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Report of a Seminar

Women and Agricultural Technology: Relevance for Research

Volume 2 – Experiences in International
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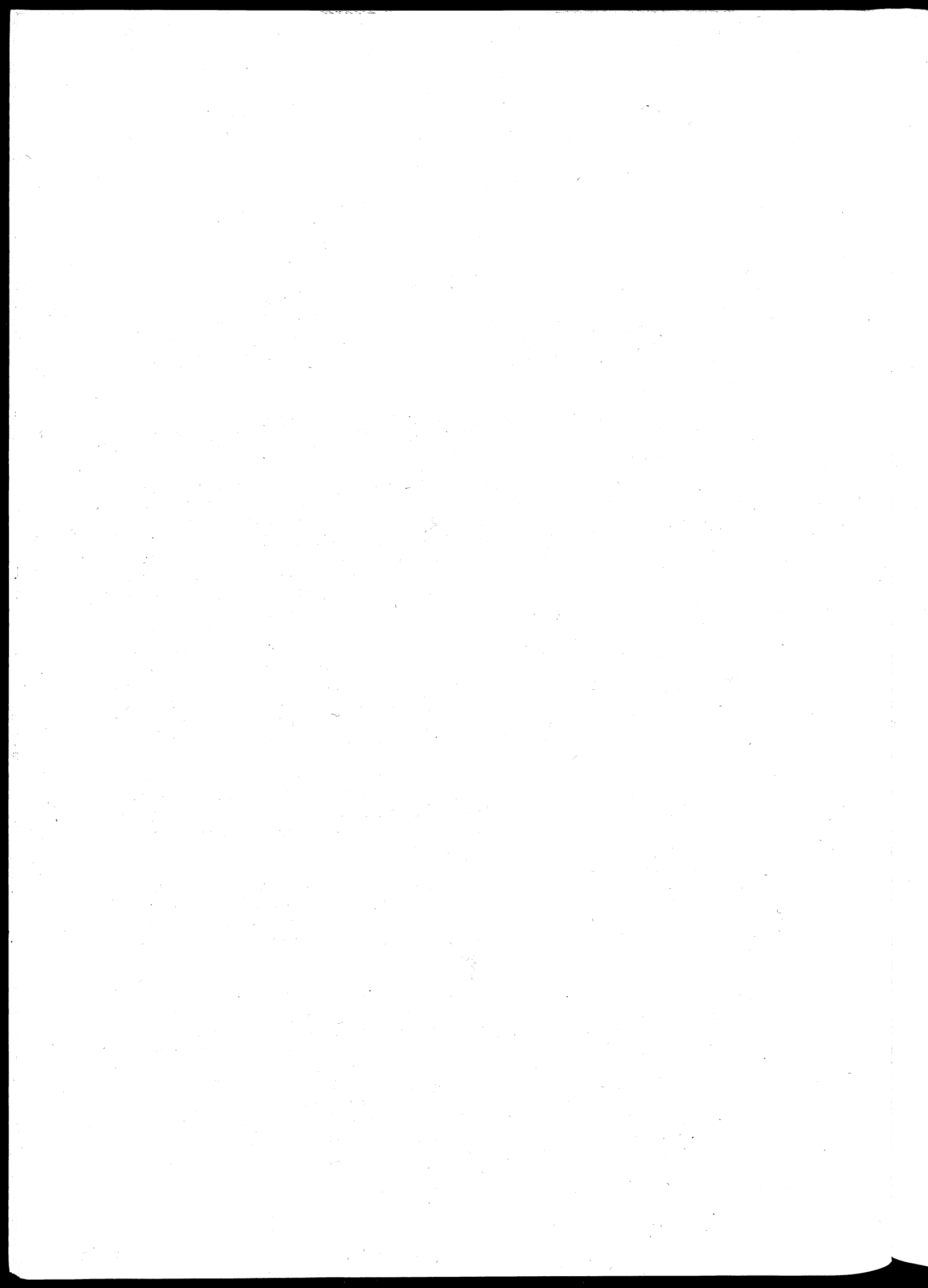
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Women and Technological Innovations in Rice Farming
in West Africa

by

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on behalf of the
West Africa Rice Development Association



1. INTRODUCTION

The role of women in agriculture

African women are noted for the significant role they play in agriculture, particularly in foodcrop cultivation for household subsistence. As crop cultivation becomes more and more commercialized, their role tends to diminish. Apart from the farming objective, the participation of women in farm work is influenced by several other factors such as:

- i) The nature of production system: For example, in the Gambia and Liberia, swamp rice cultivation is considered as work for women, and men generally avoid this type of rice cultivation.
- ii) The nature of crop: Commercial production of vegetables is generally left for women. The cultivation of some other crops are also shunned by men. For example, in the Atebubu area of Ghana, groundnut is considered a women's crop, therefore men stay away from its cultivation even though it is grown for the market. On the other hand, crops such as millet, sorghum and maize, although produced for household subsistence, are cultivated mainly by men in the Sahel countries.
- iii) The nature of farming activity: Although, in general, there is no gender labor specialization in agriculture in West Africa, women are noted to participate less in land preparation and more in all the activities which follow, namely, planting, weeding, harvesting and processing of the crop. In other words, men undertake the more strenuous work while women do those requiring less physical strength.
- iv) Urgency of the work: In some areas where female labor is less utilized, they are sometimes called upon to contribute a little more than usual where the task being performed needs to be completed as a matter of urgency.
- v) Inavailability of labor: In many areas where farm-labor supply is decreasing, due primarily to rural-urban migration, women are noted to be participating much more in some activities which were traditionally dominated by men, e.g., weeding millet and sorghum farms in the north of Ghana.
- vi) Social factors: The role of women is greatly influenced in various ways by social factors such as religion, ethnicity, culture and tradition. The Moslem religion in particular, restrains women from participation in field agriculture because of its laws of seclusion of women. However, the extent of enforcement of the laws varies among Moslems with different ethnic backgrounds. In the Gambia for example, the Moslem women, particularly those of the Mandinka tribe, not only participate but actually dominate in almost all phases of rice production.

Their counterparts in the coastal areas of Guinea are also substantially involved in mangrove rice cultivation. However, in Mali and Northern Nigeria, women are generally not involved in rice cultivation. The degree of enforcement of the seclusion laws appears to be highest among the Fulani tribe members who raise livestock, mainly cattle.

It is hard to generalize about the role of women in agriculture in Africa, due to differences that occur within and between cultures, environments, crops cultivated, etc. In some parts of West Africa, the gender division of labor follows crop enterprise lines, while in other areas it is usually along activity lines, with women performing the jobs demanding less strength, and men concentrating on the more difficult and strength-requiring jobs.

2. WOMEN'S ROLE IN RICE CULTIVATION

Rice in West Africa is cultivated on small plots of land most of which are 1 to 2 ha. In many of the special rice projects, participating farmers are usually limited to 0.25 to 1.00 ha plots per family. The role of women in rice cultivation in the region remains crucial, especially as the crop continues to be cultivated mainly for household subsistence.

Like in Asia, women undertake most of the work involved, not only in cultivation but also in the post-harvest processing of the crop. In Liberia, it is a common saying that a woman can cultivate rice all by herself but a man cannot, he will have to solicit the help of a woman. As already indicated in some areas in the region, for example in Liberia, men avoid swamp rice cultivation which they regard as suitable only for women.

The total labor supplied by women for rice cultivation in the region ranges from about 3% for floating rice cultivation using animal traction in Mopti area of Mali, to about 80 to 100% in mangrove swamp rice cultivation in the Gambia and Liberia.

3. TECHNOLOGICAL INNOVATIONS

Although rice cultivation in the region can be described generally as still traditional, the use of modern methods and technologies is spreading quite rapidly. Strictly traditional methods are practised in a few places in the region and mainly on small family subsistence farms, e.g., floating rice cultivation in Northern Nigeria. The traditional methods involve the use of non-mechanical and very simple tools, notably the hoe, cutlass and sickle to prepare the land, cultivate and harvest the crop. The system is labor intensive. The water for plant growth is uncontrolled. Chemical and other forms of fertilizers are not applied to enrich the soil. When soil fertility is too low to support a good rice crop, or weed problem becomes severe, the field is abandoned for several years, while cultivation is shifted to fields which have fallowed for several years. The varieties cultivated are usually unimproved and planting is usually by broadcasting. In several places, the crop is planted mixed with other crops. The traditional system generally results in poor paddy yield of less than one tonne per hectare.

In most areas of the region however, various degrees and items of traditional and modern methods and inputs are combined in cultivating rice on both small and large fields. As implied in an earlier statement, traditional methods and inputs are employed more on small fields, and particularly those cultivated by women, than on large fields.

The modern rice-farming system in the region involves:

- i) mechanical land preparation, using tractor and the accompanying implements on relatively large fields, ox-plough on small fields and single-axle power tiller for fields in mangrove swamps;
- ii) mechanical seed drills and transplanter;
- iii) chemicals as well as mechanical land preparation to control weeds;
- iv) chemical fertilizers to increase soil fertility;
- v) planting seeds of improved varieties;
- vi) water supply and control through irrigation facilities;
- vii) mechanical harvesting with unitary or combine harvesters.

Although not intended, most of the modern technologies, particularly the introduced machinery, which have spread more in rice growing areas of the region, tend to benefit men more than women as they have reduced the workload of men and somehow increased that of women as a result of increase in the area of farms cultivated. The most mechanized aspect of rice cultivation in the region is land preparation, and this is usually done by men. This situation however, has some benefits for women where the machinery introduced has enabled large farms to be cultivated, and consequently has offered them job opportunities such as weeding, harvesting, gathering of the harvested rice and carrying it to the mills in the villages and other collecting centers. However, it is noted that wages paid to these women laborers are often low compared to the earnings of their men counterparts.

Social norms and practices as well as the operation of extension services in the region have also contributed greatly in preventing women from benefiting fully from introduced technologies and modern methods of farming. For example, in some parts of Ghana, a married woman cannot take a loan for any activity from any source without the consent of her husband. But for the many poverty-stricken small-scale subsistence women farmers, credit is essential in order to enable them to adopt some of the modern technological innovations in farming.

The extension agents in the region are predominantly men and in some places, social norms and courtesies prevent the agents from talking directly to women farmers, particularly where they are married and are not heads of the households, which the majority of the women are not. Yet, it is the women who take the day-to-day decisions and manage the family subsistence farms.

The use of modern methods and inputs including machinery in the region is concentrated mainly in special rice or agricultural development projects. Direct participation of women in these public projects is insignificant to say the least. Women are, to a greater extent, left out in project participation by farmers even where they were the majority before the projects were implemented. For example, when irrigated rice project was implemented in the Gambia in the early 1970s, men took over that system of cultivation although they generally participate very little in rice production. A partial failure of the project is attributed to the exclusion of women participation in the project, except as providers of wage labor or assisting their husbands or male relatives on their assigned fields.

4. IMPROVED TECHNOLOGY NEEDS OF WOMEN

Technological innovations needed by women in rice farming should include those that would reduce the drudgery of the work they do; improve their productivity; and eventually, increase their income earning capacity. As indicated earlier, women contribute the greatest in traditional rice farming, particularly, planting of seeds and seedlings, weeding of the farms, bird-scaring and harvesting of the crop. In the swamps, they participate significantly in land preparation. As mentioned earlier, power tillers have been introduced in the region for swamp land preparation. However, they are found to be too heavy for the women to use. The power tiller needs to be redesigned to make it lighter for the women.

With regard to planting, mechanical seed-drills and transplanters developed elsewhere are available in the region. However, their use is not widespread and are mostly available to farmers who participate in the special rice projects. There are no policies and strategies to enhance the spread of seed drills and transplanters in the region to enable farmers generally, who are outside the projects, to adopt them. The seed drills and transplanters can be handled by women. There is, therefore, the need to study the economic use of these on small-scale subsistence farms and the design of extension strategies to spread them.

The drudgery in manual weeding using traditional tools such as hoe and cutlass can be reduced by the use of weedicides. Research work in the region has identified some of the most effective weedicides which include Stam F34, Gramozone, Basagram, Glyphosate, etc. Also, proper mechanical land preparation can reduce quite considerably weed infestation of rice fields. Row tillers for upland rice and single row weeders for irrigated rice will also reduce women's drudgery in weeding.

WARDA had modified the lance of a knapsack sprayer so that it can be used to apply liquid urea by injection, 15-20 cm below the soil surface, in mangrove swamps. The knapsack sprayer which is normally carried on the back of the operator is light and can be used with ease by women. The use of this simple equipment will increase the drudgery of applying fertilizer in mangrove swamp by women. However, applying fertilizer by the injection method increases yield by about 50% compared to the 25% yield increase by broadcasting method.

Women and children spend several hours each day during the period before harvesting, to scare away grain-eating birds from the rice fields. WARDA collaborating with United Nations Development Program(UNDP)/FAO, Organisation Commune de Lutte Anti-Acridienne et de Lutte Anti-Aviaire (OCLALAV) and Comité Permanent Inter-Etats de Lutte Contre le Secheresse dans le Sahel (CILLS) has initiated a research project in Liberia aimed at finding solutions to the problem. The preliminary findings of the research indicate that the further the site of rice cultivation is from villages, the less the damage, as the grain-eating birds tend to locate their habitat near human settlements. It is also observed that the most important grain-eating bird in the region (weaver), is closely associated with both relative distribution and abundance of oil palm and coconut plantations which it uses for nesting. The findings suggest that rice fields should be located away from human settlements and from oil palm and coconut plantations in order to reduce the birds' damage. Thus, proper location of the rice fields would reduce the many hours women and children spend to scare away grain-eating birds.

The available machines for harvesting are not suitable for the scattered and small subsistence farms. The large combine-harvesters are only suitable and economical on large farms. The use of small harvesters and threshers, e.g., the Kubota type which are appropriate for small farms, is not widespread in the region. This is due partly to its cost, which the small-scale farmers cannot afford, and the lack of credit facilities to assist them.

Currently, women use sickle to harvest rice. An improvement on this simple tool has been made in India, and will be studied for adoption in the region. The improved one is called "Naveen" sickle. In this improved sickle, the curve has been reshaped to harvest the crop at a better angle and reduce the need for frequent sharpening when the sickle is constantly used.

The handle of the traditional sickle which is hard and rough and therefore causes blisters when it constantly slips in the palm has been given a restraining stub at the rear of the handle to reduce the problem. It is estimated that the improved sickle gives 10-20% higher output than the traditional one.¹

Although WARDA is mainly concerned with rice development, it does make its expertise available to women and other farmers cultivating other crops in the region. In 1983, for example, FAO requested assistance from WARDA for the design of simple, inexpensive and easy to operate irrigation facilities for women cooperative farmers who cultivate vegetables in Bandeja village in Liberia. The women use buckets to fetch water from a nearby creek to water the one-half of a hectare farm. The facility designed would cost \$4,500 to construct and would be financed by FAO.

¹ Srivastava J.C. (1983) "Harvesting Technology for Eliminating the Drudgery of Rural Women Engaged in Rice Production, Processing and Utilization", a paper presented at a conference on women in Rice Farming organized by IRRI, 26-30 September, 1983, at Los Banos, Philippines.

5. IDENTIFICATION OF FARMING CONSTRAINTS

The identification of socio-economic, technological and other environmental constraints of small-holder rice farmers in the region is among WARDA's priority activities. The systematic information gathered through surveys of target farmers is used to guide development and identification of improved and appropriate technological packages which would fit into the broad working environment and conditions of smallholder rice farmers in the region.

The constraints identification forms the first phase of WARDA's improved Technology Assessment and Transfer (TAT) program which was started in the early 1970s but formulated into a program in 1980. The other four phases of the program are:

- Phase II: Selection and assessment of appropriate technological packages through adaptive farmers field trials;
- Phase III: Designing and testing strategies for extending improved technologies to target farmers;
- Phase IV: Liaison with national extension agents to transfer improved technologies;
- Phase V: Conducting studies to assess the adoption and impact of improved technologies.

The main objective of the TAT program is to ensure that new technological packages introduced have a better chance of adoption by farmers. In other words, the program aims at increasing the adoption rate of new improved technologies introduced to small-scale farmers who dominate the rice cultivation scene in the region.

Through the constraints identification surveys, WARDA hopes to identify, in some detail, the major technological constraints of women in rice farming in the region. This would enable the appropriate women-oriented research among the other small scale rice farmers to be carried out, and the design of appropriate extension strategies to enable women and other resource-poor farmers to adopt and effectively use improved technological packages.

6. STRATEGY TO ENHANCE THE ADOPTION OF IMPROVED TECHNOLOGY

Due to the poor financial position of the dominating smallholder, subsistence rice farmers in the region, the Association anticipated difficulties in the adoption of improved technologies that involve relatively heavy initial investment. A case in point is the recommendation of the use of single-axle power tillers to prepare rice fields in mangrove swamps. It became necessary, therefore, for the Association to try a "Group Ownership Scheme", a form of farmer cooperative, and assess its performance before recommending it to national extension agents for implementation.

In this connection, three pilot farmer cooperatives were set up in 1983 in the mangrove swamp areas of Sierra Leone to test an appropriate

extension strategy that would facilitate the adoption of fertilizer injectors and single-axle power tillers for mechanical land preparation and puddling. Each cooperative was to group about 25 farmers to cultivate a minimum of 24 ha, an area which would ensure an economic use of one power tiller per season. The farmers were to pay a membership fee of Le50.00 each (equivalent of \$20.00 at 1983 exchange rate). This provided about 35% down payment for each power tiller and 4 fertilizer injectors. The membership fee was however used as a revolving fund for the purpose of providing a repair facility and purchasing a stock of fast moving spare parts. Credit was arranged for the cooperatives for the initial cost of the equipment. In using the equipment, each farmer paid a fee of Le173.00 (\$69.00) per ha cultivated. Each Cooperative selected its own chairman, secretary and treasurer, and also nominated people who were trained by WARDA to operate the power tillers. The farmers themselves were trained to use the fertilizer injector.

A few modifications were made to the strategy by the farmers themselves when the program was implemented. In one case, fewer farmers than recommended got together and paid a higher membership fee. In another case, the farmers decided to rent out their tiller to non-members who paid a higher rental charge. Of the total farmers who used the power tillers in the first year of the experiment, 35% were non-members of the three cooperatives. This has created a demand by many farmers to start their own cooperatives along the line of the Group Ownership Scheme.

7. DISSEMINATION OF INFORMATION ON IMPROVED TECHNOLOGY

WARDA disseminates its research findings to national research scientists, public decision-makers, donors etc. through several channels which can be summarized as follows:

- i) several regular and occasional publications;
- ii) conferences, workshops, seminars and particularly the annual and now biennial rice review meetings;
- iii) project documents prepared by WARDA for member countries.
- iv) training programs;
- v) demonstrations, field-days, farmer contacts, etc.;
- vi) special request for technical assistance;
- vii) coordinated variety trials, etc.

The mandate of WARDA, an intergovernmental organization of 16 member countries, does not allow the organization to enforce the adoption of a new knowledge in rice development made available to the member countries by the Association. However, it is observed that new knowledge disseminated to the member countries is given due consideration in their efforts to increase rice production.

8. TRAINING OF FARMERS

Training is an essential requirement for the use of modern technologies. As mentioned earlier, WARDA organizes special training programs for farmers to enable them to use improved technologies extended to them. This type of training is provided mainly at our four Regional Research Stations located at Saint Louis, Senegal for irrigated rice research, Mopti, Mali for deepwater/floating rice research, Rokupr, Sierra Leone

for mangrove swamp rice research and Bouake, Ivory Coast for upland rice research. The training offered at these places has mainly local farmers participating. The training is easier where the target group have had some formal education. Unfortunately, the proportion of small-scale farmers with even the minimum level of formal education in the region is negligible and the situation is worse with respect to women farmers. The negative effect of this on the participation of women in WARDA training programs is quite conspicuous. The proportion of women who have taken courses in the WARDA training programs is less than 1%. WARDA can design and offer special training courses for the illiterate women farmers upon request of the member countries.

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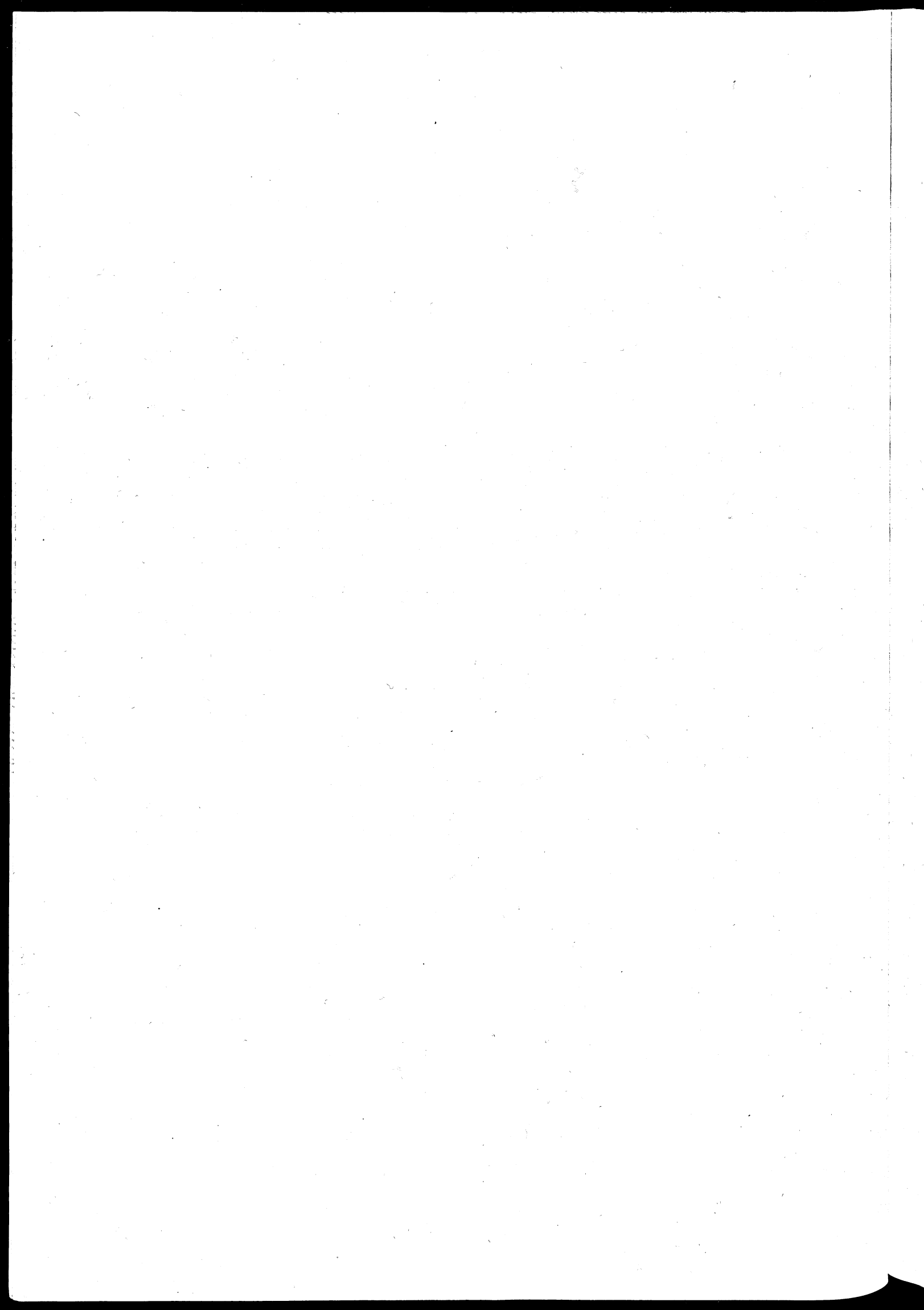
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PART II

REGIONAL REVIEWS OF WOMEN'S ROLE IN AGRICULTURAL
PRODUCTION AND DECISION-MAKING

