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JOURNAL  
OF  
RURAL  
COOPERATION



Centre international de recherches sur les communautés coopératives rurales  
International Research Centre on Rural Cooperative Communities  
המרכז הבינלאומי לחקר קהילות כפריות שיתופיות

**CIRCOM**

VOLUME 27

No. 2

1999

CIRCOM, International Research Centre on Rural Cooperative Communities was established in September 1965 in Paris.

The purpose of the Centre is to provide a framework for investigations and research on problems concerning rural cooperative communities and publication of the results, to coordinate the exchange of information on current research projects and published works, and to encourage the organization of symposia on the problems of cooperative rural communities, as well as the exchange of experts between different countries.

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*Information for Subscribers: The Journal of Rural Cooperation* is a semi-annual periodical, aimed at the pursuit of research in the field of rural cooperation. Editorial enquiries and other correspondence should be addressed to CIRCOM, Yad Tabenkin, Ramat Efal 52960, Israel (Fax: +972-3-5346376). Subscription rate: \$27 per annum (plus \$3.00 sea mail; \$6.00 airmail).



## JOURNAL OF RURAL COOPERATION

Vol. 27

No. 2

1999

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# **Completing the Chain: Research-Extension-Farmer-Cooperatives – A Nigerian Experience**

*by*  
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## **Abstract**

Tropical agricultural research has so far achieved excellent results in almost every field. However, these results seldom reach the ultimate target: the farmer. This is principally due to a missing link in the chain: research-extension-farmer. Four Agricultural Training Centres for young, small-scale farmers have so far been established in Nigeria by the Leventis Foundation, Lagos, in order to fill the gap between research and farmers. The one-year-long course gives male and female farmers 80 percent practical and 20 percent theoretical training. The ex-trainees are intended to act as catalysts in the promotion of modern agriculture practices among their farming communities once back on their own land. Many ex-trainees have formed cooperatives, which give them easier access to bank loans and the possibility of availing themselves of tractor and transportation services as well as bulk purchase of inputs. The impact of their methods have so far been tangible and improved models of cooperatives formed by these ex-trainees would accelerate the modernization and nationalization of the whole tropical agrarian system.

## **A First Missing Link: Research-Farmer**

How to increase food production in developing countries has since long been the prime and ultimate concern among agricultural scientists, economists, sociologists, extension people. Every angle of it has been researched and discussed: quality or quantity, horizontal or vertical cropping, how to tap old resources and how to find new ones. These are some of several prerogatives. Few people seem to bother about the wide gap existing between what science has to offer and what the farmer is able to apply effectively in practice. It is taken for granted that applied research should do the rest.

Yet, very little if any change is occurring at small-scale farm level, mostly as a consequence of the missing or inefficient middle link in the chain: research-extension-farmer and the reverse. Few research breakthroughs penetrate into the

bush because of its lack of infrastructures and communication. Or if they do, they are sometimes too expensive or, technologically speaking, too advanced for a small individual farmer to handle. Also when extension reaches the farm, it is not rare that the wrong family member on the farm is addressed. Too little consideration is given to the traditional gender division of work within the farm family.

Consequently, only a marginal part of new solutions is reaching destination and if so, only a few members of the farming community are involved.

Nigeria, with its more than 110 million inhabitants, is the most populated country in Sub-Saharan Africa. Although as much as 45 percent of its labor force is engaged in agriculture, it has given little evidence of insufficient land resources. So far there has rather been an inefficient tapping of the potential of the resources. Stagnation and poverty mark the great majority of its millions of subsistence farms. Use of methods, cultivars and tools, based on centuries of treasured experience, shows no or very little sign of impact of the excellent results that national research has reached in this field or of the 32 year-long presence in Ibadan of the International Institute of Tropical Agriculture (IITA).

## **IITA Research**

IITA is one of 16 agricultural research centers around the world, whose main financial support comes from CGIAR (Consultative Group on International Agricultural Research), an informal association linking over 40 governments and 15 international organizations and private foundations. IITA research, carried out by 80 scientists and other professionals from some 30 countries, focuses on the improvement of local crops such as roots and tubers (yam, cassava), grain legumes (cowpea, soybean), cereals (maize) and plantain and banana as well as farming systems including simple tools, soil conservation and management, pest, weed and disease control. The collection, evaluation and conservation of genetic resources weigh high on the list, being the very basis for any kind of genetic improvement. IITA training programs have so far involved 1,541 graduate students, 393 M.Sc., 333 Ph.D. and 815 short-term trainees, an impressive number whose influence on tropical farming has not yet been measured.

The goal set is to strengthen food security, to alleviate poverty and to preserve the natural resources on which future food production depends. How many of these objectives have so far hit the mark?

It is not to say that IITA cannot boast astounding breakthroughs: its maize and cassava varieties yield twice as much as traditional ones and some maize cultivars are ready for harvest in 85 days. Thanks to improved control over flowering as well as new simplified multiplication methods, IITA new hybrid yam lines produce gigantic tubers and the tuber could become an economically yielding cash crop for many farmers in the yam belt. IITA cowpea varieties are now resistant to most of its former enemies: insects, drought, diseases and the Striga weed, with consequently

higher returns. The planting of soybean without inoculation and its many utilization possibilities within the household could give many farmers a chance to grow the protein, and oil-rich cash crop also as a highly nutritious food crop for the family. Plantain and banana, important food commodities in the humid zones of sub-Saharan Africa, have lately suffered high losses caused by the black sigatoka leafspot disease. IITA bred hybrids resistant to the disease should be listed as elite materials.

In spite of these and several more exceptional research achievements, many smallholders still grow low-yielding local cultivars with no or little disease and insect tolerance, and use drudging tools and land management systems.

### **How to Spread the Message**

An important fact to be noted is that the CGIAR system under which IITA is operating does not include extension in its agenda. In countries such as India and Mexico, where CGIAR opened its first two research institutes, IRRI on rice and CIMMYT on wheat and barley, the initial dramatic results achieved by research spread with the existing extension support. It was therefore assumed by the CGIAR that the same could happen in other geographical areas with other crops. In Africa it did not as the extension link between research and farmers, when existing, was mostly in a deplorable condition.

Scientists both inside and outside the CGIAR system, greatly concerned with the situation in Africa, were often enquiring how this gap could be filled, *i.e.* how to transfer research results in an efficient and sufficiently quick way to farming communities without having to build a new extension system, which is always a costly long-term venture. Some took personal praiseworthy initiatives, in a way or another, but with little and often may fly impact on the farming community as a whole.

The very idea of tracing a new track to take research to smallholders came from two agronomists who had worked together or anyhow in unison during almost 40 years. One was Nigeria's most eminent agriculturalist, the late chief T.S.B. Arribisala, now known as the Father of modern Nigerian agriculture. The other one was a former Director General of IITA, Dr. Ermond H. Hartmans, who had spent a lifetime in the UN system as a farm management economist and had a long experience of African agriculture.

Their idea was to open agricultural training centers for young male and female small-scale farmers, through which research results both from IITA and other national or international research organizations could be channeled and hence put into practice by these same students once back to farming in their communities.

### **Agricultural Training Centers**

In 1986, in support of the Nigerian Federal Government's new 6-3-3-4 Educational Program, with its emphasis on self-sufficiency in food production,

the Leventis Foundation (Nig) Ltd./Gte., a non-governmental organization with its headquarters in Lagos, accepted to set up a couple of Agricultural Training Centres in Nigeria. So far the Foundation had mostly concentrated its agricultural activity on granting awards to Nigerian postgraduates and undergraduates and other students, and on donating equipment, workshop tools and teaching aids in order to promote vocational training of Nigerian youths, but with little or no feed-back.

The Leventis Agricultural Training Program was started in 1987 with two schools, one at Ilesa in Osun State (part of the former Oyo State), in a semi-humid region characterized by latheric and hydromorphic valley bottom soils and bi-modal rainfall from March to November of between 1,200 and 2,000 mm, and one in Dogon Dawa in Kaduna State. This training center is located in a sub-humid region and has about 100 ha of good farmland and a rainfall between 800 and 1,200 mm allowing for a mono-modal rainfed cropping season.

In 1998, upon a request of the Kano Government and following the success of the first two schools, a third center was established on a joint-venture basis at Panda in Kano State, where 150 ha of farmland including 10 ha of irrigated fadama land was available and the annual mono-modal rainfall lasts from May to October and varies between 500 and 800 mm.

Recently a fourth school has been inaugurated at Agenebode, Edo State, in the humid guinea savannah zone which is intermediate between the semi-humid zone in Ilesa and the humid, high rainfall forest zone. The area is important for both production of root and tree crops.

The school curriculum consists of crop production and agro-forestry, livestock production and bee-keeping, agricultural engineering, farm management as well as family life development and farm product processing and utilization. A close cooperation exists with IITA and other national and international research institutes, universities, agricultural organizations and farming training centers: IFAD (the International Fund for Agricultural Development), PNI (Pro-Natura International), NARP (National Agricultural Research Project), NTC (Young Farmers Training Centre) and the World Bank, to mention a few.

At the end of the year, which includes 80 percent of practical work and 20 percent of classroom lectures, each trainee receives a Statement of Participation, which is not intended to be used for outside employment, as the principal target is that the students go back to work on their farms and put into practice what they have learned during the one-year-long training course.

The admission to the schools is free, but requires that the applicants speak and write English, have access at home to at least 2 to 3 hectares of land, declare their intent to go back to farming on their own or family farm after the end of the school year and that they have a good standing in their village.



## Catalysts and Extension Force

Having a good standing in the village is a prerequisite, as the aim of the training program is to achieve a more rapid introduction of sound and economically viable farming systems into the rural world. The basic idea is that this can be achieved through the examples provided by the trainees once back in their villages. Here they should act as catalysts in the promotion of modern agriculture practices among their farming communities and as such function as a “viable extension force”.

The schools are provided with the necessary teaching aids, workshops, storage, classrooms, dormitories with bathrooms, cafeteria and administrative staff offices and housing as well as sufficient land and animal resources. Tuition, board and lodging are free throughout the year. During the first 10 months of their training, the students receive also an allowance until they have generated their own income within the school system from the sale of the products of their individual and communal plots and from that of animal rearing.

Since the start of the program in 1988 until 1998, a total of 1,187 young farmers (984 males and 203 females) had frequented the school and 78 percent of them had returned to their communities to farm an approximate total of 2,500 ha of land. The impact of their farming methods on neighboring farmers is presently being evaluated.

## Mushrooming Effect

Even if an updated evaluation is missing, the mushrooming effect is evident. Neighboring farmers, seeing the profitable outcome of these ex-trainees, are more willing to adopt a system coming from one of them and that they can see and touch rather than from the mouth of an extension agent. Improved cultivars distributed among ex-trainees and their neighbors by research institutes and seed companies are given free to be grown and paid back in kind (so many bags for each bag of selected seeds) once the harvest is over. New, simple animal rearing systems spread through ex-trainees including a couple of bulls, sheep and goats, poultry (eggs, layers, broilers), pigs, rabbits, bees appear frequently in their farming program.

But before starting such activities, extra money is often needed. Bank loans are still a great bottleneck for Nigerian single smallhold farmers, while registered cooperatives have a much easier access to such a service. As money management is a relatively new concept in this country, it is important that each student, before leaving school, learns how to approach and to handle it. This is done in a practical way within the school program. While in training, the students are able to raise money, under the supervision of the school, in three different ways:

- 1) from the sale of the products of their individual plots of 1/3 ha assigned to each student by the school. On these plots they grow various crops included in the school curriculum. When ready, these crops are bought by the school or sold on the local market by the students;

2) from the sale of the products of their communal plots, which the school uses as demonstration areas;

3) from the sale of the livestock production. This time, the students are divided into smaller groups (8 to 10) and are jointly responsible for the management of the particular livestock operation, be it cattle, pigs, poultry, rabbits, bees or other smaller animals.

The net return of these sales goes to the student producer, or is evenly divided among the students in the communal plot or among the participants of each livestock rearing group. The money is kept in a bank account drawn up in the name of each student and given to the students when they leave school. It is intended to be used as a starting capital for their new initiatives, including the purchase of simple, improved tools made by the students themselves, at the school workshop, and sold to them at production cost: rolling injection planters, jab planters, band fertilizer applicators, maize shellers, maize cribs, cassava lifters, ploughs and ox-carts.

The school also teaches the basic rules of how to obtain and how to use outside financial assistance. In some cases it opens the way to bank loans for specific farming activities of the ex-trainees.

## **Cooperation**

Cooperation is part of rural life in Africa. In the 1960s Nigeria started a cooperative movement, a process that has faced alternative successes and failures. In the Leventis Foundation Agricultural Schools the students learn to work together and to be jointly responsible for the final results both in the communal system of land management and in the group management of livestock. In this way, the first elements of cooperative action are introduced by the schools. The practical experience together with lectures on cooperation and cooperatives included in the school curriculum has led to the spontaneous formation of cooperatives among ex-trainees from the same areas.

So far, some 50 cooperatives have been legally registered with a bylaw by the ex-trainees in their villages. The number normally ranges from 10 to 20 members, but some with less than 10 members do also exist. These smaller groups have greater problems to access formal credit sources.

However, as far as other services are concerned, they benefit to the same extent as the bigger cooperatives.

For the first years, all these cooperatives are supervised and assisted by the school with counselling as well as with inputs such as improved seeds, chemicals, tractor services and some small loans.

Let me briefly highlight here the activities of one of the smaller cooperatives: the Kidandan branch of "Modern Farmers Cooperative Society" in Kaduna State. The cooperative was started in 1994 by ex-trainees of the Leventis Foundation Agricultural School, Dogon Dawa. The total land acreage comes to 25 ha. If it

has a setback, it is its limited number of only seven members. In order to be legally registered and thus have access to bank loans, its number must reach 10 members. It is expected that this will happen as three interested neighbor farmers have applied to become members.

Each member produces on his own land, but they all work together with land preparation and management such as tractor services, purchase of inputs and with harvesting and transport. Meetings are held regularly every last Friday of the month to discuss current problems and to assess costs and returns.

The production by the cooperative two years ago of mega maize seed on 3 ha of land for a seed multiplication company had brought a net return of Naira 79,394 *i.e.* Naira 26,464/ha = US\$311:34/ha. With a yield of 2 t/ha and a price of Naira 20,000/t, the gross return was Naira 120,000. The total variable cost amounted to Naira 40,606 for land clearing, tractor harrowing, ridging, seed and planting, fertilizers and stocking. This is a very high return, which could never have been reached if the farmers had not carried out a joint venture.

The cooperative also functioned as out-growers of hybrid maize on 2 ha of land. This time, the net return was slightly lower, amounting to a total of Naira 41,030, *i.e.* Naira 20,515/ha = US\$241:35/ha. This lower income could partly be attributed to the smaller acreage which accounted for a higher variable cost and the need of more inputs, especially fertilizers. Also the price paid by the Seed Company was lower.

However, the small number of members has led to some problems. Fertilizers and other chemicals are presently expensive in Nigeria as they are no more subsidized, and such a small cooperative cannot obtain any bank loans for the purchase of chemicals. The cooperative has therefore lately turned from growing maize to such crops as soya beans, sorghum and ground-nuts which do not require chemicals or need smaller quantities than maize.

The production of soya bean seed on 4 ha gave some pleasant surprises. The net return was this time of Naira 125,000, *i.e.* Naira 31,250/ha = US\$367:67, which was much higher than the return for mega and hybrid maize.

This change of cropping program did not have a negative effect on the income of the cooperative, but it has limited its crop diversification, as crops requiring higher inputs had to be excluded from the program.

As a result of a short course organized by the school, the cooperative has decided to start an animal traction program. In this way, the cost of the tractor services can be reduced and a better soil management program can be undertaken.

It has also urged the Leventis Foundation Agricultural School in Dogon Dawa to widen the Food Processing Technique Program and to include their wives in the same training. As a matter of fact, food processing is as a rule a woman's task in Nigeria and the School, by accepting the wives, has corrected a general misconception of gender division of work.

## Conclusion

The four Leventis Foundation Agricultural Schools are linked with the respective Nigerian Ministries and Local Governments responsible for agricultural education and development. The joint venture between Kano State and the Foundation with the establishment of the Panda school is a first important realization and can stand as an example and a still further cooperation between the government and private enterprise.

The pioneering scheme of these training centers is intended to stand as a model for practical agricultural training in Nigeria and beyond. There is therefore great expectancy that the practical approach that characterizes the training centers will be adopted by other agricultural schools, including the polytechnic institutions.

Also the approach of using young farmers as catalysts in the villages should give a multiplying effect and become an integrated part of the national extension program. Improved models of cooperatives formed by these ex-trainees would accelerate the modernization and rationalization of the whole agrarian system.

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