The Case of Using Mass Media: Communication and Behavior Change in Resource Management

M.M. Escalada and K.L. Heong[1]

[1]International Rice Research Institute, DAPO Box 7777, Metro Manila, Philippines. Email M.Escalada@cgiar.org, K.Heong@cgiar.org

Abstract
A participatory planning process was applied in two resource management initiatives in Vietnam. The first case was a pilot project established in two districts of Long An province to evaluate the use of media materials to motivate farmers to experiment or test a simple rule: "insecticide spraying for leaf folder control in the first 40 days is not needed". The second case was a research-extension initiative launched in Cantho province to motivate farmers to reduce seed rate and use of fertilizer and pesticides. The media campaign in Long An province resulted in a 53% reduction in insecticide use and no loss in production in the project sites, and the change eventually spread to more than a million rice farmers 3 years later. Leaf folder control perceptions, expressed as the belief index, changed from 11.25 to 7.62. The belief index is the sum of scale ratings of belief statements presented to respondents. A three-point Likert scale (1 for the preferred answer, 2 for indifference and 3 for the not preferred) was used to score components of belief about leaf folders. The study showed that mass media could effectively transfer some elements of knowledge-intensive pest management, especially simple non-site specific information designed to motivate. The case studies highlighted the need for processes that distill bits of information and develop them into knowledge that can be communicated and used by farmers to make resource management decisions. Some of the features found to be extremely useful in implementation are: developing high quality partnerships and building social capital, building project objectives within institutional objectives, using mechanisms to encourage participation, encouraging farmer participatory research (FPR) to facilitate farmers' evaluation of heuristics, and developing a participatory communication strategy and materials for evaluation.

Media summary
A media campaign developed through quality partnerships and stakeholder participation has motivated millions of rice farmers in the Mekong Delta, Vietnam to reduce pesticide use.

Key Words
Participatory process, stakeholders, heuristics, media campaign, multiplier effects.

Introduction
For farmers to respond to opportunities that will improve their agricultural productivity, knowledge and information play a central role. In many farming populations, access to information is often variable, partly due to differences in farmers' circumstances and ability to adopt technological options and availability of extension-communication infrastructure. In some cases, information is not available or it is disseminated through specific communication channels to which many households have limited access. To be of benefit, information must be communicated and internalized effectively by its intended beneficiaries (FAO, 2003).

Scientific achievements in rice research have been impressive considering their impact in Asia (Cantrell, 2002). From these scientific achievements, knowledge-based technologies could be derived to provide more options to farmers and consumers. However, results often remain restricted to a few research collaborators and farmers who have been trained while millions of other farmers are unable to benefit from them. Despite the strides made in rice science, farmers' knowledge and decision-making skills in crop management have lagged behind. A number of examples can illustrate the gaps that exist between scientific achievements and farmers' practice:

- Modern rice varieties can easily yield 8 t/ha when well managed. However, a large proportion of farmers still obtain yields of <5 t/ha. In the Philippines, the average yields in the on-farm experiments from 1991 to 1995 were 5.7 t/ha during the wet season and 7.5 t/ha during the dry season while the average yields of the farmers are only 3.7 and 3.9 t/ha in the wet and dry seasons respectively. This corresponds to yield gaps of 2.0 and 3.6 t/ha for the two seasons (Sebastian et al., 1999).

- In Vietnam, direct seeding with very high seeding rates from 200 to 250 kg/ha is a common practice while 100 to 120 kg/ha is sufficient (Tan, 2002).
- In China, especially Zhejiang province, agronomists' research has shown that farmers apply high rates of N fertilizer. This N fertilizer is often not utilized effectively by rice because of improper timing and rates of application. Farmers at a study site in Jinhua, Zhejiang Province, for example, apply nearly all their N fertilizer in two large doses of about 40 to 160 kg N/ha within the first two weeks after transplanting (Wang, 2002).
- In insect management, entomologists know that damage caused by leaf feeding insects is of no consequence, but most farmers spray when they see damage. A survey in Leyte, Philippines showed that 8 out of 10 insecticide sprays were unnecessary (Heong and Escalada, 1992) and such beliefs and practices are widespread throughout Asia (Heong and Escalada, 1997).
- Many farmers now grow rice varieties with insect resistant genes in them, but their insecticide use often does not change. Farmers either do not know the varieties have resistance or they have a different concept of resistance.

The above examples highlight the gaps that exist between scientists and farmers. Clearly, for research results to make a difference in farmers' productivity, these have to be applied and used. Much more effort is needed to distill and simplify many scientific results before they can be in a form that farmers can use (Mundy and Sultan, 2001).

In this paper we describe a participatory planning approach for bridging the gap, and explain how it was used successfully in two case studies to effect change in management practices by large numbers of rice growers in Vietnam.

Types of technologies

In agricultural production, there are two kinds of technologies: hardware/physical (seeds which have higher yields, machines which cut down on labor requirements, etc.) and software, information or knowledge-based technologies (Rogers, 1995), such as nutrient management. The first type, which is relatively easy to communicate, is generally disseminated through agricultural extension systems. Rice varieties or seeds, being a tangible product, have been quite easy to promote. Today, more than 50 percent of the world's rice cultivars have some association with IRRI varieties, either as direct varieties or parents. This spread has been mainly through the agricultural extension systems.

Communication barriers

Most agricultural extension systems in the developing world are built around delivering a product (a seed or machine) and disseminating information based on the problems that they observe. Often, the process of information dissemination mimics that of product delivery. Extension materials such as leaflets, radio, and television may be used, but they are designed with information difficult to be received by farmers. Often, information may be disseminated successfully, but not received, or disseminated and received, but not internalized (Norton and Mumford, 1982). Because it is easier to distribute printed or audiovisual messages to mass audiences than it is to organize supportive interpersonal communications (McAlister, 1981), most extension systems rely more on the use of mass communications.

Knowledge-based technologies, on the other hand, can have a strong influence on farmers' decisions. However, they are often more difficult to communicate because these products are not as visible as seeds and there are cognitive and psychological barriers such as selective processes and biases (Rogers, 1995; Schramm, 1973). Selective processes – selective exposure, selective perception, selective attention and selective retention – could affect communication with the audience. *Selective perception* is the tendency for people's perception to be influenced by wants, needs, attitudes, and other psychological factors (Krech and Crutchfield, 1971). Thus, despite constant bombardment of information, an individual tries to cope through selection of what is perceived. Selection is largely automatic, as new perceptions are made to fit strongly held attitudes, beliefs or behavior (Schramm, 1973).

Tversky and Kahneman (1974) classified biases in people's decision making into three categories: representativeness, availability and anchoring. In anchoring biases, people have the tendency to fix judgment based on initial impressions and are reluctant to remove them even when new information is presented. To overcome deeply held anchoring bias, information delivery and reception alone are often insufficient. Messages need to be motivational, stressing the values of the product and providing opportunities for farmers to experiment or try out. Information presented in direct conflict with existing beliefs for instance can lead to cognitive dissonance (Festinger, 1957), but to facilitate behavioral changes, motivation to experiment has been found to be useful (Escalada and Heong, 1997).

The Challenge: Reaching Millions

There are about 200 million rice farmers in Asia and an important challenge for agricultural research and development is to develop systems to reach them. By design, agricultural extension is labor-intensive (Mody, 1992). Thus, even with increased government investments in agricultural extension, the mass of small and marginal farmers has not been reached. The shortage of extension personnel, the inaccessibility of large numbers of farmers living in far-flung geographical areas, and poor transportation facilities limit farmers' access to information which could increase their farm productivity (Adhikarya, 1994). It has been estimated that, on a regular basis, most extension technicians can only serve 50 to 100 families. Other farmers who are not within the service area of extension personnel will have to learn indirectly from others who have been served directly (Hornik, 1988). With declining funding to agriculture, extension activities are likely to be trimmed further. In Asia for instance, there are cuts in agricultural spending and many extension positions have been terminated.

Given the limits of conventional agricultural extension systems, the mass media can be used to support agriculture. As the most rapid and efficient means to inform audiences, the mass media can reach millions of farm families in areas which are beyond the reach of extension personnel (Rogers, 1995). Besides extending the reach of the extension network, communication media can play a wide range of roles in the development process. Their ability to penetrate remote rural areas and transcend the illiteracy barrier has made the media a primary vehicle for bringing new ideas and knowledge, events in government and the outside world, and possibilities for improvement to the people in the countryside. Literacy campaigns and mass mobilization drives have been launched and sustained successfully by systematic use of media. New agricultural production ideas and techniques, nutrition and health care, opportunities for self-employment and other beneficial information have been brought effectively by the mass media to the consciousness of people (Hornik, 1988; Manoff, 1985; McAnany, 1973).

Participatory Planning Process

To foster participatory team approaches, cooperation is vital as resource management issues are viewed as a complex human activity system (Wilson, 1992). Research, development and extension are interactive as well as iterative. The central feature of this approach is to involve key stakeholders in a cooperative and flexible process that promotes discussion and implementation of activities to bring about intended changes. Building social capital, including empowerment of partners to participate provides a foundation for a participatory process. A cycle of monitoring, reflection and evaluation that involves all partners is a prerequisite to foster this process (Snapp and Heong, 2003). Many participatory techniques are available, including rapid rural appraisal (RRA) techniques, participatory rural appraisal (PRA), focus group discussions and structured workshops (Carmen and Keith, 1994). The themes shared by these techniques include qualitative appraisals and joint participation by stakeholders, promoting common understanding of the problems. However, Norton et al (1999) caution that often it is not how thoroughly analyses have been done but the quality of the partnership that will determine success or failure of a project.

In order to enhance the quality of partnerships, facilitating communication between stakeholders and joint planning, the participatory workshop approach is recommended (Figure 1). This approach is iterative and inter-related. It frequently involves the following stages, many of which overlap.

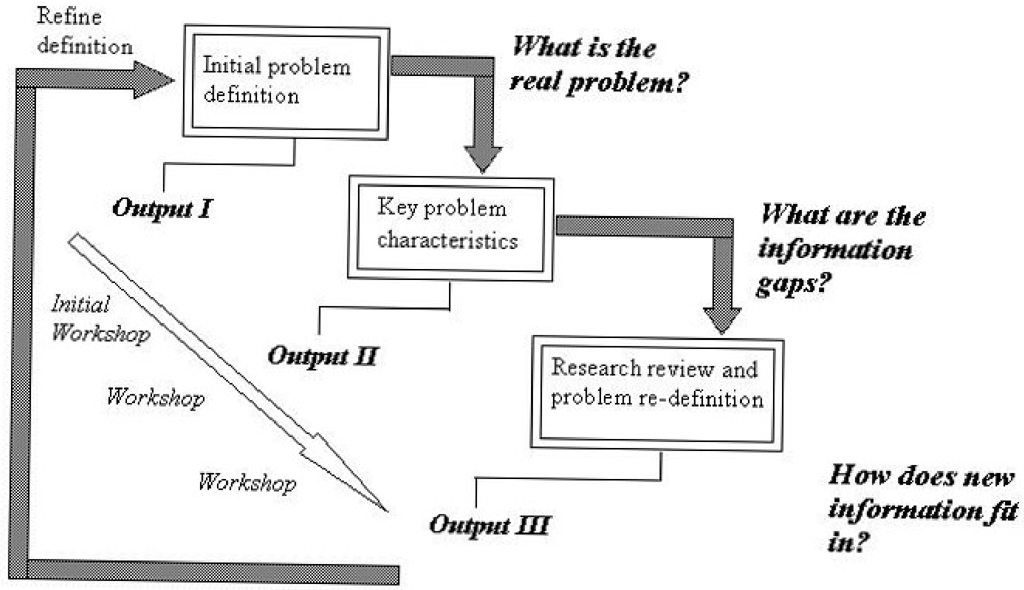

Figure 1. Participatory planning process.

Stage 1. Specify problems and opportunities

A range of techniques can be used to facilitate communication between stakeholders. Root causes and cause–effect relationships are identified. Baseline data are also used whenever available. Some of these techniques are described in Norton and Mumford (1993), and the concept of quality control circles (QCC) used in management are also useful (see Karatsu and Ikeda, 1987; Crocker et al., 1984). This can be seen, alternatively, as an opportunity to discuss with partners where opportunities lie and what inquiry or area of research is of interest to the group.

An important first step is to identify local farmers' perspectives and the way they see the problem through focus group discussions (FGD), interviews with various stakeholders, and use of analytical frameworks. A number of methodologies are available for problem identification. These include consultations with stakeholders, focus group discussions, seasonal and historical profiles, and in-depth field interviews. The "emic-etic" framework in anthropology, which roughly means local versus scientific knowledge, is also a convenient tool for researchers to obtain accurate descriptions of farmers' knowledge or concepts and compare it with scientific knowledge or concept on the same topic (Bellon and Taylor, 1993; Bentley, 1992.

Such analysis will provide important baselines, help identify intervention opportunities and whether further research is needed to solve the problem.

The baseline survey instrument is developed after a series of FGDs to validate the issues, and discover root causes of the problem and quantify its extent. Identifying the problem clearly, especially the factors that may impede the adoption of new information, is important. Through this analysis, one can determine the specific issues which have to be resolved. From baseline analysis, an impact evaluation judgment can be made because there is a basis for comparison (pretest vs. post-test measures or control vs. treatment groups).

In Long An province, a baseline survey was conducted which showed that damage caused by leaf folders was an important concern of farmers (Mai et al., 1997). Farmers often sprayed insecticides during the first month after seeding to control them. These insects were perceived to be very damaging because they can cause heavy yield losses, and early season insecticide sprays to control them were believed to be necessary. Organophosphates, such as methamidophos, monocrotophos, and methyl parathion, were the most popular insecticides used. Ecological research has shown that these insecticides are unnecessary because rice plants have the ability to compensate for leaf defoliation. Early applications of broad-spectrum insecticides will cause ecological disruptions that can favor brown planthopper development, which is a more serious problem (Heong and Schoenly, 1998). In addition, farmers generally overestimate highly visible leaf damage and tend to react by spraying. Farmers refer to them as "worms" which have negative cognition and, as pointed out by Bentley (1989), biased perceptions of insects is a human weakness, which potentially subjects them to insecticide abuse. Since people generally use heuristics in making decisions (Tversky and Kahneman, 1974), understanding current heuristics with regard to leaf folders through the application of the “emic-etic” framework was helpful in identifying intervention opportunities.

Synthesizing information

To enable farmers to utilize scientific knowledge, it is necessary to evaluate current information, and then to synthesize and distill research results from various sources into usable knowledge or heuristics which farmers can be motivated to test. Once a key heuristic was distilled from scientific research, the next step was to encourage farmer participatory research (FPR) to facilitate local farmers’ evaluations. FPR is an approach that involves motivating farmers to conduct an experiment to examine whether a heuristic is valid or to determine whether something previously untried will work (Heong and Escalada, 1997). Box 1 uses the example of the second case study in Vietnam to show how the outcome of experiments often leads farmers to adapt and spread them to other farmers. This step, sometimes known as innovation evaluation, is essential for communication as well as for initiating diffusion.

Box 1 Farmer experiments in the 3 Reductions initiative

Starting in the 1999-2000 wet and autumn-summer seasons, 30 volunteer farmers conducted farmer participatory research (FPR) to evaluate the effects of reducing seed rates, fertilizer and pesticides. Farmers allocated a portion of their fields as the experimental area and the remaining as “control”. For the experimental area, farmers were given guidelines in adjusting their seed rates, fertilizer rates and not to use insecticides in the first 40 days after sowing. Otherwise, farmers were to apply pesticides as needed. For the control area, farmers were to practice their normal routines. A simple system to record their inputs in the two plots was provided to facilitate data recording. Participating farmers were motivated to participate in the experiment through farmer meetings conducted by extension staff to discuss ways to reduce inputs and increase profits. No compensation of any form was provided as an incentive.

In WS 2001-2002, FPR was expanded to 920 farmers in Tân Lập Village, Tân Thạnh district, Long An Province, in collaboration with the Cuu Long Delta Rice Research Institute (CLRRI). In the same season, farmers conducted 520 similar experiments in 8 provinces in the Mekong Delta. Results of the experiments were presented at a farmers’ workshop in Tiền Giang province in March 2002. Another 446 demo fields were set up in 10 provinces in the Mekong Delta in 2002 and 600 in 6 coastal provinces in the Central region. In September 2002, another farmers’ workshop was organized in Phu Yen province. Results showed that for both crops, farmers’ savings from pesticides accounted for most of the difference in profits.

Huan et al (2004) reported that the farmers’ experiments have demonstrated that seed, fertilizers, insecticides and fungicides can indeed be reduced resulting in higher profits. After participating in this evaluation, most farmers modified their initial beliefs that reductions in seed and fertilizer rates would result in lower yields and profits. Farmers significantly increased their profits by an average of ~ \$58 ha^{-1} and ~\$35 ha^{-1} in the two seasons, respectively. The highest contributions were from reduction in insecticide use, followed by reduction in fungicides and seed rates.

Source: Huan, N.H., Thiet, L.V., Chien, H.V. and Heong, K.L. 2004. Farmers’ participatory evaluation of reducing pesticides, fertilizers and seed rates, fertilizers in rice farming in the Mekong Delta, Vietnam. Crop Protection (in press).

Stage 2. Design action plans

Engaging participants to determine what actions need to be taken and to outline action plans to achieve expected outcomes is an important next step. Egan’s (1988) model for change can be employed usefully at this stage which involves the several activities described below.

Developing a communication strategy with stakeholders

In Long An province, a message design workshop with participants from research, extension and agricultural communications was conducted to develop prototype campaign materials to motivate farmers to test the heuristic: "Spraying insecticides for leaf folder control in the first 40 days after sowing is not needed". At the workshop, participants designed messages and selected media materials to promote farmer participation in testing the heuristic, developed the institutional arrangements and coordination for launching, material delivery and monitoring instruments. The participants from the radio broadcasting station modified the script developed by the workshop (Heong et al., 1998), introducing jokes and colloquial conversations to make it appealing. Extension technicians came out with the idea of making the poster yellow so as to attract attention especially when posted on the unpainted brown walls of farmers' houses. Participants also introduced four symbols in the poster, which were readily recognized by farmers, to represent the four incentives for not spraying insecticides. The vice chairperson of Long An's peoples' committee of the provincial government chaired the campaign management committee and she was instrumental in promoting the project in the government's general assembly meetings.

Two months later, a management monitoring survey of 4,640 farmers showed that 97% of the target farmers were aware of the simple rule (Escalada et al., 1999). The source cited most commonly by farmers who heard about the heuristic was the leaflet (89%). It was followed by the radio drama (72%), poster (69%), the demonstration plots (43%), friends (34%) and the billboards (33%). After the campaign, 53% of the farmers interviewed cited interpersonal channels as their information sources on the simple rule, followed by 47% who mentioned mediated sources. Farmers also considered the TV as the most influential medium (25.6%), followed by village meeting (21.6%), leaflets (16.3%), radio broadcasts (15.9%), neighbors (6.6%) and demonstration plots (6.6%).

Developing an identity or "brand" that is locally appropriate
In the commercial world, a brand name is a term, symbol, slogan or design, which is aimed to identify the goods or services of a company and to differentiate them from those of competitors. It conveys the concept, benefits and other pertinent information about the product or service. Likewise, in resource management, brand names are catchy terms or slogans used to refer to a product or innovation. "*No early spray*", "*Three Reductions-Three Gains*", "*Minus-One Element Technique*" are some of the brand names used in resource management. An innovation - can be communicated better if it has a name that appropriately describes its attributes. Besides facilitating promotion strategy, a brand name also makes it easier to track down the product in impact assessment.

The campaign launch.
The launching day is a high profile event, which is officially graced by the agriculture minister and other top-level national and provincial officials. As such, it receives extensive national coverage on radio, television and print media. In many cases, besides the launch in the capital city, another kick-off ceremony is held in the province where the campaign or project is to be implemented. The local event is aimed at enlisting the support and commitment of community influentials and at increasing the public prestige and credibility of the local extension workers who organized the launch in their district (Adhikarya and Posamentier, 1987). It is also an avenue to give recognition to researchers, extension staff and farmers who have contributed to research output and experimentation. Often, prizes are given to key farmers who have done well in their experimentation. The launching signals the beginning of the project and it is best held on an auspicious day, such as the World Environment Day.

Stage 3. Review and evaluate progress and redesign action plans
One way to conduct this iterative approach is through a series of workshops, where the review stage is initiated approximately a year or two into the process as an all-stakeholders' review workshop, to ensure the quality of the activities as well as building quality partnerships (Escalada and Heong, 2003). Action and reflection cycles are integral to this process. To evaluate progress, a summative evaluation is conducted after the conclusion of the activities. Results are normally used to determine whether the communication strategy has accomplished its objectives and whether activities need to be expanded as a follow-up program. Summative evaluation results are used as inputs to formulate new or improved communication objectives or to help set up new baselines for future activities of a similar nature.

Case Study *1 – 'No early spray' campaign*
In the Long An project, a summative evaluation of 450 farmers conducted 16 months after it was initiated revealed that farmers' insecticide applications dropped from 3-4 to 1-2. Before the project, 96% of the farmers applied their first insecticide sprays in the first 6 weeks after sowing. This was reduced to 62%. Farmers' perceptions of leaf folder damage were changed positively as shown in the belief index, which fell significantly from 11.25 to 7.62. The belief index is the sum of scale ratings of belief statements presented to respondents. A three-point Likert scale (1 for the preferred answer, 2 for indifference and 3 for the not preferred) was used to score components of belief about leaf folders. The proportion of farmers who believed that leaf folders could cause losses went down from 70% to 25%, and the percentage who believed that early season spraying was required dropped from 77% to 23%. Farmers' insecticide spray frequencies

and belief index were significantly correlated. These positive relationships imply that individual farmers with high belief indices had a higher tendency to spray insecticides.

In the three follow-up post-tests, an additional seven belief statements were used and farmers were asked to respond whether they disagreed, were indifferent or agreed with the statements.
At 31 months after the media were introduced, the number of insecticide sprays had dropped significantly from 3.35 to 1.56 sprays per farmer per season. A year later, the mean slightly increased to 1.76, although not significant. The proportion of farmers who did not use any insecticides increased from 1% in the pre-test to 20% in the first post-test and to 32% in the second post-test. The proportion of farmers spraying during the early tillering, late tillering and booting stages declined significantly (Friedman test chi square = 7.6, p< 05). In the pre-test, 59% and 84% of the farmers sprayed during the early and late tillering stages, respectively. In the first post-test, the proportion of farmers spraying in the early and late tillering stages, dropped to 28% and 42%, respectively, and in the second post-test, these proportions further declined to 0.2% and 19%, respectively. The proportion of farmers spraying in the reproductive and maturing stages initially declined in the first post-test but increased in the second post-test, but were still lower than that in the pre-test.

Correspondingly, farmers' perceptions of leaf folder damage was indicated by a significant drop in the belief index from 11.25 in the 1994 pre-test to 8.22 in the 1996 post-test and 7.62 in the 1997 post-test. The proportion of farmers who believed that leaf folders could cause losses was reduced from 70% in the 1994 pre-test to 26% in the 1996 post-test, and to 25 % in 1997, so did those who believed that early season spraying was required, from 77% to 22%, and to 23%, respectively.

Farmers' insecticide spray frequencies and the belief index were significantly correlated and were not significantly different between farmers who had attended farmer field school training and those who had not. Cost (insecticide and labor) saving was the most important incentive for farmers to stop early season spraying as cited by 89% of the farmers. It is evident that the use of communication media to present a simple rule as a conflicting idea together with a method for evaluating it stimulated thousands of farmers to respond towards change (Escalada et al., 1999).

Case study 2 – 'Three Reductions-Three Gains'
Posttest surveys conducted among 910 farmers in Can Tho province 12 months after the launching of the "Three Reductions-Three Gains" project showed significant reductions in farmers' seed rates, nitrogen fertilizer and insecticide use. As shown in Table 1, seed rates dropped significantly from 243.7 kg/ha to 210.6 kg/ha, nitrogen fertilizer use from 103 kg/ha to 95.2 kg/ha, and insecticide spray frequencies from 1.15 to 0.84. However, there was a significant increase in farmers' potassium application, and fungicide and herbicide use. The increase in fungicide use could have been triggered by a blast incidence during the summer-autumn season. Likewise, labor cost and herbicide prices might have an influence on increased herbicide use. Timing of first insecticide application has shifted significantly from 16.7 to 25 days after sowing.

The belief statements related to seed rates, fertilizer use and insecticide use were scored and belief indices were computed. Reliability coefficients for belief measures were high, which suggested that the belief items used were highly connected. The Mann-Whitney U test revealed significant changes in farmers' beliefs with regard to seed rates, fertilizer and insecticide use. Farmers' perceptions favoring the use of high seed rates declined significantly from 14.9 to 14.2, those promoting nitrogen fertilizer use decreased from 26.2 to 24.8, and beliefs that encouraged insecticide use dropped from 14.0 to 12.6. Farmers' total number of insecticide applications and belief index were significantly correlated.

Table 1. Changes in seed, fertilizer and pesticide inputs

		Pre-test	Post-test
Seed rates (kg/ha)		243.7	210.6**
Fertilizers (kg/ha)			
	Nitrogen	103.3	95.2**
	Phosphorus	55.4	54.5
	Potassium	26.7	31.8**
Number of pesticide sprays			
	Insecticides	1.15	0.84**
	Fungicides	0.34	0.97**
	Herbicides	0.04	0.29**
Timing of 1st insecticide sprays (days after seeding)		16.7	25.0**

Multiplier Effects and Policy Change

The communication campaign in Long An province stimulated other provincial governments in South Vietnam to launch their own programs. Between September 1994 and March 1997, 15 provincial governments initiated their own programs, extending to the whole Mekong Delta of 2 million farmer households. The provinces spent about $151,000 over this period, distributed 340,000 leaflets and 35,000 posters, organized 1,390 demonstration plots, and broadcast the radio drama about 1,550 times. In addition, 356,600 farmers were invited to participate in the experiment to "test" whether early season spraying for leaf folder control was necessary. A survey of 12 other districts showed that 82% of the province's 210,000 households were reached. About 20% had not applied any insecticides, 77% had stopped early season spraying and the average number of insecticide sprays was 1.6 (compared with 1.55 in study sites). These research results helped to convince the Ministry of Agriculture and Rural Development to stop registering insecticides for leaf folder control in 1998.

The Long An project illustrates how collaboration between entomologists and communication scientists had helped identify the root cause of farmers' reactions to pests and unnecessary insecticide use. It is clear that the communication approach has helped bring about changes in the belief system. For instance, the 3 beliefs about leaf folders were changed markedly. In 1994, farmers expressed strong concerns about leaf folder damage, believing that if they did not spray to kill them, they would lose a lot of yield. Today, farmers in these areas would laugh at those who would spray to control leaf folder at the early crop stages. Similarly, related beliefs about insecticides were changed. Farmers' media exposure was related negatively to beliefs and spray frequency, indicating that farmers with high media exposure had low beliefs and sprayed less.

In Can Tho province, the "Three Reductions-Three Gains" initiative has likewise resulted in multiplier effects throughout Cantho, An Giang and Tien Giang provinces, using funds from provincial governments and DANIDA to support the activities. The expansion to Tien Giang has been partially supported by the International Rice Research Institute[1] in the first year and is entirely financed by the provincial government in the next 5 years. It is expected to reach all farming households in the province. The TV drama broadcast over Cantho and national TV stations and the radio drama have brought about awareness of "Three Reductions-Three Gains" to thousands. In addition, complementary exhibitions, TV interviews with farmers, TV game shows and village level demonstrations and promotions are being organized. The out-scaling effect is expected to reach the whole of the Mekong Delta by mid 2004 and northern Vietnam by the end of 2005. Large-scale effects on seed, fertilizer and pesticide (insecticides and fungicides) use are expected. In An Giang province, the Ministry of Agriculture and Rural Development (MARD) has just announced a bumper crop and profits for farmers in the Mekong Delta in the last season and primarily due to the "Three Reductions-Three Gains" campaign. The campaign is now province wide and other provincial governments are urging farmers to adopt it.

Lessons Learned

These two experiences in implementing improved resource management practices among rice farmers illuminated a few important principles. As Figure 2 shows, information on resource management seems to lack a process that can effectively integrate the various pieces of information into usable heuristics. This

[1] This initiative was facilitated by IRRI with funds provided by the Swiss Agency for Development and Cooperation (SDC).

contrasts with genetic technologies, where information is physically embodied in seeds and planting material. The information is encoded within the seed, which can be tried out in many different environments. Locally specific information obtained from participatory breeding research is integrated into new seeds by the breeding and selection process. New seeds can be disseminated throughout rural areas through various seed distribution channels. There is a need for processes that distill bits of information and develop them into knowledge that can be communicated and used by farmers to make resource management decisions. The research distillation process is rarely used to integrate and simplify volumes of information into decision rules or heuristics (Heong and Escalada, 1999). When greater attention is given to this process, the information can be presented to farmers in an appropriate form to motivate adoption.

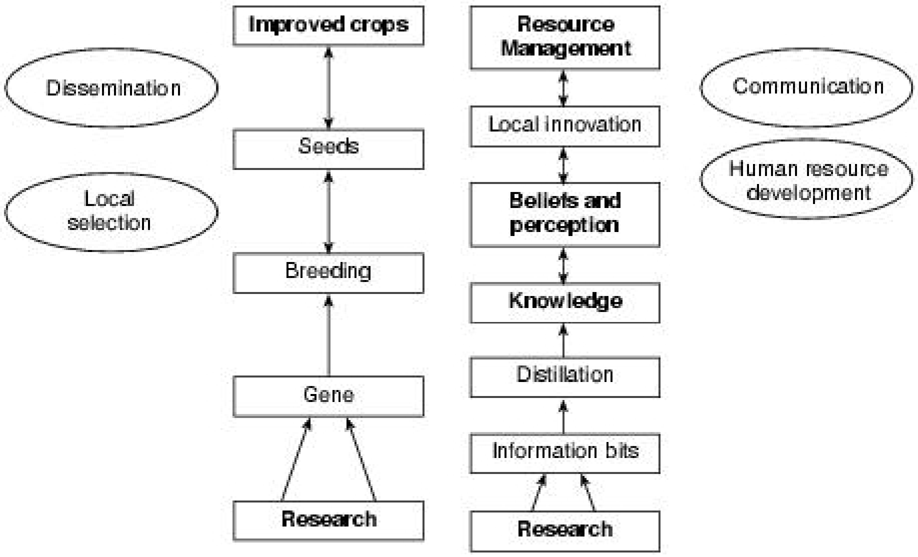

Figure 2 Alternative pathways for enhancing knowledge distillation, testing and dissemination in genetic improvement and natural resource management research

Some of the important features that we found very useful for successful campaign implementation were:

Developing high quality partnerships and building social capital.
The use of a participatory planning process facilitates equity in participation from all stakeholders and cultivates ownership of activities and high quality relationships. Participatory diagnostic workshops and establishment of a local committee to manage the project are ways that foster partnerships and build local champions.

Building project objectives within institutional objectives.
The objective of a project must also be that of the local stakeholders. They must have the capacity, structure, support, finance and desire to conduct the project. Some NARES structure may prevent it, particularly where extension is devolved and provided with little support.

Using mechanisms to encourage participation.
Participatory methods are available which provide mechanisms through which stakeholders could be involved in the process of formulating, designing, implementing, and evaluating programs. They provide guidelines not only on who should be involved but also on the timing and nature of their involvement. For instance, multi-stakeholder collaboration, where representatives of stakeholders from various sectors and levels tackle a particular issue to agree on intervention opportunities.

Encouraging farmer participatory research (FPR) to facilitate farmers' evaluation of heuristics.
In FPR, farmers engage in experiments in their own fields so that they can observe, learn, adopt new practices and spread them to other farmers. FPR is a useful approach in a fieldworker's toolkit of methods through which an innovation can be introduced to farmers. With the scientist as facilitator, farmers and scientists work together closely from initial design of the research project to data gathering, analysis, final conclusions, and follow-up actions. The main advantage of this approach is that farmers "learn by doing"

and decision rules are modified on the basis of direct experience. New information, technologies and concepts may be communicated better to farmers through the FPR approach.

Developing a participatory communication strategy and materials for evaluation.
In such an approach, communication strategies and materials are developed based on results of a participatory problem identification process on causes of farmers' non-adoption of innovations (Adhikarya, 1994). In addition, a series of participatory workshops are conducted involving various stakeholders to design materials for pretest, mass production and distribution. In addition management monitoring and evaluation mechanisms are also developed by the team to assess impact of the program. The most valuable aspect of this process is the platform it provides to facilitate stakeholder participation and the development of "win-win" situations. Goals of participants from farmers, research, extension, media, policy makers and NGOs are jointly developed in the process towards a "third alternative" (Covey, 1990). The process provides constant feedback, which encourages stakeholder discovery of successes or failures, ownership and development of innovative ideas.

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