

PD-BAN 681

EVALUATION REPORT

TOGO ANIMAL TRACTION
Project No. 698-0410-18

693-0218
C-5
D-3

Conducted by:

Christopher Mock
(Agricultural Economist)

and

Richard Rosenberg
(Animal Traction Advisor)

Submitted to:

Agency for International Development
Washington, D.C.

December 20, 1982



EXPERIENCE, INCORPORATED
MINNEAPOLIS, MINNESOTA 55402

TABLE OF CONTENTS

	<u>Page</u>
Introduction	1
Methodology	3
Findings	5
- Project Output Goals	5
- Cattle Procurement, Care, Training and Distribution	9
- Implement Distribution and Repair	18
- Credit Revolving Fund and Subsidies	23
- Farm Systems Development	30
- Recruiting and Extension Service	34
- Farm-level Benefits of Animal Traction	41
Conclusions	48
Appendix - Consultations	

LIST OF TABLES

	Page
1. Farm Placement of AID Project Oxen, Dec. 1982	7
2. Average Farm-Sizes and Use of Oxen for Soil Preparation	8
3. Acquisition and Disposition of Cattle	10
4. Price Subsidies, Terms of Credit and Repayment Histories by Project	24
5. Assets of AIP Revolving Fund, Dec. 1, 1982	28
6. Farmers and Extension Personnel Trained at the Agbassa Center	35
7. Custom Values for Animal Traction Activities	44
8. Costs and Custom-Value Benefits of Using Oxen	45

LIST OF FIGURES

1. A Design for a Draft Measurement Device
2. A Design for a Light, Hand-drawn Row-Marker

INTRODUCTION

This report summarizes the evaluation of the Togo Animal Traction Project which was conducted between November 24 and December 21, 1982 under contract with USAID. The evaluation was requested to review the present project and provide findings and recommendations that could be incorporated in a new design for a subsequent project.

The project was begun in 1979 as a two-year Accelerated Impact Project (AIP) effort to provide the means and incentive to establish regional systems promoting the adoption of animal traction technology by small farmers. This objective was to be reached by providing the financial, technical and administrative resources to permit local institutions to provide appropriate extension advice, establish accessible credit systems for animals and implements, insure adequate veterinary care, and facilitate the harmonization of animal traction activities throughout the Kara region.

This project uses animal power in the form of Togolese cattle trained to work as oxen. The cattle are transported from the Savanes region in the north of Togo to other regions with few suitable animals. The needed plows and other implements are manufactured in Togo by a small factory funded by the United Nations. Trained animals have been distributed to farmers by a number of funder agencies in addition to the Government of Togo. These agencies have also been largely responsible for extension services to farmers. The AIP project was designed to coordinate the provision of cattle to the agencies in the Kara region and to assist the Government of Togo to provide extension services in parts of the region not covered by other funding agencies.

The project implementing agency for the Government of Togo is the Ministry of Rural Development. Peace Corps volunteers are assigned to sub-sector levels as counterparts to the regional farm extension agents. A technical assistant is provided for the project.

The project began slowly and delays have caused the project completion date to be extended to December 31, 1982. An additional extension of three months is planned. Recent progress has prompted the Government of Togo to request AID to assist in a national animal traction program.

METHODOLOGY

The evaluators, an animal traction expert and an agricultural economist, spent nearly a month in Togo reviewing plans and reports, having conferences with government officials, conducting site visits, and having discussions with participants in other animal traction projects. They were graciously received, and they appreciated the candid and constructive observations offered.

After arriving in Togo on November 25, the evaluation team spent a few days in Lome speaking with officials from government ministries and gathering reports. On November 30, the team members traveled to the Kara region, stopping on the way in Atakpamé to meet the Director of PRODEBO/PROPTA. They worked in the Kara region through December 16 with the exception of a two-day site visit to the Savanes region. Several days of unexpected work was required in Lama Kara compiling data regarding several AIP objectives for which data had not been compiled. Two site visits were made to the project's Agbassa center for holding and training cattle. They presented the findings at a meeting of animal traction projects chaired by Mr. Dogbe, Director of the DRDR for the Kara region, on December 14. A list of the people who met with the team and contributed their observations is attached in Appendix A. This report was written in Lome from December 16-20.

The evaluation focuses on the original project goals as outlined in the Project Plan for the AIP. For conceptual and analytical purposes, the evaluators organized their work by the basic inputs required to reach the project objectives. Findings are accordingly reported by the following topics: cattle procurement, care, training, and distribution; implement distribution and repair; credit, revolving funds and subsidies;

farm system development; recruiting and extension services; and farm-level benefits of animal traction. The project's success in meeting its goals and objectives are analyzed and recommendations are offered for each of these areas.

FINDINGS

Project Output Goals

AIP Goals: To enable 60-80 small farmers to expand their farm area of production from 2 to 5 hectares through the use of animal traction within two years, and to act as "sole agent" for all the purchase and distribution of oxen in the Kara region.

As the AIP has developed over the last three years, the purchasing and distribution of oxen to farmers, and especially to other projects in the Kara region, has grown to sometimes overshadow the activities of working directly with farmers. As will be detailed in the next section, the project has purchased over 800 cattle of which 600 have been broken and/or trained and distributed to other projects (500) or to project farmers (100). The cattle are purchased in the northern region of Togo, the Savanes, and transported to Agbassa in the Kara region for training and distribution. This is necessitated by the lack of cattle, especially those conforming to animal traction needs, in the Kara region. The project has gained substantial respect among government officials and other projects for this work.

The project has had more difficulties in its efforts to work directly with farmers. There are presently only 32 farmers using 33 pairs of animals as compared to its goal of 60-80 farmers (Table 1). In 1981, they used oxen to plow an average of 3.05 hectares of their 4.75 hectares of crops. In 1982, the numbers were lower because of late rains: 1.84 hectares of 4.09 hectares (Table 2). While the project encountered initial construction delays described in the 1981 evaluation, it has had compensating extensions. Table 1 shows that of 55 pairs dis-

tributed to farmers or demonstration centers, 19 pairs have been terminated, five of those were sold and replaced. The remaining 14 terminations were returned, died or lost. Early efforts to introduce animals through work cooperatives groupements had a high failure rate. Other farmers returned animals because they thought dry-season care was too demanding. Better success in recruiting farmers capable of continued work with animal traction should be possible by strengthening the extension service, controlling costs and making better use of the technical package for weeding and other activities. The following pages of this report analyze various aspects of the project and make recommendations for strengthening them.

Table 1
Farm Placement of AID Project Oxen, December 1982

REGION Sector (Préfecture)	Placement of Pairs					Termination of Pairs					Present Net Pairs on Farms
	Pre-AIP	'80	'81	'82	Total	Sold	by Cause			Total	
							Ret'd	Died	Lost		
KARA											
Binah	2	2	6	6	16	1	-	1	1	3	13
Bassar (new area)	-	-	-	-	0	-	-	-	-	0	0
Doufelgou (Niamtougou)	3	1	2	5	11	3	-	2	-	5	6
Kozah (Lama Kara)	1	5	2	1	9	-	4	1	1	6	6
Keran (Kante)	3	1	7	7	18	1	4	-	-	5	13
SAVANES											
Tone (new area)	-	-	-	1	1	-	-	-	-	0	0
Oti (" ")	-	-	-	-	-	-	-	-	-	0	0
TOTALS	9	9	17	20	55	5	8	4	2	19*	36**

* While additional pairs of oxen may have been trained and returned, early records were not complete enough to allow staff to identify them.

** Of these 36 pairs, the current working status of 3 is in question, 3 other pairs are out as demonstration pairs, and two are owned by one farmer. Thus, there are presently 29 to 32 farmers using animal traction under direct auspices of the AID project.

Table 2

Average Farm Sizes and Use of Oxen
for Soil Preparation

Year	Number of Farmers Reporting	Soil Preparation in Average Hectares		
		With oxen	By hand	Total
1981	14	3.05	1.70	4.75
1982*	20	1.84	2.25	4.09

* Note that the first rains of the 1982 season fell later than usual and may have limited soil preparation in some cases.

//

Cattle Procurement, Care, Training, and Distribution

AIP Objective: To expand the physical plant at Agbassa so the project can act as the "sole agent" for all purchase and distribution of oxen in the Kara region.

Procurement and Supply

The Kara region has a limited number of cattle, approximately 33,000. Most are small local breeds that usually do not meet the needs of animal traction for weight and power. Since the Savanes region has about 92,000 heads with a higher portion of Zebu crossed with the smaller local animals, that region was quickly identified as a source of animals for the AIP and for other projects in the Kara region.

The animal corrals, buildings and wells at the holding and training center at Agbassa are essentially completed and most have been successfully used. The project has purchased 868 animals in Savanes villages northeast of Dapaong and has transported them to the Agbassa center from which they are distributed to projects (Table 3).

The apparent advantages of this type of joint buying operation are the logistical efficiencies of scale which reduce the costs of having a buyer in the field, maintaining holding areas and transport vehicles, providing veterinary care, and maintaining a pool of ox-trainers who have refined skills. Also, the aggregation of a larger herd facilitates the selection of matched pairs. Finally, theoretically a "sole agent" can avoid the demand competition that might otherwise cause price increases. In practice, it appears that these advantages are being realized by the center with the possible exception of the "sole agent" advantage in controlling prices.

Table 3

Acquisition & Disposition of Cattle

Description	1980		1981		1982		Cumulative	
	Male	Female	Male	Female	Male	Female	Male	Female
<u>Acquisitions</u>								
Purchases (mean piece)	37,313 ^c		34,417 ^c		47,000 ^h			
No. of animals	160 ^b	5 ^b	351 ^c	15 ^b	317 ^g		828	20
Returned					16 ^e		16	
Births					2 ^g	2 ^g	2	2
Total Acquisitions	160	5	351	15	335	2	846	22
<u>Dispositions</u>								
Sales (price per head)	35,000		40,000		53,000			
animals trained/broken								
-USAID	32 ^b		34 ^b		34 ^a		100	
-FED-Kara	100 ^b		208 ^c		116 ^g		424	
-Projet Vivrier	4 ^b		28 ^b		45 ^a		77	
Sub-total of trained animals	136		270		195		601	
animals untrained								
-for animal traction								
-for other uses					1 ^a		1	
Losses								
-given as replacements					1 ^a		1	
-died			13 ^c					
-other			12 ^g		2 ⁺		27 ⁺	
Total Dispositions	136	-	295	-	199	-	630	-
NET HERD INCREASE (-)	24		56		136		216	22
HERD SIZE as of:	Dec 31, 1980		Dec. 31, 1981		Dec. 15 1982		236	
calves								
yearlings								
2 years								
3 years								
4 years & above								
Totals			97	20	191	22		
			117^a		213^g			

Table 3
Acquisition & Disposition of cattle
(Continued)

Footnotes

- a June 18, 1982, report by M. Gnansim, Dir. of the Agbassa Center
- b Rapport d'Activités, 1980 " 1981 by M. Lekezime, Director TAT
- c Rapport d'Achat de Boeufs, 1981
- d Beef Buying Report, 1979-80 by Peter Geraghty, PCV
- e Table 1, Farm Placement of AID Project Oxen, Dec. 1982
- g Personal interviews with M. Gnansim
- h Personal interviews with Mr. Havlovic

The cause of the purchase price increase from 34,000 frs in 1981 to 47,000 frs in 1982 is not clear. All the major Kara regional projects that buy from the Togolese cattle market participate in the Agbassa procurement operation. They are the AID project, the FED-Kara relocation project and Project Vivrier. While the UN-FAO project, Togo Nord, buys its own cattle, it purchases them in Upper Volta. However, other projects operating in regions outside Kara are also buying animal traction animals in the Savanes region along with Savanes farmers who buy cattle directly. It seems doubtful that the major cause of the price increases has been competition among Kara area projects given the present purchasing rate of only 300 to 350 by the AID project.

The supply of animals for sale in the Savanes region should be 10 - 12% of the 92,000 herd (Josserand, 1979: 434). Estimates by SOTED indicate that 1/3 to 1/4 of the 9,200 - 11,000 animals sold annually are probably males in the 2 to 3 year range. Thus, there most likely are 2,000 to 3,000 young males of suitable age on the market each year in the Savanes. Data are not available for estimating what percentage of these animals have the characteristics appropriate for use in animal traction. Also, the animals are purchased very near the border of Upper Volta and an unknown number of animals are apparently brought into Togo by herdsmen from Upper Volta. While the AID purchases of 300-350 head a year probably are well within the supply available in the Savanes, the purchase of about 1,000 animals a year by FED and SOTOCO farmers for use in the Savanes region may be straining the supply. Prices for animals from Upper Volta and Benin should be monitored as alternative sources.

Figures are not available on the present demand for meat and the effect possible increases in its demand may have had on

prices. Previously, beef demand had been rising slowly (Josserand, 1979: 319). After a short-term increase in demand caused by animal traction, animal traction will contribute positively to the meat supply as older animals are sold at substantially increased weights. Farmers have begun to sell their oxen after 3 to 4 years for nearly twice the cost of replacement pairs. Thus, assuming a 60% increase in weight while animals are used as oxen, animal traction can be expected to contribute positively to the national meat supply two or three years after the growth rate in animal traction units per year drops below 60%. Then any competition for animals from the meat market will be reduced. This implies possible advantages to measured growth of animal traction.

Prices may, nonetheless, be controlled to a greater extent by the AID project through several practical changes in operations. It appears that the buying activities which are focused in a small cluster of villages in the Savanes region near Touaga may have created high short-term spot demand and consequential price increases. In 1980, there was a rush to buy a number of cattle quickly after a quarantine delayed buying. Most recently, about 100 head were rapidly purchased before the departure of an experienced volunteer. Delays in cash availability have also increased periodic buying pressures.

A present reserve of cattle has been developed at Agbassa which, in combination with the maintenance of cash reserves in the bank account, should allow the continued purchase of small numbers of cattle (20 to 50 each month) with the possible exception of one or two months in the worst of the rainy season. Such year-around buying would make better use of buying personnel by allowing them to be more selective. If demand increases much above 50 animals per month, placing a second Togolese buyer further east from Touaga should be considered to further distribute demand.

Also, a cattle scale should be purchased and installed at Agbassa so animals can be weighed on arrival there and their price per live-weight kilogram can be monitored. Presently, price information is of limited value because it cannot be related to the mean weight of the animals purchased. Neither observers nor participants can tell whether increases in price may be associated with increases or even decreases in the sizes of purchased animals. Weights can also be quickly associated with age as determined by teeth to be sure that small older animals without the desired growth potential are not being purchased.

Care and Management

The animals and facilities at Agbassa are generally well cared for. The level of care given seems to be largely due to the responsible and reliable management of the center's director. There have been recent problems with the provision of veterinary services and the management of veterinary medicines. That should be resolved with the scheduled replacement of the veterinary agent. Meanwhile, an inventory is being conducted on the veterinary supplies so they can be restocked and controlled better in the future.

Now that a reserve of over 200 animals has been developed at Agbassa and assuming more continuous future buying, the past methods of management through individual familiarity with animals will become increasingly difficult. Simple information systems need to be put into operation to help the center's director monitor the health and weight gains of the herd. There is presently no good aggregate report on the acquisitions, dispositions and herd characteristics. (This can be seen from the multitude of sources required for the composition of Table 3). More consistent reporting will also avoid uncertainties as to the disposition of animals not accounted for. In order to give research value to such efforts as supplemental

feeding or maintaining cows and raising calves, information must be consistently gathered on weights, births, calf mortalities, etc. The present system of numbering cattle as they are acquired will facilitate better record keeping. A reporting format should be developed similar to Table 3, with columns for total and average weights in addition to numbers of male and female animals. Columns for mean gross prices might also be useful. Changes in herd composition from period beginning to ending dates should equal the net difference between acquisitions and dispositions if all transactions are accounted for. The herd composition information will allow better planning to meet projected demand from farmers and other projects. Periodic weight and age data on individual animals will facilitate culling animals that are inappropriate for traction use, and thus free revolving funds for the acquisition of better animals.

The animals at Agbassa presently appear to be somewhat thinner than animals of similar size with farmers. That may be simply a matter of younger age. But on the other hand, finding sufficient pasture and supplemental feeds for a herd of 200 head appears to be difficult. The supply of cotton seed and brewers draff for supplement, while only 11 to 12 frs/kg, is very limited. There is not enough local peanut production to provide more than a fraction of the needed hay. The possibility of developing watering points in the hills to the northeast toward Kadjala needs to be explored. Those areas might be able to provide more of the dry season pasture needs. Also, a plan needs to be developed for making hay and extending pasture grass quality further into the dry season. This could be accomplished by cutting brachia or even existing grasses a couple times, namely, during the usual mid rainy season lull and as the rainy season subsides (von Flanders, 1982: conversation). It is probably unreasonable to expect hay cutting or pasture clipping to be done manually with machetes. Until tractors

become available, improved scythes or animal-drawn mowers should be tried.

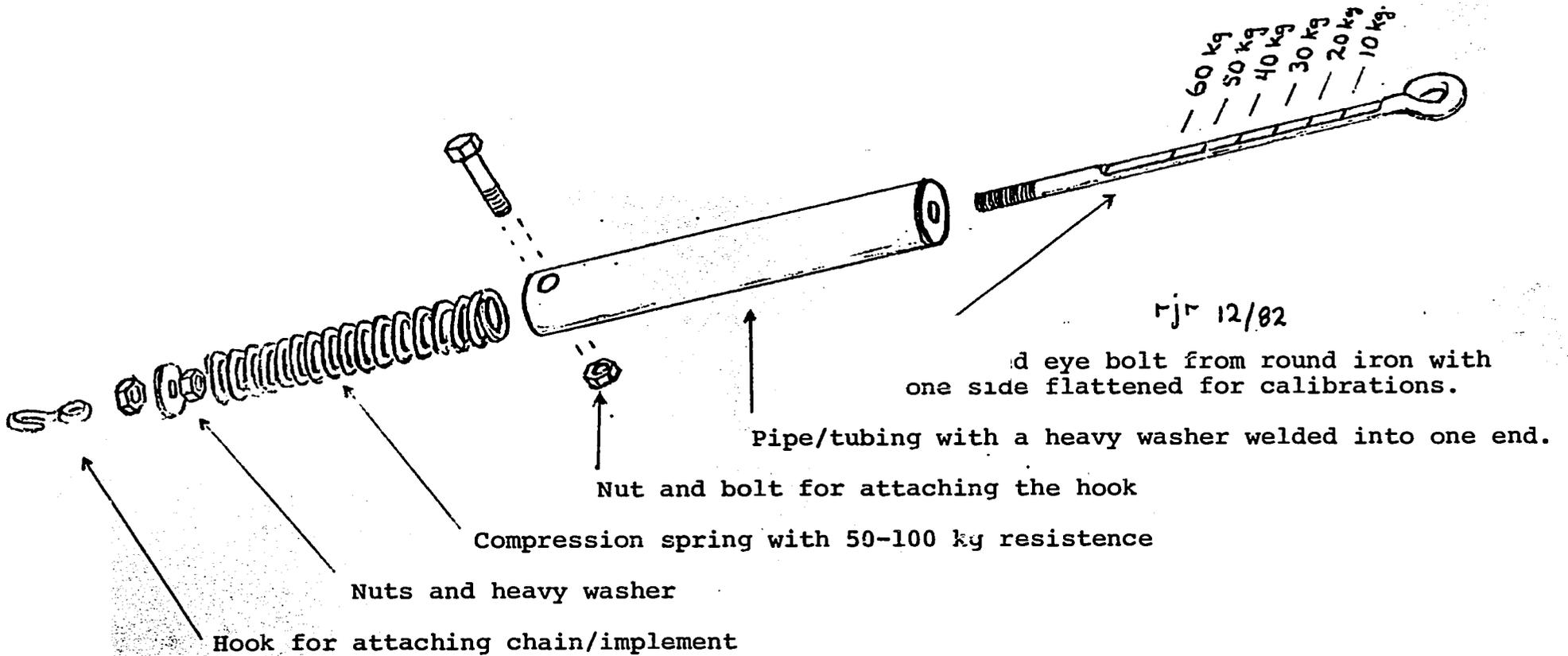
Training and Distribution

Agbassa has developed a staff of 18 experienced ox-trainers. Working in groups of three, they can apparently train up to 24 pairs of animals per month. They train the animals to respond to directions from lines held behind. This makes it possible for one person to work them in many tasks. They have recently standardized a limited number of voice commands. Trials with the use of the "running W" to break animals hold promise. With the "running W", trainers can gently and firmly lower the most recalcitrant animal to its front knees with ease. It seems most effective in teaching such voice commands as stop, left and right. Materials should be acquired for making about six of them. Their use should be monitored to avoid breaking animals to the point that they go on repeated "lie-down strikes".

Since the continued success of the center depends on its reputation for providing other projects with reasonably priced animals willing and able to work, quality control in training and selection is very important. The scale of this animal training operation justifies more refined and standardized measurements of an animal's the willingness to produce draft power. As a rule of thumb, they should produce 10% of their weight in draft power. Figure 1, A Design for a Draft Measurement Device, suggests how a simple calibrated device can be fabricated with the use of a coil compression spring, a piece of pipe and some round iron. When used in conjunction with a variable draft implement such as a stoneboat or an adjustable disk, it could serve as a simple test of the progress of pairs in training.

Figure 1

A Design For a Draft Measurement Device



Finally, having scales at Agbassa would allow the sale of animals by weight. That would be more equitable to farmers than a fixed price based on group purchase plus expenses. Further, the group pricing is becoming less reasonable as animals are now being purchased throughout the year and have differing opportunities to gain added weight and strength. Distributing trained animals to projects in installments from January through the end of April should be encouraged if purchase and training are to be continuous through most of the year. Installment distributions would both reduce demands on Agbassa's facilities and would allow more rapid turnover of the revolving fund. A policy or contract with buying agencies should be developed to encourage more timely payments for oxen relative to purchase-delivery dates.

In summary, cattle procurement, care, training and distribution have been a successful and strong aspect of the program. Nonetheless, several things can be done to control prices and maintain quality control over animal selection, care and training to assure the growth of this aspect of the program.

Recommendations

- Monitor prices of animals in Upper Volta and Benin as possible alternative sources.
- Distribute cattle purchases throughout most of the year and over a broader area to avoid creating high spot demand.
- Maintain modest cash and cattle reserves as a cushion against disruptions.
- Install scales at Agbassa to weigh cattle at purchase, quarterly, and before distribution.
- Cull older animals with low weight indicating limited growth potential.
- Institute a quarterly reporting system on acquisitions, dispositions and herd composition for management and planning purposes.

- Plan methods for improving pastures and making hay with less labor.
- Continue trials of use of "running W" in breaking oxen.
- Construct a simple calibrated draft measurement device for use in training.
- Institute simple training tests to measure the ability and willingness of animals to pull.

Implement Distribution and Repair

AIP Objective: To develop Agbassa as a primary support center and to establish 5 subsites as immediate resource bases for farmers.

The field implements and the new carts used by the project are manufactured in Kara by UPRONA. Their M9-5 Multiculteur consists of a 9-inch moldboard walking plow that can be converted into a ridger with adjustable wings, or a 5 tine spring-tooth harrow (canadienne) with reversible teeth for minimum tillage and small sweeps for weeding between rows. It is a fairly flexible package of implements that can accommodate a broad range of agricultural functions. The package does not include a peanut lifter, though one could easily be adapted to it. Nor does it have any planting capacities. The actual field use of the various parts of the package is unclear and not documented. However, reports indicate frequent use of the ridger for primary tillage in preparation for planting on ridges. The moldboard plow is used to a lesser extent for soil preparation, and the spring-tooth harrow (canadienne) with reversible teeth is used to prepare the soil for planting crops in a few areas. The price for the package has increased from 57,000 to 65,000 frs in 1982.

UPROMA also manufactures the 1 metric ton cart with a 1.5 x 2.0 meters steel flat bed with rack brackets and with rubber tires rolling on ball bearings. Its weight is modest and its price is 62,000 frs.

UPROMA's manufacturing operation was started in 1981 and is already impressive. It has performed reliably in the past two years according to the various projects. While they have a stated capacity to produce 4,000 multiculteurs per year, they realized a profit in 1982 on about 1,500 deliveries. They

think they can avoid a price increase next year. Their equipment includes welders, grinders, presses, drill presses, automatic precision cutting torches and an assortment of jigs which allows them to make all parts that do not require castings or heat treatment for tempering. Plow shares, sweeps, reversible points and hubs for the cart wheels are the main parts still imported.

There are few complaints about problems in the use of the implements or the cart. The plow share apparently wears out in 3 to 5 hectares of dry rocky plowing or about half that often in better conditions. That is not unusual though. The new rubber tire carts are not plagued with the problems of worn hubs experienced by owners of the old metal wheel carts. Some do complain that the 1.5 meter width is too wide for field trails especially in areas with limited tillable land.

Ordering of implements has been coordinated by PRODEBO/PROPTA for a 3% margin. It solicits orders, collects installments from projects and provides delivery for a fee to projects that do not use their own transportation to pick orders up at the UPROMA plant. The intermediary coordination has worked well, though it reduces direct contact between UPROMA and the field agencies. As a consequence, it may isolate UPROMA from an accurate perception of long-term demand. At least a couple projects developed a stock pile of implements in 1982. AID has 33 multiculteurs and 14 carts in stock. A stock of about 20 multiculteurs and 5 carts was observed at Project Vivrier. With an order of 45 multiculteurs placed for 1983, the AID project will probably accumulate a larger stock. This stock piling should not be criticized in view of the need to protect farmers against future supply disruptions and in light of the 12% price appreciation realized on inventories. Nonetheless, when coupled with statements indicating that several agencies want to consolidate and strengthen the farm practices of present animal

traction farmers before pushing for large numbers of new recruits, these stock piles should temper optimism about the rapid expansion of the market for multiculteurs.

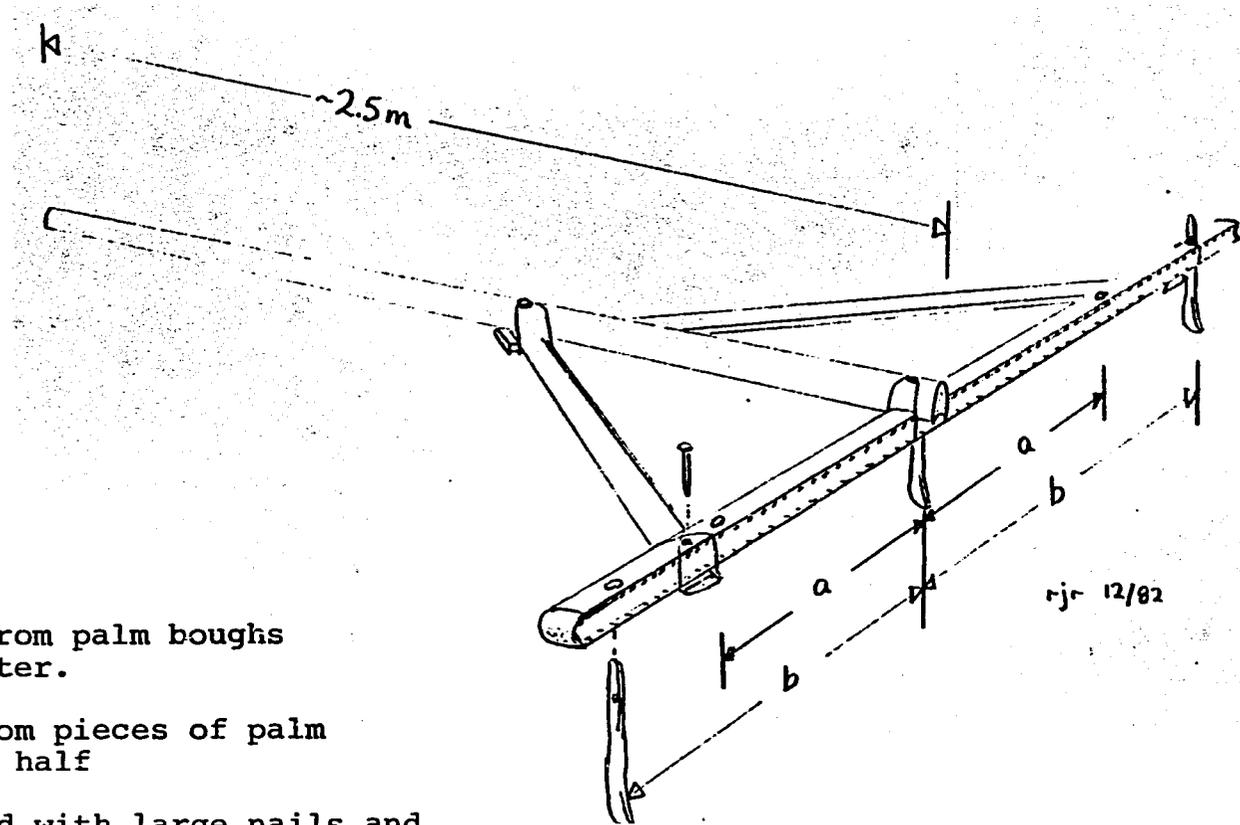
The repair and spare parts support available through the 5 CAT support centers should be strengthened. There are many reports of trips by volunteers to Agbassa for parts and supplies. The volunteers at each of the CAT sites or the associated encadreurs should be entrusted with an increased inventory of parts and supplies with a simple system to account for sale revenues and inventories before replacement.

Blacksmiths in the communities where the CATs are located should be trained to provide repair services. Although blacksmiths in Togo are apparently not able to competitively forge plow shares from broken truck leaf springs, they should be able to draw out the points of worn plow shares to extend their useful lives or weld extension points from light leaf springs over worn shares. They should also be able to forge reversible points for the ridger and the spring-tooth harrow. The Togo Nord project seems to have good experience in training blacksmiths that might be called on in this regard.

Some miscellaneous materials are made and distributed by each project. These include such items as yokes and other small items. The yokes being used by the project are the same basic design used in much of West Africa. They are neck yokes with a small post as a beam; interlocking round irons are used as bows. Given the small size of many oxen and the desire to develop single yokes to facilitate weeding with one animal, the comfort and efficiency of yoke design should be tested carefully and as objectively as possible. Such testing could be done with an inexpensive draft measurement device that would allow comparisons between yoke and collar designs. The device could be placed in the traction chain. It could be constructed with

Figure 2

A Design For a Light, Hand-drawn Row-marker



- T-frame made from palm boughs 5-7cm in diameter.
- Braces made from pieces of palm bough split in half
- Joints attached with large nails and wrapped with light wire.
- Marking pegs forged from 12mm round iron 15-20cm long with an eye through which wire is threaded to hold pegs in place.

a/ Width for close rows for small plants, e.g. 60cm.

b/ Width for wider rows for large plants, e.g. 75cm

a coil compression spring as shown in Figure 1, and calibrated with a file and various colors of paint by placing it above a hanging scale and marking the stem of the eye bolt as added increments of weight compress the spring. Then it can be used in field trials with a variable draft implement to test the relative willingness of an animal to pull.

An inexpensive row-marker, rayonneuse, needs to be developed for planting the parallel rows necessary for successful animal traction weeding. A light hand-drawn model is suggested as a substitute for the heavier and more expensive animal-drawn demonstration model at Agbassa. A light, hand-drawn model has the advantage of added maneuverability and does not take the animals away from heavier soil preparation work. In Benin, row-markers were successfully made with the large doum palm and ronier palm trunk sections. They were constructed in a braced T-design as illustrated in Figure 2, A design for a Light Row Marker. Teeth were made of short pieces of light round iron.

Cost reductions might be achieved as a result of the following recommendations for better farm systems conceptualization and trials. Some of the multiculture package might be eliminated for farm systems with restricted tillage needs. For example, for sorghum/millet production in established fields, the spring-tooth harrow (canadienne) might be adapted to both soil preparation and weeding functions and pulled with a single large animal. However, any such system needs thorough rainy season testing before being urged on farmers. If effective, it could be used as a one or two year introductory step before a second animal and more implements would be acquired.

In summary, the implement package is flexible and can accommodate a broad range of agricultural functions. Its manufacture and delivery have been reliable. The following recommendations should help maintain that reliability, provide needed miscellaneous items, and strengthen the repair and parts support system.

Recommendations

- Assist UPRONA in realistic projections of long term demand.
- Find and train blacksmiths in CAT communities to repair implements and to extend used plow shares.
- Stock more parts and supplies at each CAT support center.
- Build a draft measurement device for testing new equipment design.
- Build light hand-drawn row-markers, rayonneuse, to facilitate weeding.
- Continue work in the development of superior, low-cost single and double yokes.

Revolving Fund, Subsidies and Credit

AIP Objective: To establish a revolving credit fund to purchase oxen implements and other inputs for farmers.

1981 PES Recommendation: To obtain short-term technical assistance to help resolve credit policies and practices.

Since this project has two major aspects - cattle purchase and distribution as well as farm-level extension of animal traction - it is helpful to keep in mind that there are two distinguishable revolving fund activities. The cattle purchase and distribution aspect involves a more rapidly revolving portion of the funds than the credit to farmers for implements and animals.

Table 4, Assets of the AIP Revolving Fund, lists approximate values of assets as of December 1, 1982. They total approximately 28,384,000 frs CFA without any inclusions for veterinary supplies, the present value of which is unknown. (The exchange rate in December was about 340 frs CFA per \$1.00). No balance sheets or journals have been kept on the revolving fund itself. The funds were drawn from an AIP budget line titled "Culture Attelée" and totaled 31,086,316 frs CFA as of October 22, 1982. However, some of that amount could apparently be used for other than revolving fund purposes. Separate restricted fund accounting procedures should have been established in response to the 1981 PES recommendations. However, nothing appears to have been done to improve the funds accountability and management feedback. Nonetheless, it appears that the fund value remains essentially intact.

Table 4
Assets of AIP Revolving Fund, Dec. 1, 1982

<u>Asset Description</u>	<u>Units</u>	<u>Unit Value</u>	<u>Total Value</u> (thousands of CFA)	<u>Subtotals</u>
<u>Liquid Assets</u>				
Cash			-	
Banking Account			-	
<u>Accounts Receivable (within 60 days)</u>				9,494
- Fed-Kara			7,864	
- Projet Vivrier			1,630	
<u>Farm Credit</u>				4,280
Repayments due 12/31/82			460	
Due in '83 & beyond			3,820	
<u>Cattle</u>				11,607
Aqbassa center Demonstration pairs	213	53,000	11,289	
	6	53,000	318	
<u>Implements</u>				
Multicultivateurs	33	65,000	2,145	
Carts	14	62,000	868	
Misc.				
<u>Veterinary Supplies</u>				
Total Assets	-	-	28,394	28,394

If the target for about 40 new AID project farmers is achieved for next year, another 10,000,000 frs will be needed for credit on oxen and implements. This estimate is based on 250,000 frs per farmer and assumes the purchase of the new carts at slightly over 62,000 frs and some increase in the cost of oxen. The revolving fund includes 9,954,000 frs, due within 60 days, from the sale of animals to other projects during the year and from the collection of installments due from farmers on their credit. There are presently enough cattle on hand to meet FED Kara's order for 1982-83 if significant orders for animals are received from other projects such as SOTOCO. Otherwise, new infusions of substantial capital may not be needed until mid 1983 in anticipation of needs for 1984.

The farm credit program is based on a good contract document signed by the farmer and the project. It describes the animals and materials received, lists their prices, and details the specific repayments with interest and due dates. The terms of the credit are nothing down, a year of grace (routinely the 1st year), 5 annual installments, with 5% interest on the outstanding balance. The year of grace is offered in recognition of the usual difficulties farmers experience in their first year as they learn how to use animal power with young animals. As a result of the year of grace in conjunction with the termination of 6 of the 9 pairs placed in 1980, there were only 3 payments due in 1981. Of the three, two have paid in full and the third appears to be able to pay if pressed. This rather shallow repayment history can be updated in a month since 15 payments averaging about 28,700 frs are due on December 31, 1982. Future payments for farmers taking the complete package in 1982 with the new cart will be about 60,000 frs, of which 12,000 frs is interest at 5%.

Some refinements in the credit system should be considered. The contract with the farmer should be prepared and signed by the farmer at or near the time that materials are delivered. Farmers taking materials in the spring of 1982 have only received an invoice. More immediate clarification of the repayment plan will reduce misunderstandings.

Secondly, a small down payment toward the price of the animals, starting as low as 10,000 frs, would serve to test the farmers' commitment. This is important as the project moves beyond the demonstration phase. It would also encourage farmers with cattle to come forward with them to avoid having to make a down payment. And finally, it would help reduce the growing debt load caused by increasing prices and save some interest costs.

Some farmers are buying a second pair of oxen on credit two or three years after acquiring their first pair. This allows them to condition the young pair for a season before they sell the older pair for a substantial profit. Their capitalizing on the growth of the animals is commendable and is a purpose of the program. However, they should not need full credit on the second pair. We recommend that they be required to pay 1/4 down and the balance within one year or upon the sale of the old pair.

There was some question about the extent to which the animal mortality insurance program would decapitalize the revolving credit fund. Insurance is accorded to farmers who renew their animal health card annually. Half of the 12 deaths that have occurred in the last two years were covered since they did not result from neglect by the farmers. But the net loss to the revolving fund for young replacements seems nominal. Most if not all of the cost is covered by the carcass value of the death animal which can be sold at approximately live market value in almost all cases and the increased weight of the

surviving partner. The partner and the proceeds from the sale of the carcass are traded in for the young replacement pair. Veterinary autopsies and other required procedures seem to control fraud effectively.

Finally, the issue of subsidies that differ among projects needs to be addressed. Table 5, Terms of Credit and Subsidies, shows the wide variation among projects. AID's position against subsidies has put it at some disadvantage in the numbers game, but may put it in a good position to lead a drive to harmonize subsidies at least within the economic regions. Nonetheless, some short-term flexibility will be needed on the part of AID. A possible compromise would be no price subsidy for oxen and only 25% on implements to be phased out at the rate of 5% per year over five years. This would avoid subsidizing animal purchase, which only discourages private market channels, or the provision of animals by farmers themselves, which is likely to occur in many cases in the Savanes region. On the other hand, a modest subsidy for implements would help compensate for the recent price increases in cattle and implements and would show a good faith desire on the part of AID to work with the other projects.

In summary, the revolving fund assets seem to be largely intact and the farm credit policy is sound. Nonetheless, management and procedural refinements are required in each area.

Table 5
Price Subsidies, Terms of Credit,
and Credit Repayment Histories by Project

Project	Price Subsidies			Credit Terms			Down Payment (CFA)	Amount of Loan Repayment (CFA)	Repayment Histories As of Dec. 15, 1982	
	Animals	Implements	Carts	Interest Rate	Grace Period (years)	Payback Period (years)			% Farmers Repaying on Schedule	Delinquencies % Portfolio in Arrears
1. USAID	0	0	0	5%	1	5	0	26,692	66 ^{2/3} % ¹	37%
2. Fed-Kara	0	100%	0	0%	0	5(6) ²	3,000	17,000	*	8%
3. Fed-Savanes	0/25%	25%	25%	8%	0				(100%) ³	67%
4. Sotoco	50%									
5. Togo-Nord	40%	40%	40%	6%	0	5	20,000	14,000 to 16,000	97% ⁴	(1.5%) ⁴
6. Project Vivrier	44%	44%	44%	0	1	4	20,000	35,000		

¹Total number of loans due, 3; Loans repaid, 2.

²Two different responses given by project officials

³In principle SOTOCO takes repayment in-kind at harvest time.

⁴Contracts with farmers not repaying on schedule are cancelled. In 1981-82, two farmers were in arrears in payment and both contracts cancelled

* No data given; however 100% of farmers with loans have repaid something although less than the full repayment due.

Recommendations

- Institute a separate, restricted fund accounting system for the revolving fund.
- Develop a credit application form to gather information on farm personnel, available area, past crops, available cattle, and down payment potential.
- Require a down payment toward the price of animals.
- Complete credit contracts immediately after delivery of animals and materials.
- Tighten credit policy with respect to replacement pairs.
- Develop a coordinated subsidy policy with other agencies.

Farm Systems Development

1981 PES Recommendation: To institute systemized reporting on farm practices and results.

The 1981 evaluation recommendation seems to be directed toward a better understanding of farm level activities. Some added reporting was done as a result. The data from these reports show use of oxen in about half or a little more of the average 4.75 hectares in 1981 and 4.08 hectares in 1982. Oxen were used some in soil preparation of most crops except yams. However, few farmers appear to have used them successfully in weeding. To make animal traction economically attractive to farmers, it must be used more efficiently and for more operations.

To date, center personnel at Agbassa and volunteers have concentrated their efforts on providing trained oxen and good health care. They have done a good job with respect to these prerequisites to a successful program. With respect to the on-farm use of animal power, the project has largely relied on DRDR encadreurs. They have been relied on to adapt the implements to various crop production activities. Recent pre-training interviews and questionnaires have indicated that encadreurs do not have an understanding of how to adapt animal traction implements to cropping requirements. This lack of knowledge is a critically weak link in the program. It is one, however, that other projects are also recognizing as a problem. A coordinated effort is needed to identify various tradition and climate based farm systems in order to conceptualize more precisely how animal traction implements can be integrated into the farm systems, and to conduct trials to test the integrated concepts.

Farming systems vary with ethnic traditions, soil types, and climate. For example, the Savanes region generally has a sandier soil than the Kara region which may allow lighter tillage and weeding. The consequences of these differences for animal traction need to be understood by encadreurs and volunteers. The Tamberna apparently use more flat soil preparation and place a unique emphasis on growing fonio. There, soils are more lateritic, while the soils of the Kabiye in the Agbassa and surrounding areas are a clay with less laterite content. These superficial observations imply that several farm cropping systems need to be identified and developed rather than relying on one omnibus technical package.

The first step toward developing packages for each farm cropping system should be the simple collection of information on the typical crop mixes, rotations and practices such as intercropping, plant spacing and descriptions of soil preparation. Organizations such as DRDR, SOTOCO and IRAT can certainly provide simple recommendations for improved practices for food and cash crops. This would include planting dates, seed varieties, fertilizer, insecticides, and yield responses. These factors can be integrated with typical traditional farm systems to arrive at a recommended cropping pattern that will build on tradition, fill food production requirements, provide cash revenues, and consider long-term soil fertility.

Once a recommended cropping pattern has been identified, a specific tillage and weeding package can be conceptualized for it. The package should be designed so each tillage, seeding or weeding function will anticipate the next function and the next crop and will facilitate or reduce subsequent work. Ideally, a well-integrated system will reduce the tillage required for each subsequent crop in the rotation. This should include fallow/pasture maintenance that will minimize land clearing and weed control problems after the fallow. Agronomic soil prepa-

ration requirements can also be sequenced in this regard since crops like sorghum and millet with superficial root structures do not need the depth of soil preparation required by yams, cotton or corn.

The AIP has now developed sufficient farm experience to serve as a base for conceptualizing these systems. It simply needs to organize its resources. Other projects also appear to be at a similar stage of re-evaluating or consolidating their farm cropping systems. Luckily, the UPROMA multicultueur is quite flexible and should be able to accommodate most tillage and weeding requirements. Some simple planting and peanut lifting capabilities could be added if and where they appear to be beneficial. Cooperation of agencies is important in that UPROMA needs a certain market size to make production of new items feasible.

Simple trials can be formulated to test the conceptualized integration of animal traction techniques with possible alternatives in the recommended cropping patterns for each identified farming system. These trials could possibly be conducted in farm fields giving nominal incentives for farmer cooperation (e.g., fertilizer, use of new/experimental tools, and extra technical support). It seems that the CAT centers are well distributed by soil type, ethnic, and climate regions and the associated volunteers could assist in running the trials. These trials should be focused on simple objectives that can contribute substantially to the farm systems information base without requiring too much time and and without a large number of replications. In the circumstances, concentrating efforts on a limited number of trials will probably contribute more to the reliability of the results than would multiplication trials.

Data collection on the trials should be simple and not overly burdensome. Most useful information will probably include: date of activity, descriptions of implements and methods used (photos might be useful for extension), descriptions of effectiveness in accomplishing desired functions including effects of previous functions, hours of animal traction labor required, hours of hand labor needed to complement the mechanical work, mention of perceptible wear on cutting points, and annual yields on trial plots.

The goal of increasing agricultural production with animal traction relies on the premise of its ability to reduce seasonal labor constraints at low costs. The farm systems data collected from the farm trials can be used in simple farm systems labor analyses to test the contribution of techniques in the overall farm system. Those that do not address primary labor constraints can be shelved in favor of others that are more cost effective.

In summary, there is an urgent need to gain a better understanding of how the techniques of animal traction can be integrated into the various farm systems. This information will strengthen extension. A substantial amount of this work can be done in 1983 with existing personnel and simple trials.

Recomendations

- Collect information on various farm systems, including traditional cropping practices and recommended improvements.
- Conceptualize implement use integrated with recommended cropping patterns.
- Conduct trials and collect data on the integrated farming systems.

Recruiting and Extension Service

AIP Objectives: To develop Agbassa into a primary animal traction training center to train 60-80 farmers in animal traction technology and animal husbandry; to provide training to local level encadreurs including two (2 week) retraining sessions for 140 DRDR encadreurs from all districts of the Kara region; to train 10 oxen trainers, 30 blacksmiths, and all sub-sector level veterinary agents; and to provide demonstrations at the 5 subsites.

The buildings to accommodate the training objectives are in place in Agbassa. The dormitory comfortably houses about 20 trainees at a time. There is a kitchen with a dual purpose dining-meeting room. The roof on these facilities is being repaired during the next few weeks. There is also a pleasant outside meeting area under an open-sided, round structure with a thatched roof. As Table 6 shows, the center has been underutilized to date. The number of farmers trained (81) is inflated by counting each of two trainees per farm. The number of extension agents is lower than the projected 140, because DRDR has followed a policy of only training the extension agents where farmers have started working with animals. They were hesitant to commit more personnel to animal traction training until the program moved beyond the demonstration phase. With the new national policy emphasizing animal traction, they appear eager to move into broader recruiting and extension work and will probably ask for more agents to be trained. The center needs to prepare for this training responsibility.

Table 6

Farmers & Extension Personnel Trained
at the Agbassa Center

<u>Trainees</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>Total</u>	<u>AIP</u> <u>Objective</u>
Farmers					
-AID Project	8	34	39	81*	60-80
-Other projects					
Extension Agents (Encadreurs)					
-DRDR	-	10	10**	10	140
-Projet Vivrier	13	8	-	21	-
Veterinary agents	-	-	-	-	-
Ox-trainers	3	10	7	20	10
Craftsmen					
-Carpenters	-	4	-	4	-
-Blacksmiths	-	3	-	3	30

* This number includes two family members per farm in most cases.

** This was supplemental training for the same group of agents who participated in 1981.

Each year, several groups of AID farmers receiving oxen from the center come in for a couple weeks to learn to work with animals, to care for them, and to use them in field work. They spend some time assisting with the training of animals and the rest of the time in field demonstrations and lectures on animal and equipment care.

It seems that their time is not used effectively. The training director is young, inexperienced and hesitates to participate in informal question and answer sessions or to participate actively in demonstrations. Assuming the truthfulness of a number of reports along this line and confirmation through two personal meetings, this position should be filled by a more experienced person with dynamic teaching and demonstration skills. Having a qualified person in this position is absolutely essential to the success of the extension aspect of the project.

If farmer training is to continue at the Agbassa center, several measures could be taken to strengthen its effectiveness. Presently there are few, small farm animal traction activities at the center that trainees can use as models for their own operations. The cattle procurement operations are large and probably seem awesomely expensive and complicated to village farmers. Small farm conditions need to be created either in conjunction with the demonstration fields or in conjunction with fields on which center workers are allowed to raise food crops. This small farm set-up should include a simple stable made with forked poles, a thatched roof, a slightly raised, packed clay floor, and a simple manger. Simple Kabiye-style manure composting can be demonstrated. The adjoining demonstration fields should use animal traction weeding methods rather than the present practice of weeding demonstration fields by hand. The fields should also serve as trial plots

for the integrated farm system development and should include a full rotation of crops.

During training sessions, field demonstrations would be much more effective if they were done in soil that is moist enough to be turned rather than merely scratching implements across dust, hard fields. This could be accomplished by doing training either in the late rainy season or in small irrigated fields (now a possibility at Agbassa with its new good well). Without moist soil conditions, trainees cannot get the feel for properly adjusted implements or for the effects of differing weeding implements. If moist soil conditions cannot be obtained during training at Agbassa, farmer training in field work should be transferred to the village level under the extension agent as quickly as possible where it can be provided during the rainy season. Such a transfer would require much better training of village level extension agents and better technical support to them.

Training Extension Personnel

Although there are already several exceptional encadreurs, the long-term success of animal traction obviously depends on providing good training and support to many more, as well as to Peace Corps volunteers and sub-sector chiefs. This training needs to be in recruiting farmers and follow-up services as well as in the substance of animal care and cropping techniques.

Some training in the substantive areas of animal husbandry, ox-training and farm cropping systems should be strengthened. Animal health care training seems to be pretty well developed. Information on feeding and pasturing could be supplemented to advantage.

Agents working in areas such as the Savanes, where farmers may have direct access to trainable animals, should receive more

instruction in methods of training oxen. This would probably be most useful two or three years after the first pairs have been introduced to an area and farmers are more comfortable with the idea of working animals. Some encadreurs trained in the 60's by the old BDPA projects in the Savanes are presently assisting farmers with on-site training of animals. This should be encouraged where feasible.

The farm system development trials should provide a well conceptualized and tested technical package to fill an apparent weak spot in present training. This material should be written in booklet form along with the animal husbandry and ox-training materials. These should be well illustrated so they could serve encadreurs both as a professional reference tool and as a teaching prop for use with interested farmers.

All extension agents need to become more actively involved in recruiting farmers. This will require that all encadreurs become more familiar with the benefits, costs, and prerequisites of the use of animal traction. They should be taught more about the characteristics of farmers that indicate potential success with animal traction. They should also be drawn into the administration of the credit system from the beginning by helping to complete credit application information on previous farm area, additional lands available, prior cash crop yields, etc. They should take responsibilities with regard to preparation of the credit contract.

To aid in recruiting, the encadreurs could also be encouraged to organize subsector level plowing contests in the late rainy season with associated demonstrations of weeding, etc., to start potential recruits thinking of the next year. These contests only need minor support in the form of prizes to participants, judging and other technical support. They can generate considerable farmer-level attention to animal traction.

Encadreurs can also be trained to take a more active role in follow-up services. More training in the technical package will help them provide better technical advice in the field. Their occasional failure to report areas farmed with and without animal traction methods should be followed up.

Reports from several encadreurs are not in the files so the farm activity data reported in Table 2 do not cover all farmers. On the other hand, some reports require speculative and unverifiable estimates and should not be required. This information includes crop yields for other than marketable crops and end of the year reports on the number of days a farmer spent doing various tasks. However, the information on crop area farmed could be improved by including a column for custom work and rows for 1st and 2nd weedings as well as soil preparation. This information could be verified on a spot basis by field visits.

Agents could also be more involved in collection of farm credit for oxen and implements. A simple written notice to them at the end of October, listing the amounts due from each farmer so the farmers can be reminded to plan for the repayment, would probably greatly facilitate the collection of credit. Additional notices could be sent to them in January or February requesting explanations for delinquent payments.

In summary, some of the failure of the center to meet its training objectives is due to external factors. However, there are several measures that can be taken to strengthen the training of extension agents and farmers.

Recommendations

- Place a more experienced and creative person in the position of training director.
- Create stable and field demonstrations more similar to small farm conditions.

- Conduct field demonstrations in moist soil either during late rainy season or by irrigation.
- Encourage more use of animals in fields at the center.
- Transfer more farmer training to CAT sites or to the farms through on-site extension.
- Prepare more written materials with generous illustrations for use by encadreurs.
- Involve encadreurs more in recruiting, credit applications and collection, and field follow-up.

Farm-Level Benefits of Animal Traction

AIP Objective: To realize, along with farm area increases from 2 to 5 hectares, concomitant increases in food and cash crop production and increased farm income.

As an Accelerated Impact Project, this project did not emphasize data collection. Accordingly, comparative data on income and production prior to farmers' acceptance of animal traction and after they became established in the new technology are not available. Further, there would be serious questions on the reliability of production data for food crops which are frequently picked or threshed, thus precluding a good opportunity to measure yields. Nonetheless, good figures on crop areas cultivated before and with animal traction would allow educated estimates as to yields and income. That could be available in the future if pre-animal traction crop areas are reported as part of the recommended credit application information by the recruiting encadreur.

It is, however, clear from Table 2 and from interviews that the use-level for the oxen is presently low. In 1981, farmers prepared 3.05 hectares with oxen and only 1.84 in 1982 because of late rains. Interviews suggest that they also did 1 or 2 hectares of custom soil preparation for others. A few farmers were able to do 4 to 5 hectares with their oxen. They show promise for the others. The low use-level by most farmers is not inherent in the technical package. It may result as much in part from the need to further adapt animal traction methods to local practices, from the continuing weaknesses in extension, and from such social factors as the desire of farmers to continue participating in and using the traditional hand hoe work groups for soil preparation. The level of use of animal

power should rise substantially as these and other problems are worked out.

A somewhat simplistic method of calculating the benefits of animal traction uses custom rate values for the work done on the assumption that the benefits are equal to the custom market value. This method has several weaknesses. First, there is no way of determining whether the use value results from an increase in production ability or from the simple substitution of an easier and more pleasant technology than prior manual methods. In the latter case, the farmer may greatly appreciate animal traction, even if it results in a net reduction in his income. On the other hand, custom values may understate the overall value of animal traction, given its potential for increasing production by opening up a couple seasonal labor constraints. Recognizing these weaknesses but lacking better data, we may nonetheless gain some insights from a custom-value benefit analysis.

There seems to be a fair consensus that custom soil preparation of a hectare with the ox-drawn moldboard plow brings 6,000 frs and takes 5 to 6 days depending on soil conditions and the condition or size of the oxen. This compares with estimates of around 16 days by hand hoe at 400 frs/day (6,400 frs), tractor plowing rates of 17,000 frs (rarely used), and costs of about 10,000 frs per acre on government operated farms. Weeding rates are not well established but estimates are about 2,000 frs/ha. It probably takes about 2 days/hectare. Cart transport rates of 400-500 frs per load to be hauled 3 kilometers seemed surprisingly standard. That probably takes about 1/2 day with hitching, loading and return.

hectares, with 1.5 hectares of off-farm soil preparation, nominal weeding and 20 loads transport by cart on-farm and off-farm. These use levels were increased to about the target level of the best farmers. Appreciation in the value of the animals was added, given reported sales in 3 to 4 years of about 60,000 to 80,000 over the cost of young replacement animals. Gross benefits add to 60,200 frs/year for present use levels and 102,000 frs for target use levels and 102,000 frs for target use levels.

Costs of maintaining animals and equipment are estimated in Table 8. Information was gathered through interviews. For the increased target activity the cost of supplemental feeding of sorghum is added in. Such feeding apparently does not occur at present due to strong farmer resistance. Since adequate data are not available on maintenance and costs for implement parts, data from Benin were adjusted for present prices in Togo (Roosenberg, 1971). Thus, net benefits from present use levels are about 19,325 frs and would be 42,975 frs with the targeted use level. Assuming that production and income were increased by these amounts (rather than ox-use simply substituting for prior hand production), there would still be a cash flow problem as farmers are being asked to pay 24,000 to 48,000 frs plus interest per year depending on when they purchased their animals and implements. The target use level would probably result in a greater increase in production and income, though documentation is not available.

Table 7
Custom-Values for Animal Traction Activities

Activities	<u>Present Averages</u>			<u>Targets</u>		
	Units	Unit Values (CFA)	Totals	Units	Unit Values (CFA)	Totals
On Farm						
-Soil preparation	2.5 ha	6,000	15,000	5.0 ha	6,000	30,000
-Weeding	0.1 ha	2,000	200	3.0 ha x2	2,000	12,000
-Transport	20.3 km loads	400	8,000	30 loads	400	12,000
Custom work						
-Soil preparation	1.5 ha	6,000	9,000	2.0 ha	6,000	12,000
-Weeding	-	-	-	2.0 ha x2	2,000	12,000
-Transport	20.3 km loads	400	8,000	20 loads	400	8,000
Sub-totals			40,200			82,000
Animal appreciation			20,000			20,000
Gross Benefits			60,200			102,000
Approximate Days Work	45 days			80 days		

Table 8
Costs & Custom-Value Benefits of Using Oxen

<u>Expenses</u>	<u>Present Activities</u>	<u>Target Activities</u>
Animal care & maintenance		
-veterinary care	2,500 frs CFA	2,500 CFA
-herdboy (50 CFA x 365 days)	18,250	18,250
-supplemental feed (2 kg x 180 days x 50 frs)	-	12,000
-salt, etc.	500	500
-average interest (5 years, 5%)	2,750	2,750
Subtotal	24,000	36,000
Implement costs		
-maintenance*	6,000	10,500
-depreciation:62,000/20yrs	3,250	3,250
-interest, average 5 yrs/5%	1,625	1,625
Cart Costs		
-maintenance	2,000	2,000
-depreciation:62,000/15yrs	4,100	4,100
-interest average, 5 yrs/5%	1,550	1,550
Subtotal	18,525	23,025
Total costs	42,525	59,025
Animal appreciation and Custom-Value Benefits	60,200	102,000
Net Benefits	19,325 frs	42,975 frs
Approximate days work	45 days	80 days
Rough Benefits per day	429 frs	537 frs

*Based on Benin computation showing maintenance at about 2.5 times the price of a replacement plow share (3,000 frs CFA) per 5 ha farmed.

About all that one can conclude from this analysis is that animal traction, like most technical innovations, will only be profitable under good management. Every opportunity needs to be taken to reduce costs and to increase the levels of use. Further planning and extension will serve these purposes.

Cost reductions might be achieved in several ways. Most simply, high implement costs could be subsidized. Short-term subsidies should be considered to help farmers while the farming system is being refined and in order to coordinate prices with other projects. The implement package might be able to be simplified slightly with further farm systems development. Also, encouragement should be given for greater investments by farmers to reduce interest expenses. This should be most feasible in areas where farmers have cattle that could be traded for oxen trained to work.

Benefit increases could result from higher prices for farm products, yield increases resulting from better weeding and other inputs such as fertilizers. They could also result from AID investments in farm feeder road improvements. These improvements would allow greater cart use and access to more land as well as provide an opportunity to hire cart owners to haul rocks for bridges, etc.

Secondary beneficiaries of animal traction must also be remembered. Local production of implements provides jobs to 35 workers at UPRONA and refines their mechanical skills. There are also 18 ox-trainers at Agbassa who benefit even though their salaries are presently paid by the Government of Togo.

The evaluation team inquired about the effects of animal traction on women. We heard some reports that ox-weeding was not encouraged by men who generally work the animals because women do that work. Closer inquiry confirms that initial soil

preparation is usually the responsibility of the men, but that weeding is done by both men and women as need requires. Further, there seems to be a fair amount of flexibility around traditional sexual divisions of labor. This flexibility is probably greater with respect to innovations such as animal traction that do not fall within traditional patterns. There were several cases related where Kabiye women and girls worked in soil preparation by leading the oxen. One pair of animals in the Ketao area is owned by a woman for field work and especially market transport use. The ox cart seems to have made substantially reduced the amount of crop and wood transporting that women have traditionally done.

In summary, tentative cost-benefit computations based on custom-value of oxen use show possible benefits that could be improved with added use. Secondary beneficiaries include implement manufacturing artisans and ox-trainers. There appears to be positive benefits to women and they participate to a limited extent with the use of animals.

Recommendations

- Continue exploring for ways to reduce the costs of animals and the implements.
- Support greater use of animals especially in weeding and transport.
- Urge farmers to combine other improved agricultural practices with animal traction to multiply production increases.

CONCLUSIONS

Being in an area with few cattle conforming to the requirements for animal traction, the project developed a good animal supply and training system for its own farmers and for other projects that work in the Kara region. The project's experience in cattle supply is its major strength. While there have been isolated complaints about the quality of the animals or about their training, other projects were easily reassured by the suggestion of the simple quality control measures recommended in this report. Implementing the recommendations will contribute toward continued confidence and participation in the cattle procurement operation by other projects. In general, the project's cattle supply activities have won it broad respect and appreciation.

The manufacture of implements in-country by UPROMA seems to have resolved the previous supply problems. The plant is operated very efficiently and has rapidly developed a skilled labor force. The coordination of orders by PRODEBO/PROPTA has also worked smoothly. Nonetheless, work needs to be done to strengthen the repair services available to farmers. More parts should be stocked at the CATs and neighboring blacksmiths should be trained in the maintenance of some items.

With a few minor exceptions, the project's credit system for financing animals and implements appears to be well conceived. However, there is only a nominal collection history due to the year of grace routinely given the first year and the early termination of many of the farmers who received animals in 1980. More can be said about collections within a couple of months since payments are due by December 31, 1982. The project's credit system is similar to that of most other projects, but subsidies differ substantially. While the project has no price

subsidies on animals or implements, other projects subsidize prices of implements and/or animals from 25 to 50 percent. These differences cause farm-level confusion. Bringing the projects to a consensus compromise on this point is important, even if it means accepting a limited subsidy to be paid by the project for implements (not animals). It could be phased out over a few years as the program moves beyond the demonstration stage. AID is in a position to take a leadership role in this matter.

The difficulties encountered by the project in recruiting and maintaining more than 33 farmers is disturbing. Some of the problem lies in the fact that the project areas have been fairly densely populated--areas that other projects did not choose. The new areas of Bassar and the Savanes offer greater potential. Nonetheless, this evaluation team also feels that the quality and level of extension efforts have been a problem.

Project personnel do not fully appreciate how the use of animal traction implements fits into the local cropping systems. In fairness, it should be noted that other projects are also having difficulties in integrating the use of implements into the cropping system. This is an area where cooperation between projects seems promising and feasible. The weakest point in the project's extension system seems to be its training director at Agbassa. Serious consideration should be given to replacing him.

It is important that the training staff understand the relationship between soil preparation, planting and weeding and be able to develop creative methods for teaching them to farmers and encadreurs. The base of this information should be strengthened through the conceptualization and trials recommended for developing a better integration of the implements into regional cropping systems.

Finally, efforts to reduce or maintain the costs of the package should continue and more intensive use of the animals should be encouraged to improve the profitability of animal traction for the farmer. Profitability will be the ultimate factor that will convince farmers to use animal traction. With the national campaign to promote animal traction and the strong support of the project in the DRDR, probabilities of project success are high, provided support to farmers is sustained.

APPENDIX - Consultation

(Interviews Conducted By Location)

Washington, D.C.

1. Michael Speers - USAID (Africa Bureau, Project Development)
2. David Atwood - USAID (Africa Bureau, Development Resources)
3. Sven Kjellstrom - IBRD (Country economist/Loan officer - Togo)
4. Thelma Triche - IBRD (Country economist/Loan officer - Togo)
5. John Hall - IBRD (Livestock expert with animal traction experience)
6. Charles Humphreys - IBRD (Country economist, Mali; Animal traction experience in Upper Volta & Mali)
7. William Gellabert - USAID (Personnel Policy). AID documentation on USAID Togo program and mission staffing
8. Anthony Barclay - Development Alternatives Inc. (Vice President). Documentation on AID and TAT, and DAI reports on animal traction in Projet Nord-Togo and Upper Volta

Lomé

9. Sidnev Bliss - USAID (Rural Development Officer)
10. M. Ayeva - Ministère du Développement Rural (Directeur au Cabinet)
11. M. Gnemeqna - CNCA (Caisse Nationale de Crédit Agricole)
12. M. Nicholas - FED (Conseiller Agricole)
13. M. Marchal - FED
14. Richard Crayne - CONAVDEC (Coopératives Nationales et Unions de Crédit), (Conseiller Technique)
15. Official - World Food Program
16. Bruce Winner - Former antrac PCV, Coordinator of antrac training for new PCV's summer 1982
17. M. Gaba - Professor of Law, Politician

APPENDIX - Consultation
page 2

18. Anoumouvi Dossouvi - Centre d'Observation et de Réinsertion Sociale de Cacavelli (Directeur)--School for delinquent boys which offers instruction in animal traction
19. Warren Weinstein - Peace Corps Togo (Director)
20. Michel Del Buono - IBRD, Advisor to the Ministry of Planning, Togo
21. Numerous Peace Corps Volunteers

Atakpamé

22. Kossivi Apetofia - PRODEBO (Directeur); Chef de Secrétariat permanent du COCA
23. Katanga Tcha - SOTOCO (Directeur Général)
24. Norman St. Onge - Antrac PCV (PRODEBO)

Sotouboa

25. Several Togolese extension agents, including a female agent, teaching animal traction to male and female farmers. Also a German volunteer. All working in Animal Traction Training Institute financed by GTZ (German foreign aid agency).

Kara

26. Martin Havlovic - Projet Culture Attelée (Conseiller Technique)
27. Daké Dogbe - DRDR (Directeur); Directeur du Projet Culture Attelée
28. Bernhard Lutz - Projet FED-Kara (Chef d'équipe, Agroprogrès)
29. M. Demester - Projet FED-Kara (Directeur de la Formation)
30. M. Chabodé - Projet Togo-Nord (Directeur National Adjoint)
31. M. Moumouni - Projet Togo-Nord (Responsable de la vulgarisation)
32. Georg Bouman - Projet Togo-Nord (Agropédologue)

APPENDIX - Consultation
page 3

33. Yves Couvreur - Projet Togo-Nord (Expert en Coopératives/
BIT/ILO)
34. M. Von Flanders - Projet Togo-Nord (Expert en élevage ovine)
35. Koffi Tebou - Projet Vivrier (Directeur)
36. Jacques Fournot - UNIDO/UPROMA (Conseiller Technique
Principal)
37. Jacques Van de Steen - UPROMA, Consultant (Ingénieur en Chef,
SORCA-BMB, S.A.)
38. Ayayi Likikpo Afantonou - UPROMA, Directeur
39. United Nations Volunteer working at UPROMA
40. Accountant, Projet Culture Attelée
41. David Skubby - Antrac PCV (stationed in Guerin Kouka)
42. Malcolm Este - Antrac PCV (stationed in Gando)
43. Charles and Nancy Piott - Anthropologists (agric. systems)
44. Berto Merx - Anthropologist (in Gando)
45. Numerous French volunteers on Projet Togo-Nord, Projet FED
and other agricultural projects.
46. Numerous Peace Corps volunteers

Agbassa

47. M. Gaston - Projet Culture Attelée (Directeur du Centre de
Formation)
48. M. Barosse - Projet Culture Attelée (Directeur de Formation,
Centre de Formation)
49. David Fargen - Antrac PCV
50. Christopher Haragan - Antrac PCV

Kadjalla

51. Farmer Yao and neighbors (Self Help antrac participant)

Dapaon

- 52. Essobehyr Kambia - DRDR (Directeur, Région des Savanes)
- 53. M. Batalier - DRDR (Directeur du Service de Santé Animale)
- 54. Xavier Marechal - Projet FED-Savanes (Conseiller Technique)
- 55. Responsable de la Traction Animale, Projet FED-Savanes
- 56. M. Kombate - Livestock purchaser
- 57. Ben Lentz - Antrac PCV/livestock purchaser
- 58. Several French volunteers

Toaga

- 59. Craig Kramer - Antrac PCV

Kante

- 60. Jeffrey Coupe - Antrac PCV and his counterpart Togolese extension agent

Nadoba

- 61. M. Napa - DRDR (Extension agent)
- 62. Jeffrey Robinsin - Antrac PCV

Ketao

- 63. Directeur du Centre de Démonstration, Projet Vivrier
- 64. Andrew Hunter - Antrac PCV (Centre de Démonstration, Projet Vivrier)
- 65. Team of antrac trainers, Centre de Démonstration, Projet Vivrier
- 66. Several farmers (non-users of antrac)

Niamtougou and Mango

- 67. Numerous PCVs