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AGRICULTURE

Adoption and impact of dry-season dual-purpose cowpea in the Nigerian semiarid region

By

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Location:

Kano, Nigeria

Problem Overview:

In the semiarid zones of west and central Africa, farmers cultivate different cowpea varieties. Some are for grain for human consumption and others for animal fodder. The aboveground parts of cowpeas, except pods, are harvested for fodder.

Traditionally, farmers cultivate two main types of cowpea: early maturing varieties, grown for grain and late maturing varieties that are grown for fodder production. The dry season is characterized by scarcity in good quality fodder and hence there is a need for dual purpose varieties that give reasonable grain and fodder yields, and, thereby, maximize the output from land and labor.

Background:

SUMMARY

In the semiarid zones of sub-Saharan Africa, crop and livestock farming forms the source of sustenance for resource-poor farmers. But the dry season is usually marked with food scarcity, reduced food availability, and lower village-level economic activities. These are some of the reasons for the emergence of the collaboration between the International Institute of Tropical Agriculture (IITA) and the International Livestock Research Institute (ILRI). They initiated a breeding program to develop dual purpose cowpea varieties: varieties that produce both grain and fodder to suit diverse needs of farmers in the drylands.

While research is still needed to assess and quantify the actual impact of the adoption of dry-season dual-purpose cowpea on farmers welfare, nutritional status, gender relations, soil fertility improvement, crop livestock integration systems, and either socio-economic and ecological variables, it is unquestionably proving beneficial.

Once the dual-purpose cowpea varieties became available, diffusion was by horizontal spread of planting materials, from farmer-to-farmer. In only four years of the technology development, 75% of farmers who came into contact with it have adopted it. Substantial economic and social benefits were derived by farmers from adoption of the technology, in addition to providing nutritional and food security. Substantial cash benefits derive from the sale of cowpea grains.

In many parts of the savanna zone of sub-Saharan Africa, where livestock is important and provision of food and livestock feed remains a serious problem for resource-poor farmers, cowpeas fill an important gap in the farming system. Dry season dual-purpose cowpeas stand to fill this niche with continual farmer participation and molding of technology to suit farmer interest.

BACKGROUND

In the early 1990s, IITA and ILRI, initiated a breeding program aimed at developing dual-purpose cowpea varieties that produce both grain and fodder to suit the diverse needs of farmers in the dry areas. Success was attained with the development of dry-season dual-purpose cowpea varieties adapted to the conditions of the semiarid zone. They are considered dual purpose because they provide grains for human consumption while also providing fodder for livestock.



Cowpeas are of vital importance to the livelihood of several millions of people in West and Central Africa. Rural families, that make up the larger part of the population of these regions derive from its production, food, animal feed, alongside cash income. Its grain, which is nutritious and inexpensive, serves as a source of cheap protein for both rural and urban consumers. The cowpea grain contains about 25% protein, and 64% carbohydrate (Bressani, 1985). Its potential in the alleviation of malnutrition among resource poor farmers is inestimable.

Cowpeas also contribute to the sustainability of cropping systems and soil fertility improvement on marginal lands through provision of ground cover and plant residues (which minimise erosion and subsequent land deterioration), nitrogen fixation, increasing soil fertility and suppressing weeds.

More than 8 million hectares of cowpea are grown in West and Central Africa. Nigeria is the largest producer with 4 million ha, followed by Niger, 3 million ha. Other producers are Mali, Burkina Faso and Senegal.

The production trend of cowpea in Nigeria shows a significant improvement with about 441% increase in area planted and 410% increase in yield from 1961 to 1995 (Ortiz, 1998). This development within two decades is attributable to the significant advances made on cowpea seed improvement in the drylands by the IITA.

CONSTRAINTS

The major constraints to the adoption of dry season dual-purpose cowpea include insect attack both in the field, such as by nematodes, and in storage, and insufficient water, land, and seed. The magnitude of these problems also varies with location. There is the need, therefore, for the development of varieties that are resistant to nematodes and storage insects. Seed multiplication and distribution systems also need to be improved upon so as to enhance farmers' access to improved varieties.

IMPLEMENTATION

The test of a successful technology is its adoption by the target group. The study was carried out to examine the patterns, levels, rates of adoption and impact of the dry-season dual-purpose cowpea varieties in the semiarid zone of Nigeria. Kano State was selected for the study. It is a semiarid locality lying on latitude 11°34'N and longitude 8°44'E. The ecology is typical of that of the Sudan, with an annual erratic rainfall of between 500 and 1000mm during a 4 months season. The growing period lasts between 100 and 150 days.

A total of 599 farmers were sampled using a structured, pre-tested questionnaire. Cereals and grain legumes dominate the farming system in the study area. Millet, sorghum and cowpea are the major crops cultivated.

Fodder production is a significant source of income. Livestock rearing is not compromised; that is, the inhabitants rear animals in isolation of or in combination with crop farming. Two major cropping seasons characterize the study area: the rainy season, which starts in April and ends in late October, and the dry season, which starts in November and ends in April.

During the dry season, water is provided from both irrigation facilities and residual moisture of wetlands for the cultivation of pepper, tomatoes, onions, and maize.

No institutional effort was involved in the diffusion process of this technology. Rather, use of these varieties has spread mainly through farmer to farmer horizontal diffusion. Survey results show that most farmers received information and their first seeds from other farmers in their village. But about 40% of farmers relied on direct purchase from the market. One of the most promising cowpea varieties developed is IT89KD-288, and the adoption of this variety is the major interest herein. The results show that information about the variety was received at varying time in the state. Of the villages surveyed, one, Dandagana, received information about IT89KD-288 in 1993. In another, Gabar Da Gari, farmers became aware of the variety in 1994. The majority of farmers, those in Lantaye, received information on the variety in the later part of 1996.

ACCOMPLISHMENT

The diffusion and uptake of this variety is quite impressive, considering its adoption by over 1500 farmers in 1997, nearly 4 years after its accidental release to just one farmer. The dry season dual-purpose cowpea varieties developed, were evaluated in irrigated and wetland areas in on-farm, dry season trials. Their grain yield potential is over 1 tonne per ha and their fodder yield potential is between 4 and 10 tonnes per ha when planted at the end of January to mid February (Singh et al. 1997). They are harvested near the end of April to mid May when prices for cowpea grain and fodder are high. Of the sampled population of the farmers, 75% had adopted dry season dual-purpose cowpea varieties. Wheat cultivation in the locality is now being substituted with the dry season dual-purpose cowpea varieties.

In three survey villages, in 1994, wheat occupied a total of 39ha, while dry season cowpea was grown on 18ha. In 1997, the area cultivated to wheat had decreased by 235%. Conversely, the area planted to dry season dual-purpose cowpea had increased dramatically by about 452% during the same period in the three villages.

Farmers explained that dry season dual-purpose cowpea had replaced wheat mainly because the fertilizer (inorganic) required for wheat was no longer affordable and the new cowpea varieties do not require any fertilizer to produce acceptable yields. Other constraints to wheat production include lack of machinery, insufficient water supply, high labor demand during planting and late maturity compared to cowpea.

Farmers perspective of the technology on their household are that household food security was enhanced especially at the beginning of the rainy season when the supply of most foods was exhausted. Also, farmers observed that dry season cowpea contributed significantly to their farming practices and economic status. Farmers perception of cultivation of dry season cowpea is that it is a more dependable and profitable source of income than growing wheat and rainy season cowpea. Dry season cowpea

provides good quality fodder at a period when fodder is scarce and requires less labor and water than other crops.

Dry season cowpea grain and fodder become available in late April/early May when prices peak and farmers are able to make a high profit.

Similarly, cowpea fodder prices in the dry season were three times higher than the price of fodder in the early rainy season. Cowpea fields are also left to cattle grazing after harvesting the pods. Not only are economic benefits derived from cattle herders but also the field is nourished with organic manure which enhances soil performance. Thus, the system contributes to the sustainability of mixed crop/livestock farming systems in the drylands.

Farmers also indicated that the dry season cowpea varieties increased their choice of crops for cultivation in the dry season, and makes farming a year round activity. Benefits of this include hunger alleviation, increased food supply, and increased economic bases for the families. The cultivation of the new dry season cowpea has created additional opportunities for employment from planting through harvesting, processing, and marketing of products.

REFERENCES

Bressani, R. 1985. Nutritive value of cowpea. Pages 353-360 in Cowpea: Research, Production and Utilization, edited by S.R. Singh and K.O. Rachie. John Wiley & Sons, New York, USA.

Ortiz, R. 1998. Cowpeas from Nigeria: A silent food revolution. Outlook on Agriculture 27(2): 125-128.

Singh, B.B., O.L. Chamblis, and B. Sharma. 1997. Recent advances in cowpea breeding. Pages 30-49 in Advances in Cowpea Research, edited by B.B. Singh, D.R. Mohan Raj, K.E. Dashiell, and L.E.N. Jackai. IITA, and Japan International Research Centre for Agricultural Sciences (JIRCAS) copublication. Available at IITA, Ibadan, Nigeria.

Submitted by:

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Asimalowo Adegboyega Abdullahi
[HORIZON Solutions Site Intern](http://www.horizon-solutions.org/)
gboyega@skannet.com.ng

Contacts:

B. B. Singh
IITA
Sabo Bakin Zuwo Road
PMB 3112, Kano, Nigeria.
E-mail: <http://www.solutions-site.org/cgi-bin/artman/exec/b.b.singh@cgiar.org>

R. P. Eaglesfield
IITA
Oyo Road, PMB 5320, Ibadan, Nigeria.
E-mail: r.eaglesfield@cgiar.org


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