

# Participatory Learning and Action Research for Integrated Crop Management in Inland Valleys

**I**N DIVERSE systems like inland valleys, off-the-shelf technologies rarely provide farmers with what they need and so are all-too-frequently ignored. In 2001, WARDA started a program to support farmers to help themselves, teaching them to observe, exchange ideas, analyze and think things through in preparation for taking action to improve their farming techniques. The system fired the imaginations of the farmers and now some of them are using what they have learnt to help their neighbors and earn extra income!

## Learning from experience, building on success

There can be no doubt that over the last half century, agricultural research and development has achieved some notable successes, not least of which was the Green Revolution of the 1970s. There is also little doubt that the majority of ‘simple’ technological solutions have had minimal impact in Sub-Saharan Africa.

“The advantage of Green-Revolution technologies lies in their target audience,” explains WARDA Technology Transfer Agronomist Toon Defoer. The success of the Green Revolution was due in large measure to standardizing the farming environment—providing adequate water control for irrigation, plus inputs like fertilizers and herbicides. “Unfortunately,” continues Defoer, “the options for standardizing African farming environments are few and far between. What we have learnt is that the more diverse

the environment, the more site-specific a technology needs to be and the earlier that farmers need to become involved in the technology development and adaptation process.” (See Box ‘Research paradigms and farmer participation.’)

Defoer had achieved a measure of success in soil-fertility management for such diverse environments with an approach called ‘Participatory Learning and Action Research’ (PLAR), during an assignment with the Dutch Royal Tropical Institute (KIT) in Mali. It was in part because of his innovative approaches that WARDA ‘snapped him up’ when the Technology Transfer Agronomist position needed to be filled in 2001. Defoer has brought a whole new way of thinking and working to WARDA’s technology-transfer team.

At the time of Defoer’s recruitment, WARDA’s successful integrated crop management (ICM) program from the Sahel was ready to be adapted for inland valleys outside of the Sahel.

### **Research paradigms and farmer participation**

In this context, a paradigm may be reasonably defined as “a conceptual framework within which scientific theories are developed, which is consistent within itself, but which may need completely revising as evidence challenging the factual accuracy of some aspects of it accumulates.”

“I believe that the whole philosophy of participatory learning and action research (PLAR) is fundamentally different from that of traditional research and development, and also from that of most participatory research,” explains Toon Defoer, WARDA Technology Transfer Agronomist and driving force behind WARDA’s PLAR activities. “We call it ‘constructivism’ in contrast to ‘positivism’.”

#### **Positivist paradigm**

##### **1. ‘Conventional’ research and development**

- Researchers develop technologies, primarily on a research station, and these are then ‘transferred’ to farmers.
- Successful in relatively homogeneous environments, with little diversity, and that are not complex.
- Research can imitate the on-farm situation on-station.
- Works best where farmers have access to relevant information, water management and inputs, e.g. the Green Revolution.

##### **2. Farming systems research**

- First consideration of diversity within farming systems and the need to adapt technologies to farm realities (1970s).
- Technologies are generated, still primarily on research stations, with target ‘recommendation domains,’ where they are then tested and adapted with farmers.

##### **3. Participatory research**

- Seeking to use farmers’ knowledge (and experience) to improve research outputs, i.e. to help the researchers do a better job.
- Still involves ‘finished’ or ‘completed’ technologies (e.g. varieties) being given to farmers to see if they are adaptable or adoptable.
- Examples include WARDA participatory varietal selection (PVS) and the Sahelian ICM program.

#### **Constructivist paradigm**

- Constructivism assumes that reality is not absolute, but it is rather actively constructed by people from their experience and social interaction.
- Constructivism is especially relevant to natural-resource management in diverse and complex farming environments, where positivism does not work.
- Typically, farmers have no (or limited) control of water and no (or limited) access to inputs, such as fertilizers, herbicides and credit.
- Action research—learning by doing, or perhaps learning by trying.
- Social learning—farmers encouraged to observe, analyze, discuss, suggest solutions; farmers test ideas on their own fields, then observe and reflect, perhaps to develop better solutions.
- Philosophy: communication—helping farmers to help themselves, rather than using farmers to help the researchers.
- Focus is not so much on the *technology*, but on the *process*.
- New role for research: translating scientific principles and technologies into something usable by farmers; developing training aids for farmers.
- New role of facilitation to guide the process.
- Farmer-to-farmer training/learning, with a role for farmers’ organizations.

WARDA has recognized the potential of the inland valleys of Sub-Saharan Africa for many years (*see*, for example, ‘Technology Generation and Dissemination: The Role of Agro-ecological Characterization,’ *WARDA Annual Report 1998*, pages 23–31). “After a recent re-evaluation of the FAO data, we now have a more realistic figure for inland-valley area in Sub-Saharan Africa of 190 million hectares,” declares Paul Kiepe, Scientific Coordinator of the Inland Valley Consortium (IVC). “With improved lowland rice cropping, intensification and diversification, that gives a lot of scope for increasing food production throughout the continent.”

With the successes of PLAR for soil-fertility management and ICM for Sahelian systems behind them, and the potential for inland valleys ahead, in 2001 Defoer and the technology-transfer and IVC teams embarked on a program to introduce PLAR for ICM into inland valleys with rice-based cropping systems.

### **A new way of thinking, a new way of doing**

“I am a different man!” exclaims farmer Kouamé Dembélé of Bamoro, Côte d’Ivoire. “When I saw a problem in my rice field, I used to wait around for the extension agents to come and help me. WARDA has taught me to look at my rice, think about what I see, show it to my neighbors and discuss with them how we might tackle it. It is a new way of thinking, and it leads to action on my part—and concerted action with my neighbors!” What is more, Dembélé and his fellow rice-farmers increased their rice production by over half a tonne per hectare in the first year of PLAR-ICM.

“What we are trying to achieve,” explains Defoer, “is not so much the adoption of technologies that we researchers have developed, but rather to help the farmers to think for themselves, to interact and to decide how *they* might try to solve their own problems.” And a certain amount of success can be claimed even after the first year. “After the nine months of training, we presented hypothetical problems to a selection of

participant and non-participant farmers,” Defoer says. “Presented with a new problem, participants responded with statements like ‘I would look closely at the plant, maybe open it up to see what is inside,’ ‘I would show it to my neighbors and see if they have ever seen anything like it.’ While non-participants showed a continued reliance on outside help, like extension services, or immediate intervention, for example with pesticides.”

Dembélé and three other farmers from the pilot sites were also trained to be farmer-trainers, so that they can form the core of a farmer-to-farmer training effort to help PLAR-ICM spread. The pilot communities now form a ‘Rural Knowledge Center,’ where farmers can bring their problems to discuss with the likes of Dembélé, or else request training in PLAR for their own communities. “If farmers are to act effectively as trainers, they need some compensation for the time they invest,” says Tom Kadisha Kat Lombo, Research and Development Specialist of the *Agence nationale d’appui au développement rural* (ANADER), the extension service involved in the PLAR program in Côte d’Ivoire. The pilot project introduced the idea of ‘learning-coupons,’ which entitle a group of farmers to a single training session. “ANADER and WARDA sell the coupons at 2000 CFA [about US\$ 3, or 3 euros] to the farmer groups, who give one learning-coupon to the farmer-trainer for each training session,” explains Lombo. “The farmer-trainer then submits the coupon to ANADER or WARDA and receives the 2000 CFA in return.” For the new Rural Knowledge Center, WARDA subsidized the first 30 learning-coupons, but subsequent sessions are paid in full by the groups requesting the training. The scheme has sparked interest—and participation—in four villages neighboring the pilot inland valleys.

### **How it works**

“In 2001, we took PLAR-ICM to two inland-valley settings close to WARDA’s Headquarters,” explains Defoer, “namely, Bamoro and Lokakpli. In each setting,

### **Outline of a typical PLAR session**

#### **Introduction**

One facilitator introduces the day's subject and gives the objectives.

#### **Active discussion**

Another facilitator starts the process with questions designed to open up farmer discussion of the subject.

Farmers discuss experiences and personal practices.

Subject-matter facilitator 'presents' scientific view through learning tools, questions and elaboration.

Farmers work out most of the answers for themselves.

#### **Field visit**

Mini-groups, each with farmer-animator, farmer-rapporteur and facilitator.

Pre-selected fields to demonstrate 'good' and 'bad' aspects of subject.

Farmers observe, analyze, make decisions for action.

#### **Reporting back (plenary session)**

Mini-group rapporteurs report to group.

Different groups have different ideas, leading to expanded horizons.

One facilitator helps summarize ideas.

#### **Evaluation**

Farmers encouraged to say what they learnt and what they will put into practise.

#### **Wrap-up summary**

Volunteer farmer or facilitator summarizes whole day: objectives; farmers' observations; scientific basis; best bets for action.

explains IVC Research Assistant Philip Idinoba. Typically, the facilitation team will meet ahead of the PLAR session to prepare. Usually, one of the facilitators will be a specialist in the subject matter of the particular session; alternatively, one facilitator is specifically designated to do some detailed subject-matter background reading, although all the facilitators will seek to be versed in the subject to some degree.

At the start of the session, one facilitator will introduce the topic for the day, and state the objective. In other words, tell the participants what the facilitators expect them to learn, or retain, from the day's session. Next, another facilitator starts the 'procedure' by asking the farmers what they know about the subject of the day. Farmers are encouraged to share and discuss their own practices and experience. The subject-matter facilitator will then build on the farmers' discussion to present the scientific view of the topic. This facilitator will ask open questions and elaborate on farmers' statements with a view to giving them insight into why things are the way they are, or what is behind the farmers' observations. "But, the facilitator is not teaching in the conventional sense," says Idinoba, "rather, he (or she) is facilitating discussion, and in most cases the farmers will answer their own questions."

"This whole section is very active," explains Defoer. "It is where the learning tools come in, such as diagrams and practical activities." And it is not necessarily the facilitator who makes the diagrams. For example, if a cropping calendar is required, the facilitator might provide the materials, but the farmers will construct the calendar themselves from their own knowledge of the rice production cycle.

we ran weekly sessions with about 30 farmers for a period of nine months."

"A typical weekly PLAR session involves about 30 farmers from the inland valley concerned, plus a few facilitators, representing research and development (extension, NGO or other development organization),"

Learning tools in action: Philip Idinoba (WARDA-IVC Research Assistant) pours water into a funnel containing soil as part of a demonstration of differing rates of drainage in different soil types





Farmers construct a cropping calendar thereby giving themselves a clearer idea of just what is going on throughout the season in their rice crops

Once the active discussion is over, the farmers typically split into four mini-groups for a field visit. Each mini-group has a farmer-animator to guide group discussion and a farmer-rapporteur; it also has one of the facilitators to help the farmer-animator in case he/she goes off track. “The fields are pre-selected by the facilitators,” says Idinoba, “to illustrate a diversity of the problem in question and how it is addressed. Then the groups move around so that they each see all the fields.” In the field, the farmers are encouraged to observe and analyze—especially to think about causes and effects—and then to suggest actions and make decisions as a group.



Observe, record, analyze, learn: Field observations and discussion form a key part of weekly sessions

The mini-group rapporteurs then report back to the whole group. “The value of reporting back lies in the fact that different mini-groups will often have different ideas and therefore different conclusions,” says Idinoba. “This interaction gives the farmers insight into other ways of thinking, maybe encouraging them to broader horizons on the next field visit.” One of the facilitators

will assist in helping to summarize the groups’ findings and conclusions.

This debate then moves into an evaluation of the day’s training. Farmers are encouraged to say what they have learnt and how that knowledge will help them in their rice farming; specifically, farmers are asked which idea, or ideas, they intend to put into practise on their own farms. Finally, either a volunteer farmer or one of the facilitators will summarize the whole day’s proceedings: objectives; farmers’ observations; scientific basis; decisions for action.

“When I look at a PLAR session,” says Idinoba, “what I see is farmers’ knowledge coupled with scientific knowledge, and everybody learning!”

### Site-specificity—different results in different settings

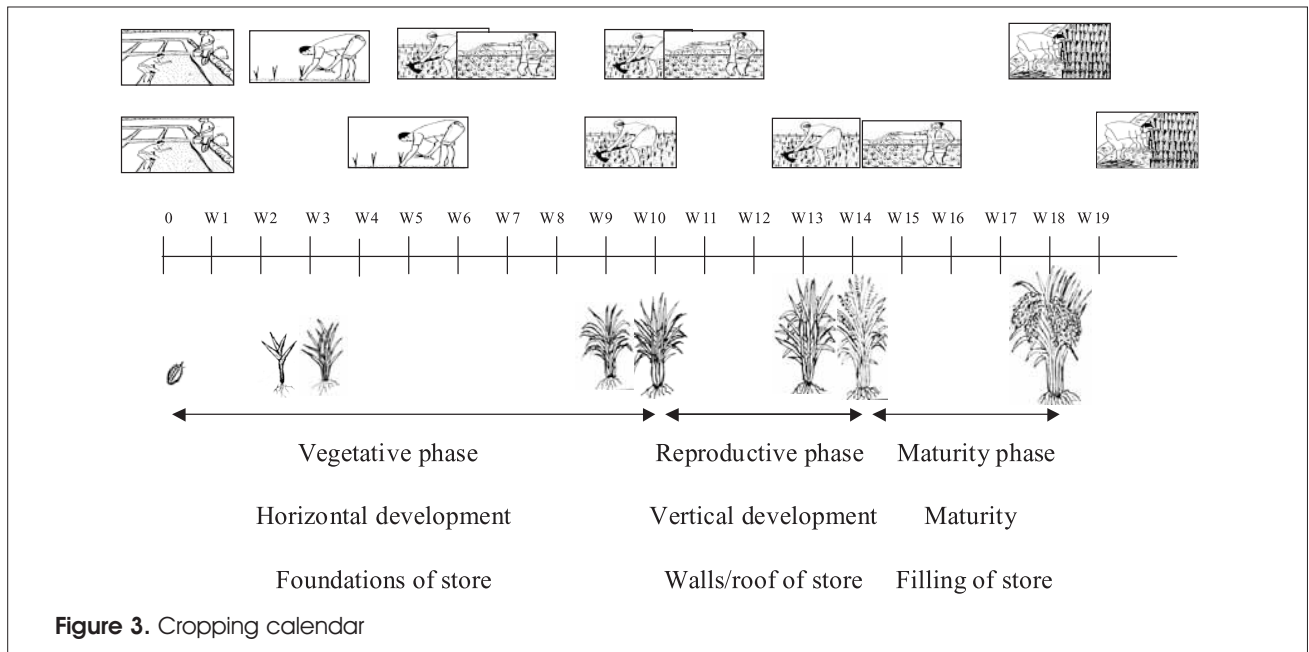
Part of the attraction of the two pilot sites was not only their proximity to WARDA Headquarters, but also their markedly different social settings and water-management practices, giving the opportunity to demonstrate the flexibility of the PLAR approach.

Bamoro inland valley is farmed by members of a single village with strong family-based ties. The narrow valley has a single, central stream that acts as both source and drain for water for the crop; there is no irrigation structure. Farmers there can only grow rice during the rainy season, and typically use no fertilizers.

In contrast, the Lokakpli valley is used by farmers from several villages with no strong social cohesion among them. The site was constructed in 1998 as an irrigation scheme with two lateral (source) canals and a central drainage canal. Farmers grow two crops a year and apply substantial amounts of mineral fertilizer.

“In both contexts, the cropping calendar provided useful, if differing, insights,” says Defoer.

With the aid of the cropping calendar, farmers in Bamoro learnt that tillering (vegetative growth) of rice ends at about nine weeks. Consequently, their practice of transplanting seedlings as late as eight-weeks old meant that almost no further tillering could occur in



the field. Since tillering has a direct effect on yield, they realized that they had a problem. They transplant late because of the risk of flooding—tall plants survive better in deep water than do short ones. Farmers deduced that the only solution was to improve water management, and to do it as a community rather than as individuals. It took four days to excavate the drainage canal and the results are more options for improving their rice-farming. With water control, it is easier to control weeds and less risky to use fertilizers. Now the farmers are using a contractor to plow their land before the season, so that they have a basis for draining the fields and doing other activities as needed. Without community action, individual farmers could not afford for the contractor to come for them alone.

In Lokakpli, farmers learnt that the efficiency of nitrogen-fertilizer application depends on the roots' ability to absorb nutrients and on the plants' development stage. Thus, applying nitrogen just after transplanting is almost useless, as damaged roots do not absorb nutrients well. By waiting for a week after

Concerted action was required at Bamoro to improve water management



transplanting, much more of the nitrogen ends up in the plant. They also learnt that critical periods for nutrients are tillering and panicle-initiation—all from the cropping calendar.

### Expanding the work

In February–March 2002, WARDA held a training workshop on PLAR-ICM, for 40 researchers, extension agents and NGO representatives from Benin, Burkina Faso, Côte d'Ivoire, Guinea, Mali, Senegal and Togo. Dembélé and his fellow farmer-trainers also attended to give first-hand accounts of the pilot work in Côte d'Ivoire.

Subsequently, PLAR-ICM activities were started in Benin, Burkina Faso, Guinea, Mali and Togo. “There were also five additional sites in Côte d’Ivoire,” Defoer says, “namely, Daloa, Gagnoa, Korhogo, Sakassou and Yamoussoukro. There were also the four inland valleys in the vicinity of the pilot sites, where communities had actually *asked* for PLAR-ICM training. However, the Ivorian civil war intervened and so there is currently no follow-up at these sites.”

In April 2003, two representatives from PLAR teams in each of Benin, Mali and Togo met together with the WARDA team for a mini-workshop. The teams reported back on progress in the four selected sites and prepared plans for the 2003 season.

### Curriculum for farmer learning

“The learning tools are the basis of the learning modules,” explains Defoer, “and together they form a curriculum for farmer learning. The learning modules help change-agents to master adult-learning principles based on farmers’ knowledge and experiences, and to bring in new insights at the right moment during the learning process.” The PLAR-ICM curriculum for farmer learning is a major outcome of the pilot project and the follow-up training workshop. The curriculum is made up of 28 modules that address relevant issues throughout the growing season (*see* Box ‘The PLAR-ICM curriculum for farmer learning’).

Two publications have been drafted by Defoer and colleagues: A facilitator’s guide and a technical manual. These will be published in both English and French in 2003.

### Bright future for PLAR-ICM and inland-valley farmers

“With the publication of the two books in 2003, the way will be open for PLAR to spread beyond WARDA,” explains Information Officer Guy Manners. “In fact, interest has already been expressed by the Technical Centre for Agricultural and Rural

### The PLAR-ICM curriculum for farmer learning

#### Start of PLAR-ICM

- Identification of the site
- Module 1: Starting the PLAR-ICM curriculum

#### Before the growing season

- Module 2: Making a map of the inland valley
- Module 3: Making a transect walk
- Module 4: Managing water in the valley
- Module 5: Using good seed and varieties
- Module 6: Planning good management practices

#### During the growing season

- Module 7: Preparing the land for rice transplanting
- Module 8: Making a nursery
- Module 9: Planning and time management
- Module 10: For a healthy soil
- Module 11: Making field observations: Land preparation (nursery)
- Module 12: Good transplantation and setting up experiments
- Module 13: Evaluation: Knowledge test
- Module 14: Making field observations: Transplanting and vegetative stage
- Module 15: Recognizing weeds
- Module 16: Managing weeds in an integrated way
- Module 17: Using herbicides efficiently
- Module 18: Making field observations: The vegetative stage
- Module 19: Managing experiments and making field observations
- Module 20: Knowing the insects in rice cultivation
- Module 21: Managing insects in an integrated way: Stem borers
- Module 22: Managing insects in an integrated way: Rice gall midge
- Module 23: Making field observations: Reproductive phase
- Module 24: Managing experiments and making field observations

#### After the growing season

- Module 25: Harvesting and post-harvest operations
- Module 26: Making the balance of the cropping season
- Module 27: Evaluating the PLAR-ICM

#### End of PLAR-ICM

- Module 28: Closing PLAR-ICM

**More than one way to crack an egg:  
Participatory technology development in Benin and Nigeria**

In terms described elsewhere in this Report, WARDA's project 'Farmer Participatory Improvement and Adaptation of Production Technology for Rainfed Rice-based Systems' comes under the 'positivist paradigm' (see Box 'Research paradigms and farmer participation,' page 24). But then, PLAR-ICM itself is still very much in the research phase, not yet ready for wide-scale adoption, and that is according to its principal proponent at WARDA, Technology Transfer Agronomist Toon Defoer. "WARDA is not in the business of puffing all its eggs in one basket," explains James Sumberg, Program Leader, Rice Policy and Development Program. "If there are other ways of doing things efficiently, we are prepared to try them."

From a review of existing literature and discussions with partner institutions (especially research institutes, universities and government agencies), four key-sites were selected—one each in Ogun State, Kogi State and Eboyi State in Nigeria, and one comprising two *sous-prefectures* (Dassa and Glazoue) in Benin.

"The first field activities for the project started in April 2000," explains Participatory Technology Development (PTD) Scientist Augustin Munyemana. "These were the establishment of demonstration farms in each of the key-sites." From among the farms available in each key-site, one was chosen for the WARDA demonstrations on the basis of its representativeness of the other farms in the key-site, and its accessibility to the target population of key-site farmers (and other visitors). "All available technologies—both modern and traditional—are established and demonstrated by WARDA staff," explains Munyemana, "so that the various stakeholders (especially the farmers themselves) can see the potential of each technology and decide whether or not to try it out." The demonstration farms form the focus of field days, where they provide a forum for interaction among researchers, extension agents and farmers. "We see the demonstration farm as providing an interface between technology generation, adaptation and dissemination," explains Munyemana.

At each key-site, rice stakeholders were invited to planning meetings in June and July 2000, and subsequently at the end of each crop season. "A typical stakeholder meeting has about 100 participants," says Munyemana, "of which, about 80% are farmers; the rest being made up from rice-consumers, marketers, researchers, development and extension agencies, and NGOs." The initial stakeholder meeting seeks to identify the main constraints to increased productivity (often achieved with the aid of a 'problem tree'), identify possible solutions, and decide which of the technologies 'on offer' should be tested and who will do the testing.

Before each crop season, a smaller group, known as the 'technology group' and comprising 10–20 nominees from the stakeholder meeting, meets to determine the practicalities—for example, layout of the field-trials, what data should be collected by the farmers—and establish a calendar of events including the timing of a mid-season field day.

Each village then organizes its own (on-farm) trials. The choice of farmers to host and manage each trial is determined by the community of farmers among themselves. Community members and project staff work together to determine the technologies and trial-layouts to be used; however, each trial is managed by the farmer whose field is hosting it. Evaluation of each trial is done at community level, and the community also decides on any adjustments.

"Around the middle of the season, each key-site holds a field day," says Munyemana. "All the collaborators and stakeholders are invited and the technologies are evaluated on site. The focus is usually the research-managed demonstration farm, but opportunity is also given for 'real-world' evaluation of the on-farm trials.

"In addition to the field days, we have had many farmers requesting the opportunity to visit trials on other farms. These are really farmer-to-farmer visits, but WARDA and its partners are happy to facilitate such activities."

After harvest, each village holds a feedback meeting, where the demonstration and season's activities are critically assessed. Focus is on what the participants think about the results and what problems were encountered through the season. It is at this meeting that the community decides which activities to continue with and whether any other activities should be introduced (and, if so, which ones). The feedback meeting elects farmers' representatives to the technology group for the next season, and provides input (feedback) into the next stakeholders meeting.

"Thus, the whole exercise is a cycle," explains Munyemana, "from stakeholder planning, through technology group decisions, establishment of trials, mid-season field day and post-harvest feedback meeting, back to the next stakeholder meeting."

### **Testing, testing**

So much for the logistics, but what are the farmers in the key-sites actually testing and what results are being generated? "We have to remember," says Munyemana, "that farmers are all different: one may face a completely different problem in his field from his neighbor, while another may simply look at the same problem in a completely different way."

Let's look, for example, at what happened when one community was offered a new rice variety. Some farmers wanted to grow the rice with other crops, others were concerned about making the most of the quantity of fertilizer they could afford, and one was concerned about the division of time between farming and fishing! In the experimental set-up, farmers were assigned trials so that the various combinations could be tested: one intercropped rice with cassava, and then planted a rotation crop of cowpea; another intercropped the rice with maize, and then rotated with a legume crop; a third tested the idea of combining rice and fish in the same field. "We at WARDA had no experience of aquaculture before this project," says Munyemana, "so we called in outside expertise to advise on setting up the trial. So far, it has been successful—fancy scooping your fish-dinner out the same field where you have been busy working your rice crop all day long!"

In addition, each of the trials mentioned above could be combined with alternative soil-fertility management options, such as mineral fertilizer, rock-phosphate and green fertilizer or compost.

### **Results from the first phase**

WARDA monitors progress at each site throughout the season with an extensive questionnaire, different from the one the technology group establishes for the farmers to use for their monitoring.

"I see positive results from the first phase in four areas," says Munyemana. "First, the methodology itself, which has been adopted by the Nigerian Agricultural Development Projects for planning and executing of a range of crop-related activities, not just for rice. Second, we have clearly determined the variety needs by location in each key-site. Third, we have identified good complementary technologies to help improve the profitability of systems where rice is not the dominant component; for example, the rice–fish system, and a rice-specific compound-fertilizer that we helped develop and test. And finally, but by no means least, in training." The project is funded by the German Government (BMZ) through its agency GTZ and, and it has a big training component. Across four key-sites, six students are working towards obtaining PhD degrees in 2004. In addition, four first-degree students each conducted a three-month field study with the project, and some 300 or so national research and extension partners have been trained in various aspects of participatory technology development.

### **Future**

The donors visited project and partner sites—Ibadan, Ikenne, Abeokuta and Lokoja in Nigeria, and Dassa and Glazoue in Benin—from 23 February to 9 March 2003 to evaluate the project, concluding:

"The project has successfully operated for three years. The PTD approach has been implemented with relevant partners and in a coherent way. A wealth of data on bio-physical and socio-economic aspects of rice production [has] been collected. ... A second project phase is justified."

The evaluation team recommend that the second phase should have a 'utilization' focus (what will be produced, who will use it, what benefit is expected); strengthen research on principles and processes of PTD; broaden the project scope; clarify the concept of knowledge-broker; and explore a stronger role for farmers' organizations.

"One aspect that may contribute to the success of the methodology is its potential to become self-sustaining," enthuses Munyemana. "We have seen that where technologies benefit the stakeholders, those stakeholders are willing to pay back some of the profit to improve the advisory service." Munyemana and his team have devised what they call a 'knowledge-broker system,' whereby extension agents will sell what they have to offer (in terms of knowledge) to the communities that are interested. Testing this system is going to be a major innovation in the second phase of the project (due to start in 2003). "If the system works," Munyemana says, "we will have found a way for extension agencies to become partly self-financing, which may in time even lead to privatization!"

Cooperation (CTA), the UK Department for International Development (DFID) and the International Fertilizer Development Center (IFDC).”

“PLAR is a living process,” says Defoer. “The PLAR that has been developed for inland-valley rice-based systems is not the same as that for integrated soil-fertility management, and the adaptations of PLAR in individual settings will show its dynamic nature and ability to cope with diverse situations.” Defoer might be the driving force behind WARDA’s PLAR projects, but “everyone who comes into contact with the program contributes to its development,” he says. “That’s part of the beauty of the system!”

Having proved its value with integrated soil-fertility management and ICM, “the PLAR approach will gradually be extended to other crops and deal with diverse aspects of inland-valley systems,” says Kiepe. He goes further: “As inland valleys have other

important social and ecological functions, PLAR will likely become the approach to deal with integrated natural-resource management in general.”

Perhaps the ultimate objective is for PLAR to become the extension approach and that the process will be scaled up to all zones where inland-valley rice-based systems are important. This has already started with the first Rural Knowledge Center in Bamoro–Lokakpli, and farmer-trainers like Dembélé selling their services to other farmers’ groups. On a larger scale, making PLAR the extension method of choice will require serious commitment from all research and development bodies involved in these systems. “One critical aspect,” says Defoer, “is to determine the optimal density of Rural Knowledge Centers that the national extension service can handle and that will allow sufficient coverage of the area for farmer-to-farmer exchange and learning.”