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Institutional Process Impacts of Participatory Rice Improvement Research and Gender Analysis in West Africa

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Acknowledgements

Collecting data for the analysis presented in this report has involved a large number of people and organizations. Although it fell upon us to write this report for publication, it would not have been possible without the materials upon which it is based, and which were collected through interviews with the scientists in the 16 national agricultural research programs in West Africa. We wish to give a special thanks to all the national program scientists who generously gave their time for the interviews.

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Any mistakes or omissions that follow are the fault of the authors. This fact is particularly relevant in this case because we had to condense the vast amount of information received through interviews with the scientists from the national programs. It inevitably means that we may have simplified some aspects of the projects represented here. Thus we caution against extrapolating these project specific results to a regional or even global level. We hope that readers who are interested in learning more about the individual projects represented in this report will contact projects directly for further information, hence the list of institutes who participated in this survey are included in Appendix 9.1.

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Executive Summary

The participatory rice breeding and gender analysis approach used by the West Africa Rice Development Association (WARDA) since 1996, and subsequently adopted by its national partners, can be characterized as functionally motivated participation, that is, trying to understand better what farmers want or need, and to feed back insights to formal research for improving future on-farm productivity. The expected impacts of incorporating participatory research approaches at different stages of the varietal development process can be argued to go beyond the economic benefits associated with the better crop type. "Process impacts" occur as a result of the participation itself rather than as a result of the technologies developed via participatory research methods. Some of these expected "institutional process impacts" include internal institutional changes (such as changes in breeding goals/objectives), breeding methods, and spillover effects to varietal development in other crops, as well as external institutional changes such as relations with other institutions (i.e., seed systems, and varietal release mechanisms).

In an attempt to study whether some of these institutional changes are taking place in the national programs in West Africa, breeders and social scientists from 16 of the 17 national programs were interviewed during the annual Participatory Rice Improvement and Gender Analysis (PRIGA) Workshop in Côte d'Ivoire in May 2001.

The results show that the national program scientists were unanimous about their reasons for incorporating participatory research /gender analysis approach into their rice breeding program. They believe that the participatory varietal selection (PVS) approach takes into account the biophysical and socioeconomic environment in which farmers operate, and hence seems to increase adoption rates better than the conventional breeding approach. National programs have received continuous, but very modest, financial support to their PVS work from WARDA. However, it has still required an additional financial and human commitment from the national programs, and it is doubtful that they would have continued investing resources into participatory research over the past 6 years were they not convinced of its benefits through a process of "learning by doing." This is also supported by the fact that 60% of the national programs have expanded or planned to expand participatory research to research in other crops than rice.

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The experience with implementing participatory research has clearly provided feedback to breeders in the national programs, and this information has led to some specific, perceived internal institutional changes. One half of the national scientists say that they have changed their breeding goals, and three quarters say they have also changed their breeding methods, and ways in which the breeding is conducted. The external institutional changes, such as changes in seed system or varietal release, have been less successful. This is probably related to less attention paid to forming partnerships with other stakeholders in seed and varietal release institutions and mechanisms, and concentrating mostly on interaction with the farmers. Only one third of the respondents said that they had created or improved some of their partnership arrangements in rice research. The involvement of other stakeholders is another area for potential improvement.

The participatory research approach implemented by WARDA's national partners has been very functional, that is, trying to understand better what farmers want or need, and to feed back insights to formal research for improving future on-farm productivity. This type of functional participatory research leads to a certain process or institutional impacts that are clearly being realized by WARDA's partner institutions—mainly the changes in breeding goals and objectives. In the next phase, WARDA and its partners may consider options for incorporating and implementing a more "empowering" type of participatory research, which builds local capacity, and leads also to enhanced skills and knowledge of farmers and communities. Also, the survey results seem to indicate that the type of gender analysis does not appear to be going much beyond "head-counting", and it is not apparent if the gender analysis work carried out by the national programs includes wider understanding of the "gender context" of the rice breeding work (i.e., differences in access to resources, division of labor, and institutional and demographic context of gender), or whether it is limited to measuring gender differences in varietal preferences.

Institutional Process Impacts of Participatory Rice Improvement Research and Gender Analysis in West Africa

1. Introduction

The West Africa Rice Development Association (WARDA) is an autonomous intergovernmental research and development (R&D) association with a mission to strengthen West Africa's capacity for agricultural technology generation, technology transfer, and policy formulation. It is comprised of 17 member states in West and Central Africa. Through its institutional nature, most activities are conducted in collaboration with the national agricultural research and extension systems of member states, as well as with academic institutions and international, regional, and local organizations.

The work of WARDA benefits mostly small-scale West African farmers who cultivate rice, as well as the millions of African families who eat rice as a staple food. Rice is an important commodity in West Africa. Regional rice consumption is booming at an average growth rate of 3.7% per year during the last decade—the combined result of rapid population growth (2.6% per year) and a steadily increasing per-capita consumption (1.1% per year, i.e., 30 kg per capita per year in 1998—Food and Agriculture Organization (FAO) data. At the same time, West African rice production has already increased substantially, reaching almost 4 million tons of milled rice by the end of the last decade, but typically not sufficiently to match the consumption increase (Erenstein et al., 2001).

Varietal improvement is one technological option to enhance local rice production. However, adoption rates of improved rice varieties in West and Central Africa have historically been very low. Many improved varieties introduced from Asia require significant weeding labor and crop inputs, and hence they have been poorly adapted to the West African land-abundant, but labor-scarce, conditions (Dalton and Guei, 2002). Many countries also lack functioning institutions required to release, promote, and distribute improved varieties. In many countries, governmental organizations exist that are dedicated to varietal release, multiplication, and distribution; but release requirements and policies are so cumbersome that few varieties have been officially released. When finally released, many were found technically incompatible with farm environments.

By 1996, WARDA had made significant and breakthrough advances in plant breeding by developing interspecific hybrid rice by crossing Asian varieties with traditional African rice. The same year, WARDA's uplands breeder and production economist attended a seminal meeting of the Consultative Group on International Agricultural Research (CGIAR) systemwide program on participatory research and gender analysis (PRGA) at the International Center for Tropical Agriculture (CIAT). This meeting brought together a group of researchers interested in participatory research. The WARDA researchers then developed a 3-year participatory varietal selection (PVS) and breeding approach with the strategic objectives of: (1) identifying promising varieties for further evaluation, (2) classifying desirable plant and grain characteristics for continued integration into the varietal development process, and (3) increasing farmer exposure to improved materials

in a research setting. In subsequent years, WARDA provided training in participatory research methods, and small research grants to its national partners. By 1998, all 17-member national agricultural research systems (NARS) were conducting participatory research based on "WARDA's 3-year model" in their respective countries. WARDA's participatory research work initially targeted upland-rice growing conditions, but by 2001 the work had spread to include lowland and irrigated rice.

The approach developed by WARDA can be characterized as functionally motivated participation, that is, trying to understand better what farmers want or need, and to feed back insights to formal research for improving future on-farm productivity. However, the expected impacts of incorporating participatory research approaches at different stages of the varietal development process can be argued to go beyond the economic benefits associated with the better crop type. "Process impacts" occur as a result of the participation itself rather than as a result of the technologies developed via participatory research methods. Some of these expected process impacts include changes in breeding goals and objectives, breeding methods, institutional partnerships, seed systems, varietal release processes, and spillover effect to varietal development in other crops. These institutional impacts can also be viewed as indicators of an institutional learning and change process that have been catalyzed by the participatory research approach.

In an attempt to study whether some of these "institutional process impacts" are taking place in the national programs in West Africa, breeders and social scientists from 16 of the 17 national programs were interviewed during the annual Participatory Rice Improvement and Gender Analysis (PRIGA) Workshop in Côte d'Ivoire in May 2001 (WARDA, 2002) [1]. The results of these interviews are presented in this study. The paper is organized as follows: Part 2 describes objectives of the study, Part 3 sets the study context; Part 4 explains how the participatory rice breeding and gender analysis work was implemented by NARS partners; Part 5 presents the survey results on specific institutional process impacts, Part 6 discusses the lessons learned, and Part 7 provides some general conclusions about the study results.

2. Objectives

The underlying assumption of this study is that involving end-users (rice farmers and other relevant stakeholders) in the design and development of rice variety is believed to provide the feedback necessary for the development of appropriate varieties. Furthermore, it is hypothesized that this interaction between the researcher and the end-users leads to changes in breeding goals and objectives, breeding methods, institutional partnerships, seed systems, varietal release processes, and spillover effect to varietal development in other crops.

[1] See Appendix 9.1. for list of national programs that participated, and Appendix 9.3. for the survey questions. Liberia is the 17th WARDA member state. Liberia's national program did not participate in last year's workshop, and was therefore left out of this study.

Hence, what we seek to evaluate in this study is not the overall impact of a research project that used participatory techniques, but rather the effect the change in research methodology from conventional breeding to participatory breeding has had on the research institute implementing the approach. The specific objectives of this analysis are given below.

Objective 1 is to characterize and assess how the national partners implemented the participatory research and gender analysis.

Objective 2 is to assess what have been the specific impacts on breeding goals, methods, partners, and institutional structures.

Objective 3 is to articulate, through self-assessment by the national program scientists, what lessons can be drawn from this experience.

3. Context

This section sets the context of the study by describing the common methodology adopted by all WARDA's national partners for participatory research, the scale of the participatory rice breeding work in West Africa, and human and financial resources involved in the work.

3.1. Common Methodology

The PVS model recommended by WARDA to the national partners is a 3-year program. In the first year, a centralized village plot is identified, with local farmers, where a rice garden is established with about 60 upland or lowland rice varieties. The varieties included in the trial are diverse and range from a locally identified check to regional traditional *Oryza sativa* varieties, to improved *O. sativa* varieties, interspecific hybrids, and African *O. glaberrima*. Men and women farmers are invited to visit the plot as frequently as possible, but formal plant evaluations are held at three stages: (1) at maximal tillering, (2) grain filling, and (3) post harvest. In the first stage, the preferred plant architecture at the vegetative stage is derived from farmer interviews. In the second stage, panicle type, plant height, cycle length, and other agronomic and morphological traits are identified. In the final visit, the focus is on grain quality attributes including size, shape, shattering, and threshability.

Varietal selections are recorded for each farmer during the three visits, and at the end of the season each farmer's choices are analyzed. In the second year, each farmer receives the varieties s/he selected in the first year, and thus a new diversity of varieties enters the locality. During the second year, observers visit the field to record performance indicators and farmer appreciation of the varieties. At the end of the second year, farmers' evaluations of processing and grain quality attributes are elicited to provide a full view of a variety's strengths and weaknesses. At the end of the season, and in anticipation of the

third and final year, farmers' willingness to pay for seed varieties is elicited in order to derive an estimate of technology demand.

3.2. Scale of Participatory Research

WARDA initiated the PVS work in an upland site in Côte d'Ivoire in 1996. By 2000, WARDA's national partners had started conducting upland, lowland, and irrigated PVS trials in some 100 sites in 17 West African countries and had involved more than 4000 farmers in the evaluation of improved rice varieties (Figure 1).

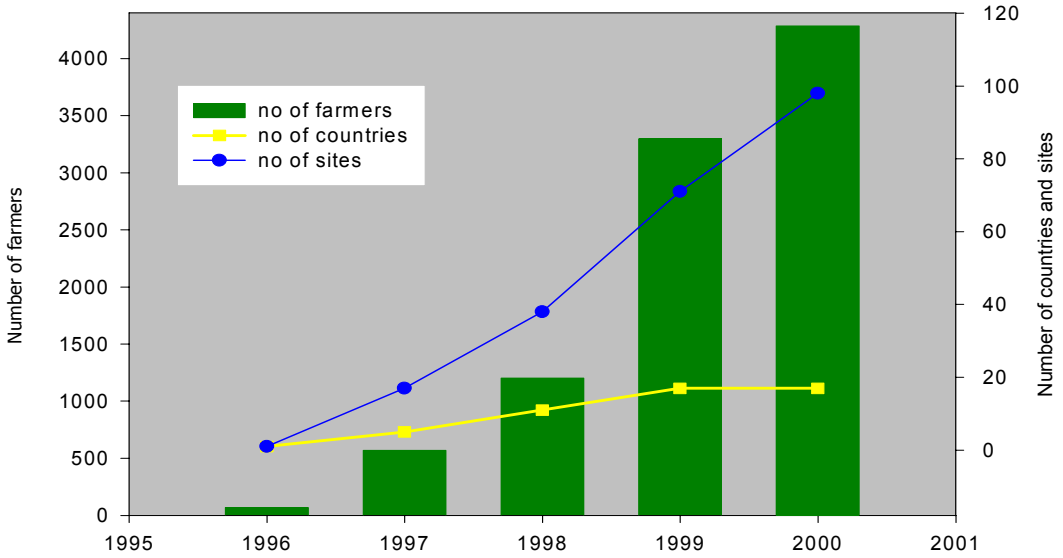

Figure 1. **West Africa Rice Development Association (WARDA)-national agricultural research systems (NARS) collaborative participatory varietal selection (PVS) activities in West Africa during 1996-2000 (Adapted from WARDA Participatory Rice Improvement and Gender Analysis [PRIGA] Program).**

3.3. Human Capital Invested in Participatory Research

On the average, the national programs have about 2.4 full-time equivalent technicians' time and 2.2 full-time equivalent scientists' time allocated to participatory plant breeding work (Table 1). However, there are large differences between programs because of the size difference between the national programs. Most of the human capital invested in the participatory plant breeding programs is in the plant breeding or in social science (Table 2).

Table 1. Human capital invested in participatory research.

Full time equivalent[a]	Minimum	Maximum	Mean	Std. Deviation
Total technician time	0.40	7.80	2.43	1.92
Total scientist time	0.50	4.05	2.21	1.24

a. N = 15, Nigeria is excluded.

Table 2. Human capital involved in participatory research by discipline.

Full time equivalent[a]	Minimum	Maximum	Mean	Std. Deviation
Scientists in:				
Plant breeding	0	2.00	0.84	0.60
Plant protection	0	1.00	0.21	0.28
Soil management	0	0.66	0.10	0.20
Crop production practices	0	1.30	0.14	0.34
Post harvest	0	0.80	0.01	0.22
Social science	0	1.20	0.40	0.37
Other	0	2.15	0.43	0.66
Technicians in:				
Plant breeding	0	3.40	1.03	1.12
Plant protection	0	0.80	0.10	0.22
Soil management	0	0.10	0.00	0.00
Crop production practices	0	1.50	0.20	0.48
Post harvest	0	0.60	0.01	0.18
Social science	0	3.40	0.78	1.15
Other	0	1.00	0.24	0.35

a. N = 15, Nigeria is excluded.

3.4. Financial Resources Invested by WARDA in the National Partnerships

WARDA organizes annual meetings to bring together NARS collaborators from all 17 member-countries to discuss progress and plan subsequent work (WARDA, 2002). In addition, WARDA provides annual small grants to the participating national programs for participatory rice research, typically about US$3,000 per year for each country[2]. Some countries receive larger grants because of the greater number of sites in which they are working. In 2001, WARDA dispersed US$168,000 to its national partners for PVS work. Small grants have been imperative for reaching the large scale of the participatory rice

[2] WARDA receives funding from several donors to implement the annual meetings and provide the annual grants. Donors include Japan, the United Nations Development Program, the Rockefeller Foundation, the Gatsby Foundation, the UK (Department of International Development), and the PRGA program.

research in West Africa today, and, without the small grants, most national programs would not have had the funds to begin experimenting on decentralized and participatory rice breeding approaches.

4. Implementation

The purpose of this section is to describe and assess how the national partners implemented PRGA. Although all 17 national programs have followed the similar 3-year PVS model introduced by WARDA, it is possible to find that one standard approach can be implemented in various ways depending on scientist skills as well as both internal and external institutional constraints. We will first discuss the motivation behind adopting participatory approaches in rice breeding by the national partners then summarize how the sites and farmers involved were selected, and the adequacy of site and farmer coverage and usefulness of gender analysis. Second, we will discuss the continuity in implementation and strategy for the national programs to link the research and extension phase, and plans for making the newly selected varieties available to farmers throughout the region.

4.1 Motivation

To obtain an indication of the actual driving force for implementing a PRGA approach in rice, NARS collaborators were asked to list the reasons for testing it. This resulted in a wide array of responses, which were subsequently grouped in common categories as shown in Table 3. Responses were typically positive and highlighted various institutional changes. Most responses related to PVS, and only a few specifically address the gender analysis component.

The most common reason for trying the PRGA approach, mentioned by 56% of the NARS representatives, was that this would ensure the greater appropriateness of the R&D process compared to the conventional approach. That is to say, the PRGA approach more adequately takes into account the biophysical and socioeconomic environment in which farmers operate, for example, in terms of the diversity of farmers' conditions and the corresponding farmers' preferences. The second most common reason, mentioned by half the NARS, was that the approach was expected to enhance the adoption of developed varieties compared to the conventional approach. Indeed, some noted that the adoption of varieties released through the conventional approach frequently had lacked faster adoption levels. This is naturally closely related to the first category—appropriate technologies are more likely to be adopted. Some NARS specifically mentioned as reason for trying the PRGA approach the need to provide feedback to research (e.g., farmer preferences, research priorities, and monitoring farmer choice).

Among the other response categories, three also provided positive comparisons between the PRGA and the conventional approach as reasons for trying it. The PRGA approach was thereby perceived to shorten the R&D process, provide a wider choice to farmers, and lower the implementation cost. One NARS (Togo) specifically tried out the PRGA

approach so as to compare it with the conventional approach. About 40% also mentioned issues related to the PVS approach and network, such as received training, participation in workshops, and the possibility of exchange with other scientists, NARS, and PVS being an innovative approach.

Table 3. Reasons for trying participatory research and gender analysis in rice.

Categorized response[a]	Frequency	Percentage
More appropriate research and development (R&D) than conventional	9	56
More adoption than conventional	8	50
Training/workshops/exchange/collaboration/innovative	6	38
Farmer participation	5	31
Shorter R&D than conventional	4	25
Wider choice than conventional	3	19
Lower cost than conventional	3	19
Provide feedback to research	3	19
Imposed	2	13
Need to address women	2	13
Empowerment, women	1	6

a. Table includes multiple responses from 16 national agricultural research systems.

About one third of the NARS specifically mentioned issues related to farmer participation, for example, in terms of allowing for farmer participation by leveling the playing field, or the need for farmer participation in varietal development. Only two NARS representatives mentioned that the reason for trying the approach was because they were requested to do so by their superiors.

Only two NARS representatives (Cameroon and Chad) mentioned gender analysis related issues as a reason for trying the approach. Both highlighted the need to address women as a reason. The Cameroon representative added the need to empower women, and that women play an important role in rice field activities, are easier to reach, and pick up ideas more easily.

4.2. Method of Site Selection

The NARS collaborators were asked how the PVS sites were selected. This resulted in a wide array of responses, mainly reflecting the criteria involved and/or the involvement of other actors. The responses were regrouped in categories as shown in Table 4. Two NARS collaborators (Mali and Cameroon) had one or more PVS sites on station.

Table 4. Participatory varietal selection site selection.

Categorized response[a]	Frequency	Percentage
(1) Site selection criteria base	14	88
Agro-ecological zones	4	25
Position rice (potential/representativeness/system)	10	63
Location (accessibility/proximity)	7	44
History (research and development)	5	31
Farmer willingness	5	31
(2) Site selection involves other actors	8	50
Village involvement	1	6
Farmer involvement	2	13
Extension involvement	6	38
Nongovernmental organization involvement	3	19
(3) Site is on-station	2	13

a. Table includes multiple responses from 16 national agricultural research systems.

Most NARS (88%) highlighted that site selection was based on one or more criteria. The most common criterion related to the position of rice within the site (e.g., in terms of rice development potential, rice production system present, and national representativeness). Some related this to larger agro-ecological zones. Site location was also a prominent criterion, particularly in terms of accessibility and proximity. Other criteria were also largely practical, including previous R&D experiences, and farmer willingness to cooperate.

Half of the NARS specifically mentioned the involvement of other partners in site selection—most commonly extension services. Nineteen percent reported nongovernmental organization (NGO) involvement. Direct involvement of farmers and village communities was not commonly reported, although as mentioned above, farmers' willingness to cooperate was sometimes considered as site selection criteria. The site selection only plays a role in the first year's PVS trials, because in the second and third years, farmers decide themselves where to plant the trial varieties on their own fields.

4.3. Adequacy of Site Coverage

The NARS collaborators were asked whether site coverage was adequate (Table 5). Half of the NARS did not find the coverage to be adequate, as against 31% that did. About 20% considered the coverage adequate for only one of their national rice ecologies, but not adequate for all of the rice ecologies present within the respective countries. Resource constraints were the most frequent reason for inadequate coverage.

Table 5. Adequacy of site coverage for participatory varietal selection.

Adequate coverage with sites	Frequency	Percentage
No	8	50
Yes	5	31
Partial	3	19

4.4. Method of Farmer Selection

The NARS collaborators were asked how the PVS farmers were selected. Responses mainly reflected the criteria involved and/or the involvement of other actors. The responses were regrouped in categories as shown in Table 6.

Table 6. Farmer selection for participatory varietal selection.

Categorized response[a]	Frequency	Percentage
(1) Farmer selection criteria based	13	81
Willingness/voluntary	9	56
Rice related	6	38
Socioeconomic characteristics	5	31
Random	1	6
(2) Farmer selection involves other actors	10	63
Extension	8	50
Farmer/community	7	44
Nongovernmental organization	1	6

a. Table includes multiple responses from 16 national agricultural research systems.

Most NARS (81%) highlighted that site selection was based on one or more criteria. The most common criterion (56%) related to the willingness of the farmers to participate on a voluntary basis. Other criteria tended to be either related to rice (e.g., farmer growing the relevant type of rice, or farmer experience with rice) or related to socioeconomic characteristics of the farmer (e.g., household head, openness, and social standing). One NARS (Senegal) mentioned selecting farmers randomly from farmer lists in participating villages.

Over one half of the NARS (63%) specifically mentioned the involvement of other partners in farmer selection—most commonly the extension services and/or the farmer/village communities.

4.5. Adequacy of Farmer Coverage

The NARS collaborators were asked whether coverage of farmers was adequate (Table 7). Slightly less than one half (44%) of the NARS found the coverage to be adequate against 31% that did not. One NARS (Mali) considered the coverage adequate for one site, inadequate for another. Three NARS (19%) were unable to say whether coverage was adequate based on their current information. Two NARS (Nigeria and Ghana) specifically highlighted that women farmers were inadequately covered. One NARS (Cameroon) highlighted that coverage varied over space and time. Adequacy differed per site and had improved over time as the approach became more acceptable and of more interest to farmers.

Table 7. Adequacy of farmer coverage in participatory varietal selection.

Adequate coverage of farmers[a]	Frequency	Percentage
No	5	31
Yes	7	44
Partial	1	6
Unable to say	3	19

a. Responses from national agricultural research systems collaborators.

4.6. Gender Analysis

The "WARDA PVS model" puts emphasis on involving women in the PVS work. The respondents were asked if it made any difference to their research to have involved women farmers (Table 8). If it made a difference, the follow up question was about how they have used this information learned from the involvement of women (Table 9).

The WARDA model implemented in three sites in Côte d'Ivoire emphasized including 50% men and 50% women in the PVS trials. The NARS have received some training in gender analysis methods, such as assessing the importance and roles of men and women in rice production. However, it is not obvious that this type of gender analysis was conducted, or, if it was conducted, that the results were used in determining the PVS participant group. It appears that many countries have implemented the 50% women-50% men egalitarian approach, rather than paying attention to the results of gender analysis that would aid in determining the right proportion of various stakeholders in the participant group. But there are ample indications that many countries are articulating the need to pay more careful attention to the farmer group formulation and its implications to the results obtained (Mali and Cameroon).

Table 8. Did including gender make a difference to participatory varietal research?

Did including gender make a difference?[a]	Frequency	Percentage
Yes	11	69
No	2	12
Unknown	3	19
Total	16	100

a. Responses from national agricultural research systems collaborators.

Table 9. Use of gender information.

Use of gender information[a]	Frequency	Percentage
Used the information or intends to use it	7	44
Not used the information yet	4	25
Unknown	5	31
Total	16	100

a. Responses from national agricultural research systems collaborators to follow up on question of whether involving women farmers had made a difference to their research.

In Guinea-Bissau, women were not originally involved in upland rice production, but through their involvement in the PVS activities they have now begun cultivating upland rice. Most (69%) of the countries stated that it made a difference to involve women in the PVS trials. Only two respondents said that it made no difference (Côte d'Ivoire and Nigeria), whereas for three respondents it was not clear if it had made a difference or not.

When asked how this information may have been used, 44% of the respondents replied that they have used the information obtained from the involvement of women. Four of the NARS have collected gender-differentiated information, but have not yet used this information in any way. In five of the cases it was not possible to tell if they have used the information or not.

Apparent lack of further elaboration by the NARS on the use of gender-differentiated data could mean that gender analysis is erroneously equated to mean that some of the participants in the varietal selection trials must be women. There are only two cases (Cameroon and Senegal) that planned to use gender-differentiated data in terms of assessing the impact of new varieties on women.

It would also be erroneous to simply conclude that if men and women participants selected the same varieties, involving women made no difference. There is empirical evidence from participatory research projects (Lilja and Dalton, 1998; Johnson et al., 2001) that men and women may choose the same varieties or technologies, but for

different reasons. Although men and women find the same technologies acceptable, they may be doing so for different reasons. This information may be important both for designing dissemination programs to target technologies towards specific user groups, and for future technology development research.

4.7. Strategy to Make Varieties Available

The NARS collaborators were asked what strategy they had, if any, to make varieties available to more farmers once research has identified the top varieties that farmers prefer. That is, we were interested here in assessing their strategy for linking the "research phase" of PVS with the "extension" phase. The responses to this open question were regrouped in the categories as shown in Table 10.

Table 10. Elements of research and development strategy.

Categorized response[a]	Frequency	Percentage
Seed multiplication	13	81
On-station	6	38
Farmer/community	9	56
Seed company	1	6
Extension	2	13
Stakeholder involvement/information exchange	5	31
Seed certification	4	25
Seed distribution	4	25

a. Table includes multiple responses from 16 national agricultural research systems.

Most NARS (81%) highlighted seed multiplication as a central element for their R&D strategy. In most instances (56%), farmers would multiply seeds at the community level, and farmer training was required for this purpose. On-station seed multiplication was mentioned by 38% of the NARS, reflecting either a stand-alone seed multiplication system or on-station multiplication as component of a wider seed multiplication strategy (e.g., to multiply [pre-] basic seed for subsequent multiplication off station). Only in exceptional cases did the NARS mention the involvement of the extension service and private sector for seed multiplication.

Other elements of the R&D strategy revolved around:

- The need for stakeholder involvement and information exchange between stakeholders, mentioned by 31% of the NARS;
- The need for seed certification, either in terms of ensuring seed certification is obtained (19%) or helping develop a seed certification system (Togo); and
- The distribution of seed through existing networks, such as farmer/community networks (19%) and extension (Guinea Bissau).

5. Institutional Impacts

The national participatory plant breeding projects are expected to improve or complement the formal sector research systems (e.g., redefining breeding strategies) or possibly reorient the entire program. This naturally involves strong linkages to the formal variety release and seed production system. This section summarizes a range of these "institutional process impacts."

5.1. Breeding Goals

One of the assumptions of participatory research is that it allows scientists to better understand farmers' priorities, and this enhanced understanding is then reflected in the breeding goals. Perhaps the goal of the breeding program before PVS was to breed for maximum production and wide adaptation only, and now the goal is to target specific environments such as poor soils, or perhaps the emphasis is on breeding for biodiversity. Also, perhaps previously the goal was to reach all farmers and now the goal is to reach specific types of farmers.

In the questionnaire, a distinction was made between breeding goal (this section) and breeding method (next section). However, from the responses obtained it appears that the distinction between the two was not always clear. Only one country (Ghana) specifically mentions that the breeding goal now is to breed for different types of farmers.

One half of the respondents said that they now understood farmers' preferences better and that that this interaction had changed some of their breeding goals (Table 11). For example, in grain quality aspects, awned seed was earlier eliminated from the selection process, but now retained as a useful characteristic to protect early varieties against birds (Mali). Previously, breeders were preoccupied with trying to develop short-cycle varieties, and now they realized that farmers wanted medium-cycle length varieties (Niger).

Twenty five percent of the participants replied that the participatory research had not really changed their breeding goals. Most of them stated that they were still breeding for environmental adaptation, higher yields, and pest resistance. There was no mention of whether these breeding goals were in line with the farmers' priorities or not.

Table 11. Changes in breeding goals of national agricultural research systems.

Categorized response	Frequency	Percentage
Farmers' priorities are better understood, and they are reflected in the changed breeding goals	8	50
Breeding goals have not changed	4	25
Unknown	4	25
Total	16	100

In 25% of the cases, we were unable to determine whether the participatory research had had any effect on the breeding goals, whether to change them, or in the case where goals were left unchanged, to verify that they met farmers' priorities. There is a possibility that PVS is seen as a technology transfer method rather than a technology development method. This was articulated at least by one country (Nigeria).

5.2. Breeding Methods

We also tried to find out how the NARS have changed their methods (strategy) in obtaining their breeding goals (Table 12). Perhaps the breeder has changed her/his selection criteria, the germplasm s/he uses, the way field books are set up, etc. Maybe the breeder now has a different order of importance of traits s/he considers in breeding? Did the breeder only use one criterion before and now uses different selection criteria for different users and/or environments? Were there changes in how research is implemented, for example, technical content and organization of plant breeding (e.g., use of participatory tools institutionalized, or number of on-station trials is reduced)?

Table 12. Changes in breeding methods (strategy) of national agricultural research systems.

Categorized response	Frequency	Percentage
Yes	12	75
No	3	19
Unknown	1	6
Total	16	100

Three-quarters of the respondents said that they had changed their breeding methods as a result of the participatory research. Many of the examples of changes were inherent to the approach, such as involving farmers right from the beginning, and reducing the breeding process because of the elimination or reduction in on-station and other on-farm trials. Another issue mentioned by some of the respondents was the inclusion of new germplasm, which is a direct result of the collaboration with WARDA, and which provides the new material for the PVS work.

More interesting were the examples given that reflected the non-methodological following of the "WARDA model", but actual country-specific examples of initiatives to change breeding methods and practices, such as modifications in the on-station trials based on what was learned from the PVS work with the farmers (Guinea-Bissau), and emphasis on the multidisciplinary approach (The Gambia). There were also examples of modifications in the field-books to allow the inclusion of participatory data and interdisciplinary work with many other stakeholders (Sierra Leone). Other modifications went beyond only soliciting farmer selection criteria, but putting emphasis on farmer feedback in terms of taking results back to the farmers for discussion and interpretation (Chad).

5.3. Partnerships

In PVS, farmers and scientist form a partnership. In many cases, scientists have been working with the farmers through on-farm trials, but the relationship has been very different in nature. Typically, in the on-farm trials, the role of the farmer is to provide land and labor. In participatory research, the role of the farmer is also (or solely) to provide information in the form of feedback to scientists about the varieties being evaluated.

The national program scientists were asked if there has been any change in the partners and collaborators they work with (within and outside the NARS), because of the PVS and gender analysis they are implementing (Table 13). Seventy-five percent (12 out of 16) of the national programs stated that implementing the participatory research had improved their existing relationships with the farmers and/or extension. There was often an articulated acknowledgement of mutual improvement in the relationship with farmers; scientists acknowledged appreciation of farmers' contribution, as well as believed that farmers were better motivated to work with them because of perceived shared decision making in research (Guinea, Mauritania, Togo, Ghana, Benin).

Table 13. Changes in partners of national program scientists because of the participatory varietal selection and gender analysis they are implementing.

Categorized response		Frequency	Percentage
Yes, new partnerships were formed and relations with farmers and extension were improved		6	37.5
No, new partnerships were not formed, but relations with farmers and extension were improved		6	37.5
No new partnerships were formed, and it is not known if existing partnerships were improved		2	12.5
Unknown		2	12.5
	Total	16	100.0
Yes, existing relations with farmers were improved		12	75.0
Unknown if existing relationships were improved		4	25.0
	Total	16	100.0
Yes, new partnerships were formed		6	37.5
No, new partnerships were not formed		8	50.0
Unknown		2	12.5
	Total	16	100.0

In order to institutionalize participatory research, as well as to scale up the results to other farming communities, it is expected that new partnerships also be formed. Our results show that, in addition to improving existing partnerships, 37.5% of the programs had established new partnerships, typically with the nongovernmental groups, and with producer organizations. Senegal had also established a partnership with a women's

organization. The partnerships with the NGOs were often motivated by the need to solve the need for seed multiplication.

5.4. Variety Release

In the PVS approach, farmers are testing, on their own fields, varieties that have not been officially released. In many of the West African countries, the formal variety release does not function well, and the certification boards have not met for long periods of time. Despite knowing the inherent difficulties within the official system, we asked the NARS how the varietal release system in each country handles the varieties that farmers test in the PVS, and what the NARS plan to do with the material in terms of releasing it (Table 14).

One half of the NARS said that PVS varieties selected by the farmers still need to go through the official variety approval system, but they believed that the PVS results obtained could reduce the time involved in the official process.

Over one-third of the NARS (37.5%), said that it was possible to release varieties selected by the farmers in PVS, but some additional on-station testing may be required, or some other alternative procedures had been developed in order to facilitate the varietal release. For example, Togo developed testing plots with the Ministry of Agriculture that is responsible for the formal release. In Senegal, the extension agents responsible for release are involved in the PVS evaluations. The Cameroon NARS is in the fortunate position of being the agency that proposes the varieties for release.

Table 14. Acceptance of participatory varietal selection (PVS) results for formal release.

Categorized response	Frequency	Percentage
No, varieties selected by farmers cannot be released, and formal releases have to follow official channels, but it is possible that the PVS results can speed the official process	8	50.0
Yes, varieties selected by farmers can be released, but some additional on-station testing of the selected varieties may be required, or other alternative plans have been developed to facilitate the official release	6	37.5
It is unknown how PVS date may be useful in the release	2	12.5
Total	16	100.0

We also asked if the NARS scientists thought that there had been any changes in the formal release system because of the influence of the PVS, perhaps because of the interaction with the people involved in the formal release mechanism (Table 15).

Table 15. Changes in formal release because of participatory varietal selection.

Categorized response[a]	Frequency	Percentage
No, there have not been changes in the formal release system	12	75
Yes, there have been changes in the formal release system	4	25
Total	16	100

a. Responses from national agricultural research systems scientists.

Three-quarters of the NARS had not noticed any changes in the formal release system that could be contributed to the use of the PVS approach. The remaining one-quarter of countries (Côte d'Ivoire, Burkina Faso, Mauritania, and Nigeria) all stated that the most significant difference is the reduction in release time. They all said that formal release process is shortened by 3 years, which is the time used in the PVS evaluation.

5.5. Seed System

The difficulties with formal release are also connected to seed availability. Often, the government agency responsible for formal varietal release is also responsible for seed multiplication. Also, the government agency can only multiply officially released varieties. Once the farmers have tested the varieties on their fields, there is a quick demand for the seed that the NARS are having difficulty meeting. The NARS scientists were asked if the formal seed multiplication system has changed as a result of the pressure from the PVS work (Table 16).

Table 16. Changes in seed system because of participatory varietal selection.

Categorized response[a]	Frequency	Percentage
No changes in the formal seed system	8	50.0
No, there has not been a change in the formal seed multiplication system, but an alternative system has been developed	6	37.5
Yes, there have been changes in the formal seed system, but the type of change is not known	2	12.5
Total	16	100.0

a. Responses from national agricultural research systems scientists.

One half of the NARS responded that there had not been a change in the formal seed system, but did not elaborate on alternative methods of seed multiplication. Over one third of the respondents (37.5%) said that they had developed alternative methods of dealing with the lack of formal seed multiplication and distribution. Guinea, Togo, Burkina Faso, Mali, Cameroon, and Guinea-Bissau had all established some type of community-based, seed multiplication scheme, or had been able to form a partnership with the NGO or extension service to carry out the seed multiplication.

5.6 Other Crops

Many of the NARS scientists involved in this survey not only are responsible for rice breeding, but also work with various other crops, and their institutes have a mandate over many crops (Table 17). A very convincing indicator of the institutionalization of participatory research is whether or not NARS scientists have begun applying the approach to research in other crops or crop management practices.

Table 17. Participatory varietal selection (PVS) applied to other crops.

Categorized response[a]	Frequency	Percentage
Yes, the PVS approach has been applied to research in other crops or management practices	5	31
No, the PVS approach has not been applied to research in other crops, but there are plans to do so	5	31
No, the approach has not been applied to other crops	6	38
Total	16	100

a. Responses from national agricultural research systems scientists.

About one third of the scientists said that they have begun using the participatory approaches in other crops such as maize, sorghum, cassava, and banana. One country also has begun participatory research on fertilizer use.

Another one-third of the participants have made plans to use the participatory approaches in other crops, or they have had colleagues request help from them in beginning to use participatory approaches in other crops.

6. Lessons Learned

We also sought input from the survey respondents about lessons they have learned from practicing participatory rice breeding. This section describes the categorized answers about reported weaknesses of the participatory rice breeding approach, as well as other comments about lessons learned.

6.1. Reported Weaknesses

The NARS collaborators were asked to list what they perceived to be some of the weaknesses of the PVS approach. Responses mainly reflected the criteria involved and/or the involvement of other actors. The responses to this open question were regrouped in categories as shown in Table 18.

Many NARS (69%) reported weaknesses in relation to resource issues, including resource needs (38%, for example, in terms of data collection procedures being too time

demanding), limited availability of resources in general (50%), and limited availability of trained personnel in particular (19%).

Table 18. Reported weaknesses of the participatory varietal selection approach.

Categorized response[a]	Frequency	Percentage
Scale issues (limited coverage)	6	38
Resource issues (resource availability, resource needs, training)	11	69
Varietal issues (stability, certification, biodiversity, acquisition)	4	25
Seed issues (availability)	4	25
Stakeholder issues (involvement/information exchange, stakeholders)	4	25

a. Table includes multiple responses from 16 national agricultural research systems.

Other reported weaknesses included:

- Scale issues (38%), in particular that the current national coverage was frequently perceived as too limited.
- Varietal issues (25%), including various issues such as varietal certification and acquisition, perceived instability of some lines included in PVS, and potential replacement of land lines and corresponding potential negative effects on biodiversity.
- Seed issues (25%), in particular seed availability.
- Stakeholder issues (25%), in particular stakeholder involvement and information exchange among stakeholders.

Two NARS collaborators (Mali and Niger) were of the opinion that the current PVS approach may be proceeding too fast, that is, was cutting too many corners that were deemed necessary to assure a successful outcome. One NARS collaborator (Guinea Bissau) regretted the sole focus of PVS on varietal choice, whereas other constraints may be more pressing for the development of rice farming (e.g., seed availability, food security, and credit).

6.2. Other Comments

The NARS collaborators were finally asked if they had any other comments about the institutional impact of PVS and gender analysis. Most responses were appreciative about the approach, and reiterated some of the issues raised earlier. The most frequently reported categories included the better appreciation of farmer needs with PVS, the need to assure adequate and timely stakeholder involvement, the need to scale up and to broaden the approach to other fields, and finally, the need for political commitment.

7. Conclusions

The results of this study show that the national program scientists were unanimous about their motivation to incorporate the PRGA approach into their rice breeding program; they believe that the PVS approach takes into account the biophysical and socioeconomic environment in which farmers operate, and hence seems to increase adoption rates better than the conventional breeding approach. National programs have received continuous, but very modest, financial support to their PVS work from WARDA. However, it has still required an additional financial and human commitment from the national programs, and it is doubtful that they would have continued investing resources into participatory research over the past 6 years had they not been convinced of its benefits through a process of "learning by doing." This is also supported by the fact that 60% of the national programs have expanded, or plan to expand, participatory research to research in crops other than rice.

The scientific merit of participatory research is sometimes criticized. For example, it is claimed that participatory research provides "only local solutions, which cannot be extrapolated to wider geographical and/or social conditions." These claims are related to site and farmer selection in participatory research. It could be argued that the logic of that criticism itself is erroneous, because the statement is measuring the impact of participatory breeding against the common conventional breeding goal, which is wide adaptation, but omits to acknowledge that wide adaptation has not been achieved through years of conventional rice breeding, in West Africa at least. The goal of participatory research in West Africa is rather "local adaptation at wider regional/global scale." The national program scientists typically selected the PVS sites, but our survey results show that two-thirds of the national program scientists did not believe that their current PVS research sites provided adequate coverage for the national rice research mandate. But the wide adoptability of a single or narrow range of varieties is likely related to this conventional thinking. However, it is also possible that this view of the inadequacy of the PVS sites is related to the view that PVS is a technology transfer, rather than a technology development method. If the national program scientists see PVS as a technology transfer mechanism, then their assessment of the inadequacy of the site coverage is naturally measured in the context of extension standards. This question may merit some further discussion between WARDA and the national partners.

Most of the participating farmers involved in PVS volunteered to be participants. It is possible, but not necessary, that some bias may be introduced to results because participants were usually self-selected. This is an easily testable concern, and hence merits a further discussion between WARDA and its partners as an area of improvement as far as the quality of participatory research is concerned.

The survey results give some indication that the type of gender analysis does not appear to be going much beyond "head-counting." Most national program have implemented a "50% women and 50% men" egalitarian approach to choosing the partner farmers, rather than paying attention to the results of gender analysis that would aid in determining the right proportion of various stakeholders in the participant group. It is not apparent if the

gender analysis work carried out by the national programs includes wider understanding of the "gender context" of the rice breeding work (i.e., differences in access to resources, division of labor, and institutional and demographic context of gender), or whether it is limited to measuring gender differences in varietal preferences.

The experience with participatory research has clearly provided feedback to breeders in the national programs, and this information has led to some specific perceived internal institutional changes. One half of the national scientists say that they have changed their breeding goals, and three quarters say they have also changed their breeding methods, and ways in which the breeding is conducted. The external institutional changes, such as changes in seed system or varietal release, have been less successful. This is probably related to less attention being paid to forming partnerships with other stakeholders in seed and varietal release institutions and mechanisms, and concentrating mostly on interaction with the farmers. Only one third of the respondents said that they had created or improved some of their partnership arrangements in rice research. The involvement of other stakeholders is another area for potential improvement.

The participatory research approach implemented by WARDA's national partners has been very functional, that is, trying to understand better what farmers want or need, and to feed back insights to formal research for improving future on-farm productivity. This type of functional participatory research leads to certain process or institutional impacts that are clearly being realized by WARDA's partner institutions, mainly the changes in breeding goals and objectives. In the next phase, WARDA and its partners may consider options for incorporating and implementing more "empowering" type of participatory research, which builds local capacity, and leads also to enhanced skills and knowledge of farmers and communities.

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9. Appendices

Appendix 9.1. List of Responding National Agricultural Research Systems

Country	Acronym	Institute name
Benin	INRAB	Institut National Des Recherches Agricoles Benin
Burkina Faso	INERA	Institut d'Etudes et de Recherches Agricoles
Cameroon	IRAD	Institute of Agricultural Research for Development
Chad	ITRAD	Institut Tchadien de Recherche Agronomique pour le Développement Rural
Côte d'Ivoire	CNRA	Centre National de Recherche Agronomique
Côte d'Ivoire	OVDL	Organisation des Volontaires de Développement Local
Côte d'Ivoire	ANADER	Agence Nationale d'appui au Développement Rural
Gambia	NARI	National Agricultural Research Institute
Ghana	CRI	Crops Research Institute
Ghana	SARI	Savanna Agricultural Research Institute
Guinea	IRAG	Institut de Recherche Agronomique de Guinée
Guinea-Bissau	INPA	Instituto Nacional de Pesquisa Agraria
Mali	IER	Institut d'Economie Rurale
Mali	CRRA	Centre Regional de Recherche Agronomique
Mauritania	CNRADA	Centre National de Recherche Agronomique et de Développement Agricole
Niger	INRAN	Institut National de Recherches Agronomiques du Niger
Nigeria	NCRI	National Cereals Research Institute, Badeggi
Senegal	ISRA	Institut Sénégalais de Recherches Agricoles
Sierra Leone		Rokupr Rice Research Station
Togo	ITRA	Institut Togolais de Recherche Agronomique

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Appendix 9.3. The Survey Form

Interview for PRIGA participants in 2001

Interviewer:

Introduction:
The purpose of this brief interview is to find out how the implementation of the participatory varietal selection (PVS) and gender analysis (GA) approach has changed the way rice research is organized and implemented in your institute.

PART 1: BACKGROUND INFORMATION

Institute

Name (agronomist/breeder):	Name (social scientist):
Country:	Year the PVS was begun:

1.2 How many scientists and technical staff at your institute are currently involved in PVS and gender analysis in rice research? What percentage of their time?

(Note to the interviewers: Do not list names, only numbers and time involvement in PVS/GA)

Research program area	Scientists FTE = full time equivalent for the PVS rice program	Technical support staff FTE = full time equivalent for the PVS rice program
Plant breeding		
Plant protection		
Soil management		
Crop production practices		
Post harvest		
Social science		
Other:		
Other:		

PART 2: OPEN QUESTIONS

2.1 You have probably been involved in rice research for a long time. Can you give us some background and reasons why you decided to try the PVS and gender analysis approach in your rice research?
2.2 Has the PVS and gender analysis changed your breeding goals? *(Note to interviewers: Perhaps the goal of the breeding program before PVS was to breed for maximum production and wide adaptation, and now the goal is to target specific environments, such as poor soils, or perhaps the emphasis is on breeding for biodiversity? Also perhaps previously the goal was to reach all farmers and now the goal is to reach specific types of farmers?)*

2.3 Has PVS and gender analysis changed your breeding strategy (to reach the goals)? *(Note to interviewers: What we are trying to find out is how the NARS have changed their methods (strategy) in obtaining their breeding goals. Perhaps the breeder has changed selection criteria, germplasm used, the way field-books are set up, etc.? Perhaps the breeder now has a different order of importance of traits s/he considers in breeding? Did the breeder only use one criterion before, and now uses different selection criteria for different users and/or environments? Were there changes in how research is implemented, e.g., technical content and organization of plant breeding, e.g., use of participatory tools institutionalized, number of on-station trials is reduced, etc?)*

PART 3: SPECIFIC QUESTIONS

3.1 (a) How were the sites for the PVS selected?
3.1 (b) Given the number of sites that you have, do you think that you have an adequate coverage of the rice growing environments you intended to target in your PVS work?
3.2 (a) At the sites that you have, how were the farmers selected who participated in the PVS?
3.2 (b) Given the farmers that you selected, do you think that you have an adequate coverage of the types of farmers you intended to target in your PVS work?
3.3 You involved some women in your PVS work. Did it make any difference to your research to have involved women farmers? How have you <u>used</u> this information learned from the involvement of women?
3.4 Has there been any change in partners and collaborators you work with (within and outside the NARS), because of the PVS and gender analysis you are implementing? *(Note to the interviewers: For example, have they made new links to work with the NGOs, seed traders, etc. List types of organization, NOT actual names of organizations.)*
3.5 (a) In the PVS approach, farmers are testing, on their own fields, varieties that have not been officially released. Then what happens to the varieties that are selected by the farmers? Can you take them for release or distribution? *(Note to the interviewers: How does the varietal release system in the country handle the varieties that are tested by farmers in the PVS, and what do the NARS plan to do with the material in terms of releasing it?)*

3.5 (b) Have there been any changes in the release system that resulted from the implementation of the PVS and gender analysis?
3.6 Have there been any changes in the seed multiplication and distribution system in your country that resulted from the implementation of the PVS and gender analysis?
3.7 In the PVS, farmers have access to new varieties, and they choose varieties they like, and then test them on their own fields. Once your research has identified the top varieties that farmers prefer, what is your strategy, <u>if any</u>, to make these varieties available to more farmers? *(Note to the interviewers: What we are asking here is that after the "research phase" what connection is there to the "extension" phase? Or do the NARS think of PVS solely as an "extension" tool from the beginning?)*
3.8 Since you started PVS work in rice, has the approach been used for any other crops in your institute? Specify.
3.9 What are some of the weaknesses of the PVS approach?

PART 4: ANY OTHER COMMENTS ABOUT HOW PVS AND GENDER ANALYSIS HAS CHANGED RICE BREEDING

4.1 Any other comments about the institutional impact of PVS and gender analysis.