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Evaluation of the Benefits of the Hitched Culture on Farms: Case of Kara and Savannah in the Northern Region of Togo

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Abstract

The harnessed culture introduced in Togo since the German colonial period increased with the Project of Support to Animal Traction (PROTA) and the establishment of Agricultural Equipment Production Unit (UPROMA) in the year 1980. Despite a lack of interest in the use of this technology in the year 2012 in certain regions of Togo, the technology has truly taken root in the savannah region which still accounts for about 89% of the national team. Thanks to the training courses administered by the CARTO center and the follow-up of trainees, animal traction has led to changes in respect of the cropping pattern, the practice of sowing on-line, the use of improved seeds, chemical fertilizers, and phytosanitary products. The practice of harnessed cultivation led to an increase in the size of cultivated areas, a modification of the types of speculation practiced and provided additional income. This technology, however, faces natural, technical and financial difficulties that limit its adoption. To ensure the development of this technology, strategies leading to the reduction of factors limiting the development of harnessed culture in Togo have been adopted. This involves the creation of new training centers and the revitalization of the former training centers in harnessed culture, the creation of breeding centers for draft oxen and the supply of veterinary products for the health monitoring of animals. Research into the use of donkeys in animal traction and the transport of crops is a path to explore.

Introduction

The harnessed culture was introduced in Togo during the German colonial time. In fact, in 1900, the Berlin-based colonial economic committee hired a team of black American experts to introduce animal traction and also promote cotton farming (Westneat et al., 1986). Attempts to adopt the culture harnessed to Mango in 1908 and to Tabligbo in 1913 had failed because of the disinterestedness of farmers.

Attempts to relaunch the harnessed culture resumed in 1950 with the introduction of a farm School in Barkoissi (Oti) and Toaga (Tone) in the north of the country. An introduction program of animal traction in the north of the country was set up by the Office of Agricultural Production Development (BDPA) with the Regional Society for Development and Planning (SORAD) in the Savannah region in the year 1960 (Amegbeto, 1988).

In the Kara region, the Americans through the Peace Corps created a center for animal traction in 1971. In 1970, animal traction was adopted as the objective of the national agricultural development policy. Several support structures for peasants for the adoption of harnessed culture in Togo had been created since its introduction.

Background and justification

In northern Togo, soils are shallow and poor. Agricultural parcels are fragmented, heterogeneous, and raising cattle for many households is an additional activity. In order to better exploit the available potential and in order to improve the living conditions of the producers, the introduction of the harnessed culture was made in 1910 and then intensified between 1970 - 2000 as part of the development projects (EDF, PROPTA, SOTOCO and NGO). Today this innovation would allow, among other things, to enlarge the plots and to increase the production. As the population grows, so does the need for food and the area under cultivation is reduced. In addition, the acquisition of tractors is expensive and difficult to access for vulnerable producers.

Thus, after a long period of introduction of this technology, it is important to analyze its evolution and its effect on farmers through discussion groups with key players.

Goal

The overall objective of this study is to analyze the evolution of this technology and its effect on farmers for sustainable food security.

Specific objectives

- Describe the temporal evolution of animal traction in the northern regions of Togo
- To analyze the conditions of use, advantages and difficulties encountered in the harnessed culture in the area
- Propose solution approaches and avenues for the development of animal traction in North Togo

Method

Study zone

This study was conducted in the Savannah and Kara regions. The Savannah region is located between 10°30'0"N and 0°30'0"E. It covers an area of 8470 km² with a density of 77 inhabitants / km². It has a population of 828,224 inhabitants, (RGPH4, November 2010). As for the Kara region, it is located between 9 ° 40'00 "N and 55 ° 5'00" E. With an area of 11,738 km², it has a density of 71 inhabitants / km² for a population of 828 121 769 940 inhabitants (RGPH4, November 2010).

Data gathering

Data collection took place in two phases. The first focus was on the collection of secondary data. To do this, the old reports on harnessed culture (CA) were collected and exploited (DRAEH Savanes, Tambimong Rural Animation Center Ogareo CARTO, etc.).

The second was to organize focus groups for discussion with key informants. The participants were the practicing producers of the harnessed culture and having a proven experience in the field. An interview was made with the managers of training structures to support farmers practicing CA. (3 CARTO managers, TAMI Rural Training Center, Family House).

The manufacturers of draft equipment were also interviewed (UPROMA in Kara, VETAGRI2000 in Dapaong, UPF, Tamaz in Sokode, Forge without borders in Lomé).

Analysis method

The data were analyzed using descriptive statistics. Thus frequencies, percentages and averages have been calculated. The results are presented in the cross-tabulations.

Results and Discussion

Temporal evolution of animal traction

From 1975 thus the period of the green revolution, till date, the number of teams has varied greatly depending on whether there is a project to support the culture harnessed or not. Thus, the total number of pairs of draft oxen estimated in 1975 by PROPTA was 4195, of which 77% are from the Savannah region (Table 1). This figure has evolved to 11839 teams in 1996 before declining to 341 teams in 2012. The drastic reduction in the number of teams noted in 2012 can be attributed to the end of the Project for the Promotion of Animal Traction (PROPTA) which ensured distribution of equipment, training and supervision of producers under the former Regional Directorate for Rural Development (DRDR). Despite this deduction the savannah region still maintained its position as a leader in animal traction with 89% of draft oxen identified as shown in Table 1. In 2017, the number of teams registered was 16,267 in Tône. This renewed interest in harnessed culture is as the result of the revival of Togolese agriculture through the National Program for Agricultural Investment and Food Security, and other initiatives such as Federation of Cooperative Savings and Credit Union (FUCEC) and New Cotton Company of Togo (NSCT). The success and breadth of the harnessed culture in the savannah region can be explained by the revitalization of the CART training center and the TAMI Rural Training Center, which are still active.

Table 1: Evolution of the number of teams in Togo

Regions	1975	1996	2012	2017
	Pair of oxen	hitches	hitches	Draft oxen
Savannah	3 214 (77%)	-	305 (89,4%)	16267 (Tone)
Kara	637 (15%)	-	15	-
Centrale	257 (6%)	-	-	-
Plateaux	55(1,3%)	-	15	-
Maritime	22(0,7%)	-	-	-
Total	4195	11839	341	-
Source	Starkey et Ndiamé (1986)	RNA (2013)	RNA (2013)	Survey DRAEH 2017

Source : Compiled by the authors from Starkey and Ndiamé (1986); RNA (2013)

Support structures

Since the introduction of the draft culture in Togo, several structures to support farmers for its adoption have been created (Table 2).

Table 2: List of support structures

Support structure	Year of creation	Role and area of intervention	Actual state
The Colonial Economic Committee of Berlin in collaboration with the Industrial Institute of "Tuskegee, Alabama"	1930	Tabligbo and Mango	Closed down
Barkoissi School and Toaga Center	1950	Pilot action to promote the AC in the Region des Savanes	Closed down
BDPA et SORAD	1960	Action to support and promote the CA at the national level	Closed down
US Peace Corps	1971	Region of Kara	Closed down
TAMI CFR Center,	1973	Training in harnessed culture in the Tône and Cinkassé prefecture	Operational

The European Development Fund (EDF)	1980	Region of Kara and Savannah (Tone and Tandjouare)	Closed down
GTZ and the North Togo Project	1980	Region of Kara	Closed down
Agricultural Equipment Production Unit (UPROMA)	1981	Manufacture of animal traction equipment in Kara, for all users of animal traction	Operational
PROPTA	1982	Plateaux and Savanes	Closed down
Tambayong Ogaro Rural Animation Center (CARTO)	1982	Training in harness culture in the prefectures of Kpendjal, Tône, Tandjouaré and Oti	Operational
Galangachi Training Center (NSCT)	2017	tTraining of the oxen of cotton growers	Operational

Source : compiled by the authors

Of all the support structures for harnessed culture, only two are still active in the training and support of farmers to the harnessed culture. These are the CARTO center and the TAMI center. Beside these two centers, the NSCT has just created in 2017 a third center in Galangachi for the training of cattle for its cotton growers. In terms of supply of equipment for animal traction, it should be noted that the UPROMA center is still active, but is currently idle due to the lack of orders. The UPROMA center is subject to strong competition from private blacksmiths who also manufacture animal traction equipment (VITAGRI2000 in Dapaong, UPF, Tamaz in Sokode, Forge without frontier in Lomé). In addition, UPROMA now well known as UPROMAH as a result of privatization, is also faced with lack of communication Italso lacks marketing strategy for the promotion of its equipment and customer loyalty.

▪ "CARTO" Center

The CARTO center was created in 1982 under the initiative of Mgr. Hanryon (then Bishop of Dapaong). It was created in the north of Togo, in the Savanes region, Kpendjal prefecture, in the village of Ogaro, which is indicated to be the heart of the Gourma country (Préfecture de Kpendjal)., There was no other agricultural training center in this environment and was considered the poorest and most isolated in Togo by then.

CARTO is a rural training center, made up of a teaching farm called Trainee Village. The young couples of peasants come to learn new cultural practices (harnessed culture, market gardening, agroforestry, nursery, reforestation, soil restoration, rotations, organic manure among others). They are are housed for the whole 9 months of their training . In addition to agricultural training, they receive social training such as literacy, hygiene, Income Generating Activity (AGR), sewing,

inventory management among others. Until 2011, 355 peasant couples were trained in the to practise harnessed culture. Aided by training and supplemented by a subsidy to agricultural equipment paid by CARTO at the end of the internship, and putting into practice all the knowledge acquired during various trainings will considerably improve their standard of living : thus begins a new life.

Each couple after signing a contract with CARTO benefit from a partially subsidized team allowing them to settle in order to put into practice the content of the training acquired. It is important to note that during training, trainees are given the opportunity to plant trees at home.

Follow-Ups are made 3 times during the first year after the training and 2 times the second year. For this purpose, cards are designed for monitoring. These follow-ups are done by several CARTO supervisors, in order to be able to make shared observations.

Trainee producer couples are introduced to the handling of the equipment of the team, to its daily maintenance, to the training of draft oxen, to the use of the intensified donkey traction: the manure production and storage technique then to the application of organic manure.

▪ **TAMI Center**

Located west of Dapaong, the Tami Rural Training Center was established in 1973 by Msgr HANRION, Bishop of Dapaong for pastoral care in the area and to fight against food insecurity. Attached Culture was best suited to lead this fight. Thus, like the CARTO in the East, this Center trains and installs young couples experienced in the use of animal traction.

▪ **UPROMA**

The Agricultural Equipment Production Unit (UPROMA) was created in 1981 for the manufacturing of animal traction equipment. It is located in Kara on an area of 2 hectares. Its objective is to make available to the Togolese rural world in particular and the subregion in general, agricultural equipment capable of facilitating agricultural development. In 1999, UPROMA was privatized and became a Production Plant for Agricultural and Hydraulic Equipment (UPROMAH). The main tools for the traction culture produced by this unit are:

- a. The M9"SS Multiculturter consisting of the 9"CH9 plow; BHV, triangle hoe with 5 HSS soft teeth and 5 diggers.
- b. The Multiculturist M6"3S, identical to the first but small size for single-ox traction, donkey or for small oxen.



Ridgemaker



Plow with ploughshare



Triangular hoe

Figure 1 : Photos of some agricultural equipment produced by UPROMAH

In addition to this equipment, UPROMAH also manufactures carts (GP 1000 kg, PP 1000kg and PP 500 kg); the first two are pulled by pair of oxen while the third can be pulled by a single ox or a donkey. UPROMAH also has harrows (two types with 15-tooth or 25-tooth chassis); rotary seed drills (SR1 single-row manual and SR2 two-row towed); the fertilizer spreader and the peanut lifter. This unit also manufactures spare and wear parts.

The marketing of products (multiculturalists and carts) was done in three forms: the unassembled kit, the semi-assembled kit and the assembled finished product kit.

UPROMAH had benefited since its creation until its privatization in 1999, from the technical and financial support of the United Nations Industrial Development Program (UNIDO) and the United Nations Capital Development Fund (UNCDF). Today, this unit can no longer sell the equipment because of competition from other production units such as Forge without frontier; local blacksmiths or imports from Ghana and Burkina Faso. Thus the action of UPROMAH is very limited by lack of control.

Terms of use

To practice harnessing, you need a pair of trained oxen and proper traction equipment. Animal traction equipment is often a homiculturist or a multiculturist. The homiculturist is composed of the plow, the triangle, the butteur and the bar of the radiator. As for multiculturalists, there are several types including, Bourguignon-type multiculturist, ARARA multi-farmer. In the field it is the Bourguignon type of multi-farmer who is most used by farmers.

a. The material of draft

The Bourguignon Multiculturist consists of the 9"CH9 plow, the BHV scorer, the triangle hoe with 5 H5S soft teeth and 5 digging tips mounted instead of the soft teeth for the optional deep_scarifiage. This M9"5S Multiculture is the basic equipment for starting harnessed crops.

When the farmer is experienced in draft cultivation, he obtains additional material for animal traction such as wagons, harrows, rotary seed drills, fertilizer spreaders, peanut lifters, etc.

The used parts must be regularly changed:

- For the plow there is the coulter, the mouldboard, sep and pallet, the heel, the bushing, and the traction chain
- For the scorer, there is the scoring heart, the scoring wings, the scorer's point.
- For the hoe, there is complete caliper, reversible plow, crow's foot plough and flexible tooth
- For bolts, there are all the bolts for the assembly of the products and the bearings for the axles of plow.

b. Variation in the price of animal traction equipment

The cost of traction equipment varies according to its quality. Table 3 compares the price of equipment sold by UPROMAH with the price of equipment sold on the market. It shows that the equipment manufactured by UPROMAH is more expensive but is of good quality (long life) than the material sold in the marketplace (short life).

Table 3: Price of Equipment and spare parts for animal traction equipment

Name of the material	UPROMAH		MARKET	
	Unit price	Duration of Life	Unit price	Duration of life
Plow	126.740	??	60.000	??
Triangular hoe	122.530	??	70.000	20 ans
Complete jouc	56.250	??	??	??
Heart <u>butteur</u>	48.500	??	9.000 à 11.000	1à 2 ans
Traction bar	48650	??	??	??
Water Bowl	50.450	??	??	??
Bolt to fix buttress heart and wings	300	??	300	??
Hitch point	1500	1-2 years	2.000	2 months
Pair of wings <u>butteur</u>	5600	5 years	6.000	4 years
Wheel	12000	5 years	10.000	2 years
Shock to flat plowing	19050	2-5 years	12.000	2 years
<u>Bar arionnaire</u>	322010	More than 10 ans	20.000	20 years
<u>Talon butteur</u>	2000	1-2 years	1500	2 years
Triangle point	2590	2-5 years	2000	2 years

c. Variation in the price of draft animals

The price of draft oxen varies according to race and place of purchase. The price of the pair of cow varies from 240000 to 250000fcfa (Table 4). Of course, small oxen are cheaper than larger oxen. It should be noted that small oxen are more hardy, disease resistant and have a working life of 5-6 years while larger oxen are less hardy, poorly resistant to disease and work between 3-4 years .

Table 4: Prices and characteristics of draft animals

Locality	Animal race	Unit Price	Duration of work
OGARO	Pair of oxen	300.000	3-4 yrs
OGARO	donkey	35 to 65.000	3-4 yrs
DAPAONG	Pair of oxen	240-250.000	3-4 yrs
Koundjoare	Nomad Cow (big size)	240-250.000	3-4 yrs
DJIGBANGA	Small cow	200-230.000	5 yrs

d. Hire of draft ox service

Farmers who do not have draft animals rent the services of those who own them because animal traction makes it possible to carry out farming operations more quickly and easily. The use of oxen service has simply become a reality throughout the savannah region. The price of these cultural operations varies from 10000F to 25000 depending on the operations (Table 5).

Table 5: Rental cost of animal traction service and working hours

Cultural operation	Cost of hiring (Fcfa/Ha)	Duration of work (day/Ha)
Scarifiage	15 000	1-2
Flat plowing	20.000	2-4
ridging	20 000	1-1,5
Rayonnage	10 000	1-1,5
Sarclo-binage	15 000	1-2
Sarclo-buttag	1 500	1 - 2
Flat plowing	. Scarifiage	



Figure 2: Photo of some agricultural activities done with draft oxen

Advantage of harness Culture

Draft animals in general and oxen in particular are a unique source of renewable energy and agricultural power. They appreciate in value during their useful life. They are the first stage in the combination of agricultural and beef production (Sanguare et al., 1986).

The adoption of the harnessed culture has had a positive impact on the speed of execution of cultural operations such as plowing, weeding and ridging. Thanks to the harnessed culture, there is a reduction of the difficulty of the cultural operations. Thus the young people engaged in the culture harnessed settle in their village. There is thus a reduction in rural exodus in the eastern zone of the savannah region where harnessed cultivation is practiced compared to the eastern zone of the Kara region where this practice is not so widespread. Valid young people go on an adventure either to Nigeria, Benin or Ivory Coast. For example, farmers make more use of family labor.

Animal traction has led to modifications in accordance with the cropping calendar, the practice of sowing on-line, the use of improved seeds, chemical fertilizers, and phytosanitary products. Therefore the use of the harnessed culture has provided additional income. Because of the harnessed culture, there was an increase in the area under cultivation and a change in the types of crops grown.

Couples' trained at the CARTO Center for use of the harnessed culture reduce the practice of plowing with daba. The most widely used method of cultivation is scarification and ox-plowing (more than 90% of the former producers formed at CARTO use the oxen for plowing and plowing, and discussions with them show that the areas sown would have increased despite the lack of adequate equipment (plow, triangle, etc.) The use of organic manure combined with chemical fertilizers led to an increase in yields of 1.21 to 1.64 T / ha. This really proves that CARTO training is practiced by trained producer couples'. One fact is that even without draft oxen, the trained producer couples' share with the neighbors who have them. carry out the planned cultural operations with the oxen.

The introduction of harness culture into the environment has helped the abandonment of old and bad cultural practices in favor of new ones: the promotion of agroforestry, the reduction of the consumption of wood energy through the use of improved focus. All this has favored the creation of income-generating activities, the promotion of breeding, the construction and maintenance of manure pits. However, efforts still need to be made to combat bush fires, to maintain manure pits and to protect plants against animals.

- The training in culture harnessed by CARTO has had a positive impact in the community. Farmer groups are often formed around former producer couples trained at CARTO. Approximately 58 groups have been registered and these combine the strengths of their members in income-generating activities. According to the farmers, the practice of harnessed culture has many advantages:
 - food self-sufficiency
 - increase in yield
 - improvement of the habitat
 - purchase of a means of transportation such as motorbike and bicycle
 - schooling of children
 - increase in cultivated area
 - coverage of health care expenses

Difficulties in animal traction

For many farmers interviewed, animal traction is not yet exploited to its full potential because of factors limiting natural, technical and financial orders. The main limits to the development of the harnessed culture in Togo are:

- The rainy season: it is becoming shorter and it is not possible to exploit the full potential of the traction equipment. Moreover, the short period of the rainy season limits the full exploitation of the harnessed culture because the sowing period is very short compared to the preparation time of the fields. This limits the possibility of extension of the fields and therefore the revenues;
- local labor: some cultural operations and other work are difficult to achieve by animal traction (stump removal, root removal, mound planting for tubers (yams or cassava), seeding, manure application, field maintenance and harvesting). To do this, this work requires the use of wage labor, but often unavailable because of the exodus of young people. These young people often go on an adventure in Benin, Ghana, Burkina Faso, Nigeria, or Ivory Coast.
- The lack of financial means: the increase in cultivated areas requires investments for the preparation of the land.
- The scarcity of draft animals: the unavailability of these animals is a limiting factor for animal traction in certain environments;

- Insufficient supervision and information: Insufficient supervisory awareness and then lack of information on proxy areas are not likely to facilitate the appropriation of technology by users. Once the difficulties are met, the hitches are abandoned.
- There is also a problem of availability of draft oxen given the competition between harnessed culture and butchery
- inexperience with animals, exposes peasants to failures due to problems of zootechnics and veterinary medicine.
- The theft of draft oxen is also a problem to be solve.

Tracks for the development of animal traction in Togo

To reduce the limiting factors and ensure the development of the harnessed culture in Togo, certain measures have been taken and others must be taken again:

- To reduce– the theft of cattle, the Catholic Church through its movement Young and Rural Adults Catholic (JARC) builds stables for producers who owe oxen. The beneficiary contributes up to 40,000 CFA francs, provides sand and water during the construction of the barn. The barn not only houses draft oxen but also helps to reduce the theft of animals, and facilitates the feeding, maintenance and collection of cow dung for field fertilization.
- To facilitate the supply of draft animals, there is a need for the creation of livestock markets or the revitalization of zootechnical centers for the supply of draft animals; in addition to the supply of draft animals by some projects (CARTO, TAMI CFR) to livestock breeders or cattle markets;
- To compensate for the lack of draft animals, there is a growing trend towards the use of donkeys for animal traction.
- To ensure the training of farmers in the use of animal traction, there is need for the creation of new Training Centers and Rural Animation for animal traction in each of the 5 regions of Togo.
- To cover the feed and sanitary requirements of draft animals, there is a need for the supply of food supplements or storage of crop residues and mineral supplements for lean periods; the supply of subsidized veterinary products, made available to groups of cow breeders in the veterinary services. However, we must not subsidize everything. In fact, by seeking to subsidize everything, farmers and pastoralists would be less inclined to worry about sustainability and commitment. It is therefore essential that farmers and ranchers contribute a certain percentage.
- To facilitate the use of donkeys in harnessed cultivation (ashen traction), it is necessary to train farmers in its use and to have a breeding and training center for donkeys. Donkey use would be appropriate in carrying out cultural operations that require less force. Moreover the donkey is docile and can be used even by a single woman or by children.



Photo: Using the donkey to plow



Using the donkey for transportation

Parallel between use of draft oxen and tractors

During the field survey, farmers, animation centers and the equipment manufacturing workshop identified some of the advantages and disadvantages of animal traction over the tractor. These are :

- The depreciation of the market value of the tractor from the day of its acquisition, and the appreciation of the market value of the draft oxen over time until it is reformed;
- The small size of the areas exploited: The fields are not as big for the good profitability of the tractor;
- The need to hire a good tractor driver and the purchase of fuel for the use of the tractor,
- The scarcity and high cost of tractor spare parts on local markets compared to parts of the couplings that are locally manufactured;
- Too deep plowing of the tractor compared to the plowing done by draft animals which not only closes the topsoil to a shallow depth but also does a clean job not requiring maintenance before sowing;
- Farmers would like the state to support (subsidy) for the purchase of hitch for each household.— For them, giving tractors to a community often gives rise to conflicts, during the first rains, the authorities (traditional chief and his notables) would like to work first their fields at the expense of the real peasants who are obliged to wait while the sowing period is moving forward.

Conclusion and Recommendation

Animal traction is still practiced in Togo and is concentrated in the northern part of the country. It is mainly relevant in the savannah region where two private centers of support are active in its promotion. It had a positive effect on the farming practices of producers in this area of Togo. The practice of harnessed culture, however, faces natural, technical and financial limits. The creation of

training centers and support for harnessed culture, health monitoring and the subsidy of veterinary products would be a good strategy for the revitalization of this technology in Togo.

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