 5: Days That Others Borrow Farmers Tools
- Figure 6: Numbers of Days Lost By Farmer
- Figure 7: Number of Days Lost by Others on Farm
- Figure 8: Additional Work Days With Sufficient Tools: Farmer
- Figure 9: Additional Work Days With Sufficient Tools: Others
- Figure 10: Ranking by Farmer of Need for Pick
- Figure 11: Ranking by Farmer of Need for Hoe
- Figure 12: Ranking by Farmer of Need for Machete
- Figure 13: Farmers Who Plant Hedgerows by Region
- Figure 14: Farmers Who Know How to Use "A-Frame"
- Figure 15: Distance From Water Source By Region

Tools In Household by Region: I

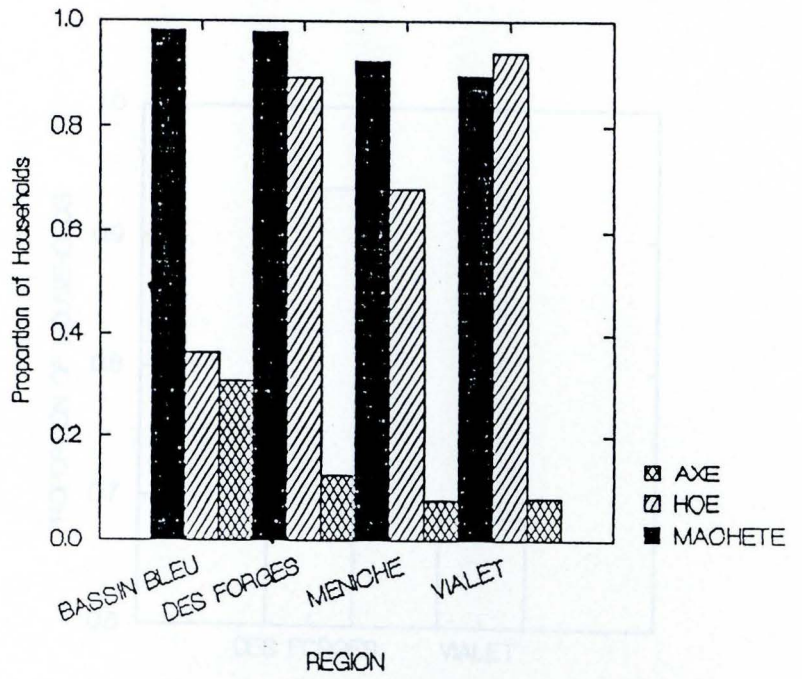


FIGURE 1

Tools in Household by Region: II,

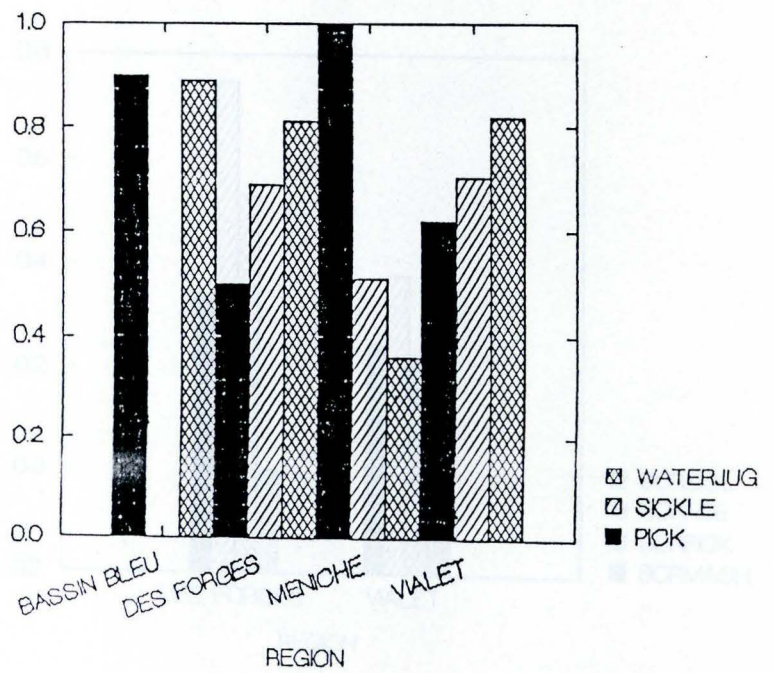


FIGURE 2

PROPORTION OF BORROWERS BY REGION

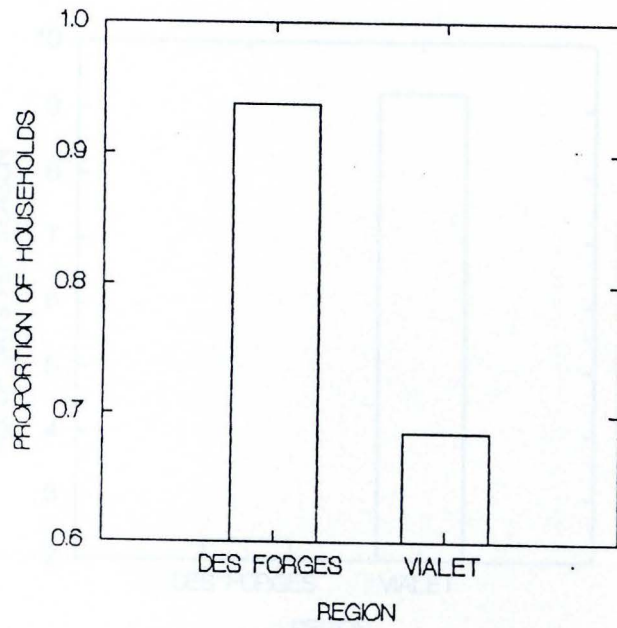


FIGURE 3

MOST FREQUENTLY BORROWED TOOLS BY REGION

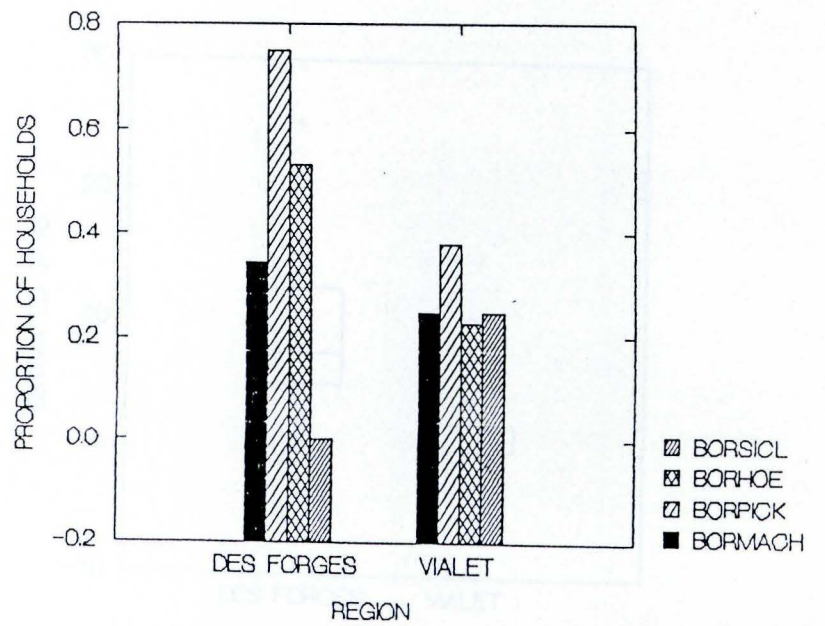
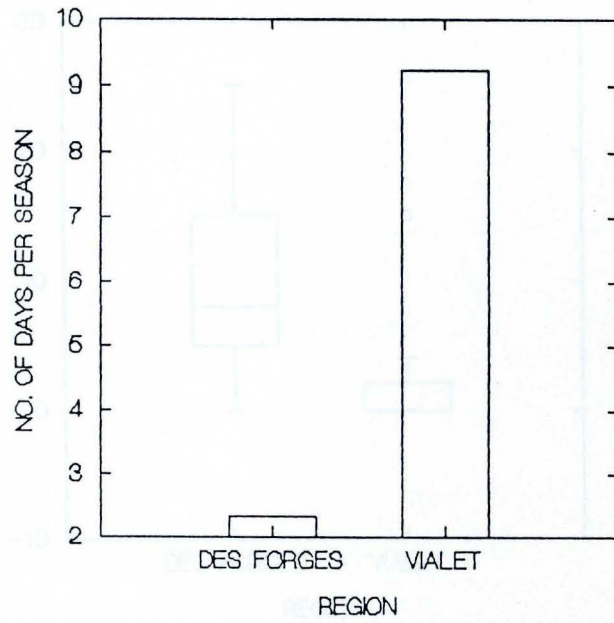


FIGURE 4

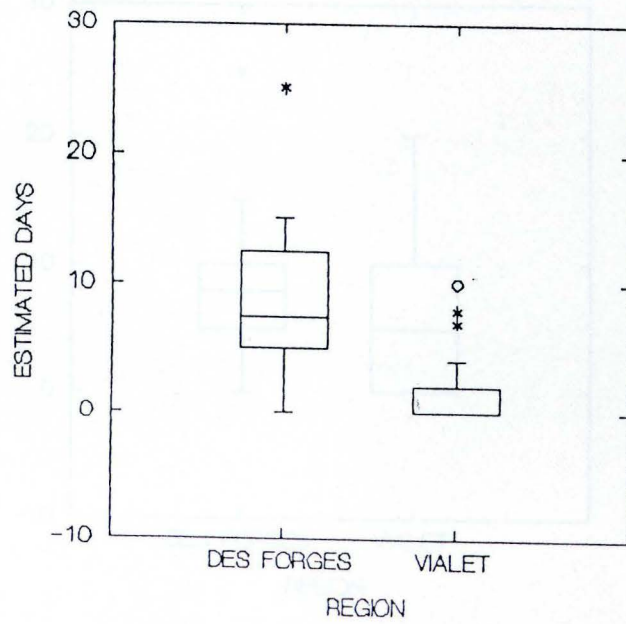
DAYS THAT OTHERS BORROW FARMER'S TOOLS

FIGURE 5



NUMBER OF DAYS LOST BY FARMER

FIGURE 6



NUMBER OF DAYS LOST BY OTHERS ON FARM

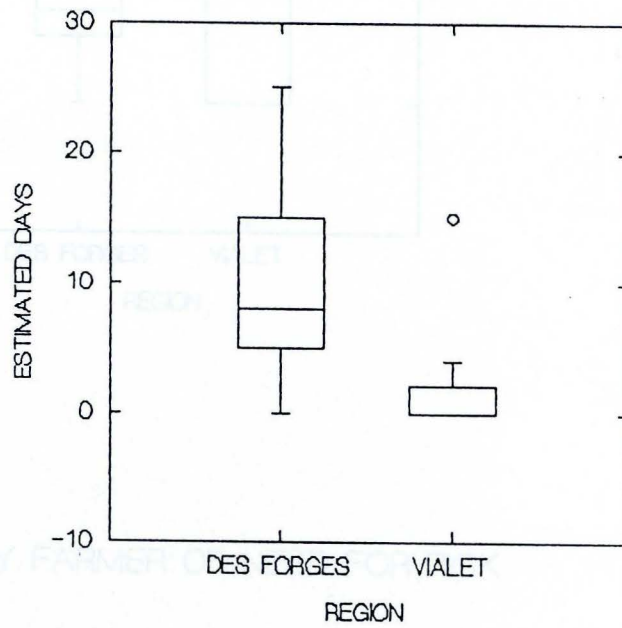
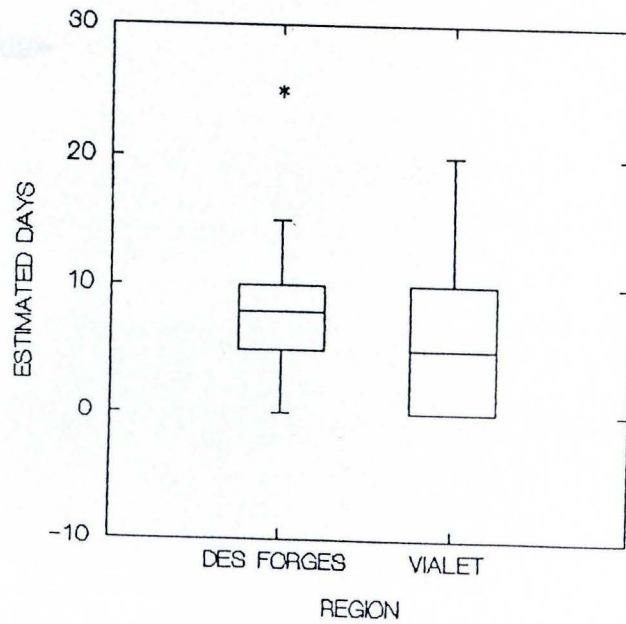


FIGURE 7

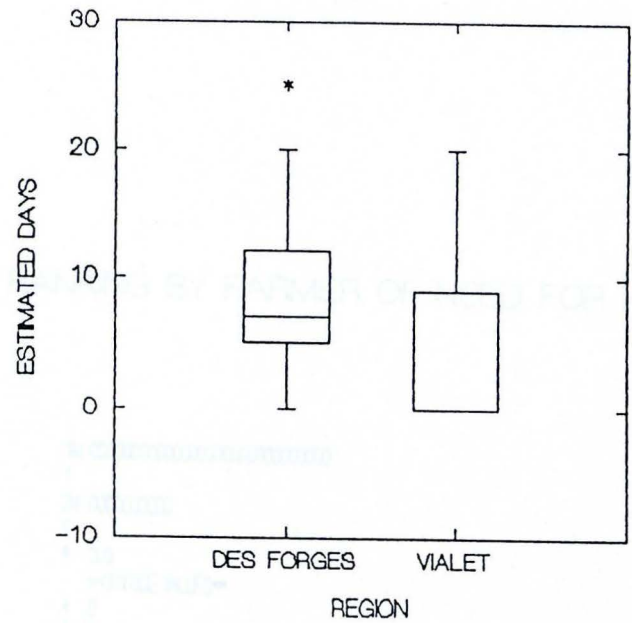
ADD'L WORK DAYS W/ SUFFICIENT TOOLS: FARMER



FIGUR 8

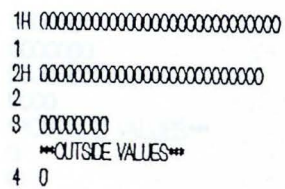
ADD'L WORK DAYS W/ SUFFICIENT TOOLS: OTHERS

FIGURE 9



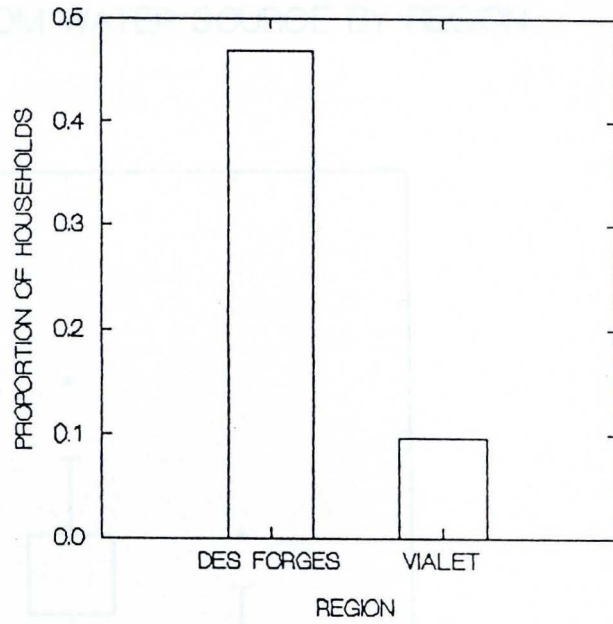
RANKING BY FARMER OF NEED FOR PICK

FIGURE 10



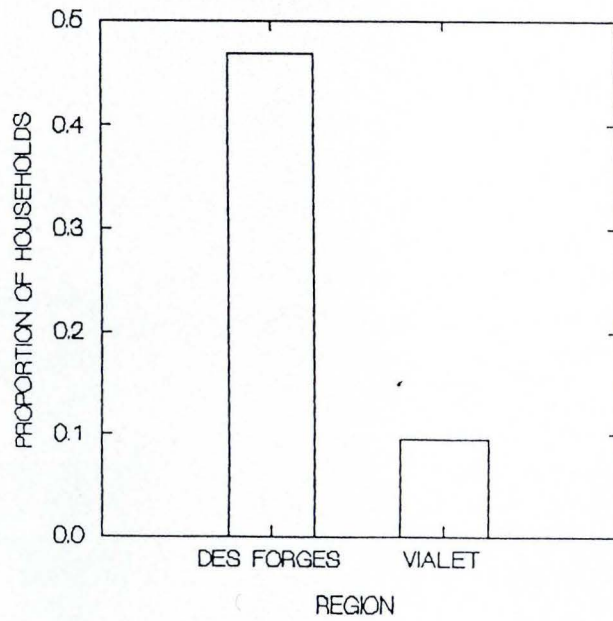
FARMERS WHO PLANT HEDGEROWS BY REGION

FIGURE 13



FARMERS WHO KNOW HOW TO USE "A-FRAME"

FIGURE 14



DISTANCE FROM WATER SOURCE BY REGION

PAPERS' COMMENTS ON STUDY TOPICS

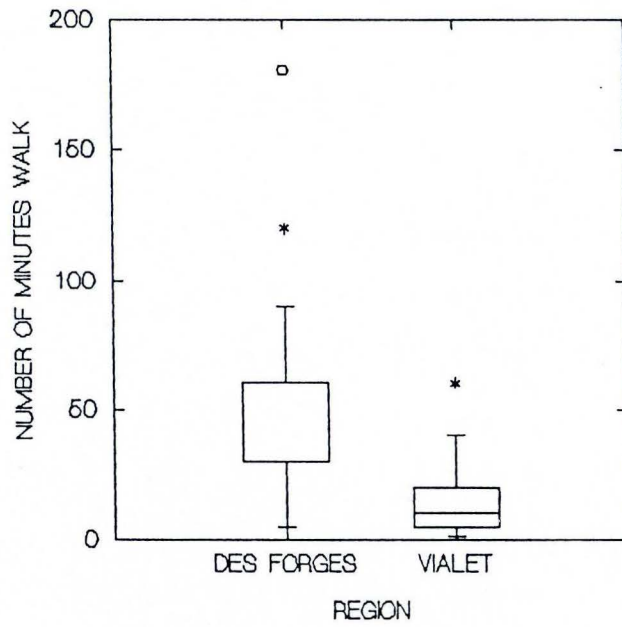


FIGURE 15

APPENDIX E

FARMERS' COMMENTS ON STUDY TOPICS

IRRIGATION AND WATER

"There's no water on the land; there is only rainfall."

APPENDIX E

"Water is not irrigate the land."

FARMERS' COMMENTS ON STUDY TOPICS

"I cannot irrigate the land, only God can."

"Existing water cannot irrigate the land. There is only rainfall."

WAGES OF LABORERS

"I lend whatever tools I have in exchange."

"Sometimes I give three gourdes to encourage them."

"I give them one or two working days per season."

"Sometimes I pay five gourdes."

"I give one day of work for each day I borrow."

"I pay five gourdes a day for tools borrowed."

Additional Work Days if Tools Were Available

"Others on the farm do not work at all because they don't have any tools. They would work with us everyday if they had tools."

"I would work everyday except on Sunday or if I were sick (if I had more tools)."

"No one is working because there are no tools."

Tool Quality

"The problem we have is that tools are very expensive and don't last long. We have to buy them often."

"Presently the hoes we buy are not of good quality. They barely last three or four months and are too weak for the land. This gives us considerable problems. Even machetes are not of good quality any more and that both are very expensive in the shops."

APPENDIX E

FARMERS' COMMENTS ON STUDY TOPICS

Irrigation and Water

"There's no water to irrigate the land; there is only rainfall."

"Water is sixty minutes walk away but it cannot irrigate the land."

"It cannot irrigate the land, only God can."

"Existing water cannot irrigate the land. There is only rainfall."

Reciprocity to Lenders

"I lend whatever tools I have in exchange."

"Sometimes I give three gourdes to encourage them."

"I give them one or two working days per season."

"Sometimes I pay five gourdes."

"I give one day of work for each day I borrow."

"I pay five gourdes a day for tools borrowed."

Additional Work Days If Tools Were Available

"Others on the farm do not work at all because they don't have any tools. They would work with me everyday if they had tools."

"I would work everyday except on Sunday or if I were sick (if I had more tools)."

"No one in my house helps me because there are no tools."

Tool Quality

"The problem we have is that tools are very expensive and don't last long. We have to buy them often."

"Presently the hoes we buy are not of good quality. They barely last three or four months and are too weak for the land. This gives us considerable problems. Even machetes are not of good quality any more and that both are very expensive in the shops."

Hedgerows

"In Des Forges, farmers do not know if they must only use leucaena for hedgerows."

"I have a lot of land but I will not plant hedgerows with leucaena. If I get another variety, I will take five "marmites" of seed. I don't know which variety is the best but I do not want leucaena." (Des Forges)

"I would like to plant hedgerows in only one part of my land so I can see how much it produces."

"I would not like to plant hedgerows with crops."

"My land is flat, therefore I don't need to plant hedgerows."

"I cannot plant hedgerows on the land that I have."

"I do not have enough land for crops with the hedgerows."

"We are not prepared yet to plant hedgerows because in the area, CARE only uses leucaena for hedgerows."

"I do not plant hedgerows on the land because the land does not belong to me."

"I would not like to plant hedgerows on the land."

"I have many rocks on my land and would like to improve it but need technical help."

"I would like to build a rock wall terrace."