

Summary

Capitalizing on 18 years of experience of shared farm machinery in Benin: such is the project undertaken by the Farm Machinery Cooperative of Benin (UN Cuma) along with its historic partner, the French Farm Machinery Cooperative Cuma Benin.

In 1997 in the village of Ina in Northern Benin, a group of Beninese farmers purchased a tractor and established what would be the first farm machinery cooperative (Cuma) with the support of the Dordogne *département* Cuma. This was done through a project of the Association of French Farmers and International Development (AFDI for the French acronym). Since then, farmers in Benin have been gradually increasing the number and forms of cooperatives of this kind. Currently, there are around one hundred Cuma organizations in Benin with approximately 850 members, and a network of unions, across four *départements* (Alibori, Borgou, Mono and Couffo). Cooperation between farmers from France and Benin takes many forms that have been expanded and made more professional through the establishment of the Cuma Benin Association, which unites a plethora of stakeholders from the Aquitaine Region, members of the Cuma, and other key contacts.

To assess the benefits of the development of farm machinery cooperatives in Benin and to establish the best ways to boost the development thereof, UN Cuma and the Cuma Benin Association thought it would be of great interest to have an outside perspective on their experience, in the form of this study. The National Federation of French Cuma (FNCuma), The Foundation for World Agriculture and Rurality (FARM) and the U.N. Food and Agriculture Organization (FAO) contributed to this endeavor between February 2014 and March 2015. This study picks up many of the salient points of work done by a student at the Montpellier SupAgro Institute for Higher Education in Tropical Agri-food Industry and Rural Development.

Farm machinery: A key to agricultural development in Sub-Saharan Africa

Farming in Africa is at the heart of three major challenges: improved food security, poverty reduction and job creation. To rise to these three challenges, it will be crucial to increase farm production, specifically labor productivity; which will in turn mean an increase in yields, of cultivated surface area per person, or improved knowledge of the work force.

Farm mechanization is a broad term that includes the use of tools or machines for working the land, production and post-harvest techniques, by using human, animal or motorized energy – in the last case this is referred to as farm machinery. Through farm machinery, farmers save on labor and improve work conditions. In this way, they generally increase cultivated surface area, yields, and in some cases, decrease post-harvest losses, which leads to an overall increase in production.

Regions of the world vary in terms of the use of farm machinery. This has caused enormous gaps in labor productivity between manual labor farming and heavily mechanized farming: the gap is around 1 to 2,000 in gross productivity. Sub-Saharan Africa (SSA) has a low rate of farm machinery use, making the margin for improvement of agricultural productivity in the region enormous.

Nonetheless, the risk related to the advent of mechanization – and even more so to the advent of farm machinery – is that it could potentially lead to an increase in unemployment in rural areas and therefore to an exodus to urban areas. However, mechanization can actually lead to job creation if it accelerates the completion of work on farming tasks that are considered bottlenecks in the work calendar. One example of this is the planting of new plots of land which requires extra labor. Services related to farm machinery (manufacturing, assembly, repair, maintenance, financing, etc), if sufficiently developed, are also great sources of job creation. In addition to the quantitative impacts, mechanization also diminishes the burden of work and can potentially improve the attractiveness of the farming sector, especially for young people.

If there is enough land to be cultivated, farm machinery along with other types of agricultural progress could still contribute to improving productivity. In SSA, the surface area of cultivated land in some countries could still be increased. However, it is important to be realistic when it comes to how much and how easy it will be to implement the use of farm machinery. In regions with land saturation, the use of farm machinery will have little impact on work productivity, unless farms that currently do not use farm machinery hand their land to farmers who use a tractor. This dynamic would most benefit medium and large-sized farms.

Benin and Sub-Saharan Africa: low rates of farm machinery use

For several decades now in SSA, the results of programs aiming to mechanize family farms have been mixed: the use of animal traction continues to flourish in the farming sectors that are best adapted to this (cotton farms, peanut farms, rice farms). The number of unmoving farm machinery (pumping, threshing, transformation) is on the rise; meanwhile the number of tractors has been stagnating since 1990. According to Faostat, of the 28 million tractors in the world, between 530,000 and 550,000 are in Africa with 45,000, 16,000 and 74,000 in West Africa, Central Africa and East Africa respectively. Less than 5 % – and in many countries less than 1 % – of farms in SSA possess a tractor.

Since the end of the 1990s, issues related to farming mechanization have almost been entirely overlooked in development and agriculture policies and strategies. Another salient element from this period was that the main research and training programs in farming mechanization were halted. In Benin, and more generally in SSA, the current process of implementing the use of farm machinery has been slowed down by a lack of investment (equipment, facilities and infrastructure, training, research, etc), a lack of qualified staff (machinery operator, mechanics, artisans, etc), and a lack of adapted equipment, spare parts, and imported material of varying quality.

Until now, Beninese farmers have preferred individual use of farm machinery, but personal purchase requires a big investment, which is generally above and beyond of the income of the majority of family farms. Purveyors of farm machinery services are expanding relatively well, whereas cooperative procurement of equipment for production is not very widespread.

Beninese Cuma: a farmer's initiative within the framework of partnerships between cooperatives

In France, farmers developed the Cuma model in the post-war period as a way to more easily purchase farm machinery, increase farm production and thereby contribute to national efforts to achieve food self-sufficiency. In addition to these considerations, being a part of a Cuma was also a way for farmers to stand up for their rural lifestyle: maintaining family farms and stop rural exodus. In a socio-economic and institutional context that is radically different, family farmers in Benin that are also members of Cuma have the same goal of gaining access to farm machinery as a way to boost farm production.

In France and in Benin, the organization of a Cuma is based on the voluntary participation of small solidary groups of farmers who collectively invest in equipment, communally organize their farms, and form a network for training, representation and exchange of best practices. Therefore, being a part of a Cuma means much more than simply sharing equipment, it is a means to working broadly for more solidarity in farming.

In the Borgou and Alibori *départements*– the two areas where the study was carried out – one Cuma has a dozen farmers who have purchased and are managing a 30 to 60 CV tractor, a disk plough and a three tonne trailer. In the south, (Mono and Couffo *départements*), some Cuma are investing in cassava graters or palm nut oil pulping machines which run on thermal engine energy.

Since the first Cuma were founded, the Beninese farmers network has been established with the support of French volunteers. There are regional and *départemental* unions as well as a national union

that employ four coordinators. The coordinators run support activities with the Cuma and with three mechanics. Through the assistance of the partners, the network offers several services to assist in beginning to use shared farm machinery: awareness raising, training members in cooperative management, training tractor operators and mechanics, facilitating access to spare parts, etc. Nevertheless, the financial and human resources of the unions are still far below what is needed to be able to respond to the groups' demands. For this reason, the network between Cuma organizations is not so much developed and the cooperatives feel far from their unions.

Members of the Benin Cuma are in close contact with the French Association Cuma Benin. In this way they place emphasis on sharing of know-how via exchanges amongst farmers, amongst technicians, or between farmers and technicians. Through this, they are contributing to the training of coordinators, mechanics, tractor operators, and farmers that are members of Cuma. Then, via the establishment of an import/export company, Tracto Agro Africa (T2A), with a branch in France and a branch in Benin, the French association makes it easier for Cuma in Benin to gain access to material. The Cuma Benin Association also plays a role in developing new partnerships – with education and training in agriculture for example – founding of centers of machinery for training in two agricultural secondary schools in Benin. Finally, the French association carries out fundraising activities to safeguard jobs for employees in the network of Cuma organizations in Benin.

Farmers: making the model their own

Developing cooperatives in Africa has been very challenging and there have been several failures. For some decades now a new generation of cooperatives has sprung up. The Cuma movement in Benin is a good illustration of this shift.

The cooperative approach that has been offered to farmers in Benin is based on an imported model (the French Cuma model and Beninese laws on cooperatives) where the members have had to adapt to the rules. The study has made clear that groups are based on a very strong endogenic dynamic. The establishment of a Cuma organization is a response to technical, economic and social elements that were singled out by farmers themselves with the aim of: 1) carrying out tending more swiftly over a shorter period of time and at the right time to improve yields 2) increasing farm production and incomes 3) sending children to school rather than have them working in the fields. The studies also showed that faced with these problems, the chosen approach to a cooperative usually results from an exchange of ideas amongst farmers. The farmers learn of the experience of a neighboring Cuma and they then meet to discuss it prior to starting the process of establishing a cooperative. In other cases, a local or national leader or a person from a professional agricultural organization catalyzed and mobilized the involvement of farmers.

The members constantly negotiate the rules of the Cuma, which are more or less formal, for the purposes of ensuring the success of community action. In fact, the cooperatives that were polled have overwhelmingly shown that they prefer equality of members, democracy and collective decision-making. Each individual farmer is free to join a Cuma and has a right to participate in the decision-making process, no matter what its area surface ploughing by the Cuma. What is more, the cooperatives are established on the basis of the personal or professional affinities of a few farmers in a specific geographical area (most often a village). Therefore, crisis and conflict are managed more easily and opportunistic behavior is limited. Regular meetings are held with members of the Cuma which also contributes to group cohesion as they are a prime occasion for exchanging on issues related to shared farm machinery, and more generally on farming practices. Moreover, financial responsibility boosts involvement, participation, and a sense of ownership on the part of producers. The amount of the capital contribution of each Cuma member is based on the surface area that the farmer would like to work with the tractor. Each farmer contributes to the costs related to the use of the material proportional to his/her use. This cost sharing of equipment undeniably facilitates access to farm machinery for small farmers: the polls showed that farms of varying size have joined Cuma organizations. There are the formal aspects of the organization of a cooperative of course, but in

addition to that the breakdown of the principle and practices of cooperatives is very concrete and shows the will of the farmers.

Nonetheless, with the entry into force of The Ninth Uniform Act of the Organization for the Harmonization of Business Law in Africa on cooperatives⁴, Cuma organizations face a new challenge. These groups must assess what will need to be amended within their cooperatives and unions in order to comply with the statutes of the new legislation, all the while conserving their own individual nature.

Access to and renewal of equipment: two key steps for Cuma organizations

Purchasing a tractor and equipment is a very complex process for the groups. Ways to access credit are few and far between: the farmers themselves collect the capital needed for purchase which can take years. Once they have the capital, it is not always easy to find the right equipment for the needs of the farmers. T2A, occasional government programs or NGOs serve as intermediary for the purchase and importation of the equipment. The farmers rarely get their supplies from the scarce private suppliers. This is usually because of the very high cost of European brand equipment, or because of the poor quality of Asian brand material. Because of these challenges, 44 % of Cuma are still in the research of equipment phase. The wait can take years, and this can lead to member dropout leaving the members who are left to close ranks around a smaller group of farmers.

Once the equipment has been purchased there are other risks. The Cuma organization might not survive because of the inability to collect sufficient funds to repair equipment in the case of unexpected breakdowns or updates of the tractor. While it is true that the provision of services – labor or transport – by the Cuma for non-member farmers is a good way to earn extra money, it is nonetheless very important to establish financial reserves for future investment. That is one of the good practices that must be developed in order to safeguard the survival of the group.

Varying results of farm machinery

Used predominately for cotton and corn crops, the main advantage of the tractor comes at the crucial time of planting; this frees up labor to expand land area to be worked. The amount of time saved over the course of the entire cycle is not enormous. However, the use of farm machinery has led to a steep increase in cultivated land surface area per farm: on average, the farmers polled increased their cultivated surface area by 3.5 times what they were farming prior to tractor use – with a minimum of 1.2 times and a maximum of 6.4 times. Cotton and corn are the staple crops of the region and they are also the ones that are seeing the largest increase in surface area. This is a testament to a certain specialization of farms and of a market orientation of production.

The farm machinery-mechanization chain is incomplete – ploughing is the only cultivation work that is done with the tractor – if the ploughed surface area increases, more labor will be needed for the cultivation work that follows: planting, weeding, harvesting. This manpower predominately comes from outside the farm, the cultivated surface area per family having significantly increased. The capital and the choice of production of farms that are a part of the Cuma remain a family endeavor but the increasing proportion of external labor means that these operational structures are beginning to resemble a model of an employer's organization (also called family business⁵) more than strictly a family organization.

Initial results show that the labor productivity per hectare decreases during the shift from animal-drawn to tractor ploughing, because the increase in yields is not significant and the costs of machine work is more expensive than the animal-drawn method. However, thanks to an increase in cultivated surface area, productivity per family worker increases greatly. Farmers have stated that their income

⁴ See Foundation FARM study: http://www.fondation-farm.org/zoe/doc/farm_etude_ohada_complet.pdf

⁵ According Cirad (2014): "Family business includes farms that are characterized by a structural use of permanent wage labor to supplement the family labor, but operating capital is family. This combination induces wage relation in the operation of the farm."

has increased and that they can also invest in their farm, and better cover education, health and food costs for their families. Nonetheless, in order to confirm the contribution of the increase in labor productivity in corn and cotton to the overall family income, it must also be ascertained that the increase in family labor, factoring in the expansion of the surface area, does not have a negative impact on other remunerated activities, farm related or otherwise.

The model of partial use of farm machinery as practised by the members of Cuma organizations maintains, or even creates jobs in rural areas because the post-ploughing activities remain manual and cultivated land surface area is increasing greatly – made possible by the fact that there is still non-cultivated land available.

Improved factoring in of agro-environmental challenges

The Cuma network is making great efforts to train tractor operators and farmers to drive and maintain tractors and calibrate ploughs and to promote ploughing that has the least possible negative impact on the soil. Farmers in Benin are conscious of the agronomic risks of a “bad” ploughing. Moreover, awareness raising has been relatively effective considering that Cuma farmers acknowledge the fact that Cuma tractor operators offer higher quality ploughing services compared to their private service provider counterparts.

In addition to activities focused on the tractor ploughing techniques, it is necessary to implement preventative land-use measures (grubbing, anti-erosion methods). This will only be possible if there is a reform of land rights that safeguards farmers’ right to the enjoyment of their investment. The issue of the breakdown of cost of these land-use measures between farmers and the public authorities has yet to be addressed.

Farm machinery also requires the implementation of overarching measures for the conservation of soil fertility. Although Beninese farmers depend essentially on chemical fertilizers for maintaining the fertility of their soil, they could potentially use other methods including rotating crops, planting legumes, covering the soil with crop waste, organic manure, and agroforestry.

The French and Beninese Cuma Network: striking a balance between dependence and autonomy

One of the specificities of Cuma organizations in Benin is the partnership with the Cuma Benin Association. These relations are long lasting and based on trust amongst the various stakeholders: French partners, elected officials, employees, and members of the Beninese Cuma organizations. It extends beyond the traditional cooperative practices of the development project variety, which focus on obtaining a quantifiable objective over a short period of time.

To date the partnership has focused most of its attention on technical aspects. In order to move forward, the study suggests that the focus could now be shifted to assisting the Beninese network in defining strategic guidelines and the formal establishment of a shared vision for collaboration between the French and Beninese. This would make it easier for joint reflection on the crucial challenges facing the Beninese network: seeking greater financial autonomy and changeover amongst elected officials. The Beninese network is far too dependent on funds from the Cuma Benin association. In addition to a commission levied on tractors sold via the T2A network, Cuma dues were meant to come back to the Beninese network to finance the operating costs of the decision making body and the travel costs of employees. However, the dues have almost never been paid. In any case, as with French Cuma network, public funds have a far too important role in the process of shared farm machinery.

Public policy in favor of mechanization for a change in scale

Cuma organizations seem to be solid cooperative organizations of which farmers are proud to be a part. Members transmit a positive and attractive image of the farming profession to rural youth: farm machinery represents a bit of modernity that might be an incentive for them to stay and work in the sector. The success of this collective action is spreading to other villages and new projects are emerging, like the Borgou Corn Cooperative, established by Cuma representatives. Finally, the impact of Cuma organizations goes beyond the solely agricultural sector: some invest in social projects or community infrastructures in their village.

Despite all of these assets, Cuma organizations or similar are still somewhat marginal in Benin: 850 farmers are in a Cuma out of an estimated total number of more than 400,000 farmers in the country. A change in scale will require the development of strong public policy for mechanization and farm machinery, which should include:

- Recognition of the existence of an autonomous agricultural movement which can discuss with the State regarding the developed, implementation and assessment of its mechanization policy;
- A host of measures to promote investment in small and medium-sized family farms at two levels:
 - Within cooperatives, through the setting up of adapted mechanisms for financing the acquisition through credit of expensive equipment;
 - Within farms, for legislation that guarantees access to land and the right to protect farmers' investment in land. Land management is essential for protecting environmental sustainability of farm machinery;
- Tax and legal incentives to establish a stable national farm machinery sector that would give way to a private sector (companies, producers organizations). The purpose of the latter should be to establish demand, manage mechanization and establish a market for farm equipment and spare parts;
- Financing research and training programs to best adapt the techniques of mechanization/farm machinery in order to respond effectively to the needs of family farms.

In 2008, the Beninese government adopted a Strategic Plan for Stimulus of the Agricultural Sector (PSRSA, for its French acronym). In this plan the government has emphasized the importance of farm machinery and recognizes the role of Cuma organizations as “Structures of reference in the use of farm equipment.” Nonetheless, the Beninese Cuma network still does not play a significant role in the implementation of PSRSA. Strengthening ties with policy decision makers will be crucial to rooting the Beninese Cuma organizations' experience in the cooperative process in the country.



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