Three cases and a model:
The application of an integrative, participatory R&D framework to UPWARD projects in Indonesia, Nepal and the Philippines

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Introduction

The framework for integrative, participatory research and development (R&D) for sustainable agriculture aiming at achievement of impact, described in the previous chapter, was partly developed in the context of the UPWARD and CIP-supported "Sweetpotato Integrated Crop Management (ICM) and ICM Training Development" project in Indonesia. Since the project was designed according to an earlier version of the model, and the model adapted as the project advanced, a high degree of congruence between model and project can be expected. A brief description and analysis of the project, confirming this congruence, is given in this chapter, together with the analyses of two other UPWARD-supported projects in Nepal and the Philippines. The purpose of this paper is to demonstrate the applicability of the model as a framework for project design and/or evaluation. More detailed information about the projects' methodologies and achievements can be found in previous UPWARD publications (UPWARD, 1996; UPWARD, 1997).

Case 1: Sweetpotato ICM and ICM training development in Indonesia

The "Sweetpotato Integrated Crop Management (ICM) and ICM Training Development" project in Indonesia was implemented over a period of three years (Nov. '94 - Oct. '97) as a collaborative effort of sweetpotato farmers from East and Central Java, Mitra Tani (a local NGO), International Potato Center (CIP - ESEAP Region), Duta Wacana Christian University, and the Research Institute for Legumes and Tuber Crops. The output achieved for each of the three stated objectives is as follows:

Objective 1: Identify ICM and ICM training needs:

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The project assessed and documented a range of aspects dealing with the impact of cultivation practices on production, impact of sweetpotato pest and diseases on production, farmer knowledge of crop health, pests and natural enemies, current crop and pest management practices, and current farmer decision-making capability with respect to management of sweetpotato crop and pest management. Training needs of sweetpotato farmers in the selected project areas were identified. Although the project was initially designed as an Integrated Pest Management (IPM) project, the results of the needs identification study oriented the project at a very early stage towards ICM.

Objective 2: Develop an ICM training model:

Sweetpotato ICM technology was:

- developed through:
  - analysis of farmers' practices as documented during the needs identification;
  - experiments conducted by the farmer researchers;
  - experiments at the CIP experiment station in Muara, Bogor; and
  - literature review;
- revised after testing in a pilot sweetpotato ICM Farmer Field School (FFS); and
- documented in a technical manual for FFS facilitators[5].

A sweetpotato ICM FFS curriculum was:

- developed by conducting and evaluating pilot FFS activities, including:
  - testing the rice IPM FFS model as a basis for sweetpotato ICM FFS ;
  - designing a tentative sweetpotato ICM FFS curriculum and a training-of-trainers (ToT) curriculum based on the evaluation of this field school, ; and
  - conducting, evaluating and revising the FFS and ToT curricula;
- documented in a manual for FFS facilitators[5].

Objective 3: Design and plan a sweetpotato ICM training program:

- Links were established with the Government of Indonesia's National IPM Program, and a strategy for organizing and funding sweetpotato ICM FFSs within the government extension system was developed.
- A ToT for farmer trainers and staff of the National IPM Program was conducted and evaluated. The trainees originating from six major sweetpotato-growing districts in four

[5] The manual produced in Bahasa Indonesia ("*Sekolah Lapangan Pengelolaan Tanaman Terpadu untuk Ubijalar*" or Integrated Crop Management Farmer Field School for Sweetpotato) contains 158 pages with field guides for FFS exercises, and 90 pages with technical background information on the topics presented in the field school. The manual is presently being translated into English and adapted for wider application. The English version is expected to be available by June 1998.

provinces made workplans for sweetpotato ICM FFS implementation with funds from the National IPM Program and local government. A ToT for NGOs is planned for 1998.

- Pilot Sweetpotato ICM FFSs in the six districts were initiated during the 1997 dry season by the National IPM Program in the context of the Follow-up FFS sub-program (meaning that farmer groups trained are rice IPM FFS alumni). The field schools received technical backstopping and were monitored by the project.

On the whole, all objectives and expected outputs as stated in the proposal were achieved during the three-year project period, albeit partly through activities different from those originally planned. Ongoing internal monitoring and evaluation of activities implemented helped identify needs for methodology adjustment. For instance, the original design of the programme to scale-up from a small core group of farmer master trainers (most of whom had participated in the project as farmer researchers) appeared untenable . The role the farmer researchers could play as field school facilitators was overestimated. Even though they felt confident as researchers, due to their lack of experience with the field school training approach they felt much less confident as trainers. A new plan for scaling-up was made by involving the National IPM Programme (farmer) trainers. Another example of adjustments of the programme as a result of internal evaluation was the involvement of external researchers to fulfill unforeseen expertise gaps. When certain types of expertise were not available or forthcoming from the project partners, we forged other links and brought in outside expertise.

In accordance with its title, the project focused on problem identification, technology and extension development, and therefore, was engaged primarily in R&D realms. By deliberately phasing over the technology (ICM) and training (FFS) models developed to the existing extension mechanisms -- i.e., through the conduct of a ToT and backstopping of farmer training -- the project tried to anticipate larger scale impact. Assessment of this impact will be undertaken during the second phase of the project, which will focus on monitoring and evaluation of farmer training, implementation, effects and impact. One possible mechanism in the upscaling process was underutilized; i.e., farmer-to-farmer dissemination. This option should have been better anticipated by clearly defining the expected output relating to awareness raising on sweetpotato ICM within the farming communities where sweetpotato ICM field schools are conducted, and by more specifically developing activities in the field school model addressing farmer-to-farmer dissemination.

The integrative nature of the project is demonstrated by:

- the change of project scope from IPM to ICM;

- the multidisciplinary composition of the project collaborators, including eight sweetpotato farmers, an entomologist/ecologist an ecologist/extension specialist, an agronomist, a socio-economist, and an all-round NGO field coordinator and trainer; and
- the involvement of a microbiologist, virologist, plant breeder and soil scientist for specific research activities for which no expertise existed among the project team members.

The participatory approach applied for project implementation highly favored the achievement of outputs. The participatory nature of the project is demonstrated by:

- the intensive participation of eight farmer researchers (sweetpotato farmers from the four project sites) at all stages of the project, except proposal writing;
- the involvement of the farming community (farmers, women farmers, traders, consumers) at the stage of problem identification; and
- the participation of farmers in pretesting the training model.

The involvement of the farming community, particularly the eight farmer researchers, at all stages of the project, directed the research towards addressing farmers' needs, and highly contributed to the validation of guidelines and methods developed. Therefore, the ICM guidelines are readily accepted by farmers attending FFS, as well as by the government institutions in charge of rootcrops. Since no farmers were involved at the very first stage of project negotiation among institutional collaborators and the proposal writing, one of the basic principles of the participatory approach was violated; however, this stage was guided by the outputs of a Rapid Rural Appraisal in sweetpotato farming communities conducted by CIP and RILET. The results were presented during a workshop with farmer participants, and the outline and activities of the project were discussed and negotiated with the farmer researchers from the moment they became involved.

Although impact assessment is the major task during the project's second phase, the issue was raised by the farmer researchers, who had expected that their research activities would directly benefit their fellow farmers, which was apparently not the case. The discussion made clear that different perceptions about "impact" existed. Impact, as it is defined in the model, cannot be expected from participatory technology development activities only, and should therefore be avoided as research still carries risk. On the other hand, the benefits of the research should -- to the extent possible -- be tangible in order to stimulate farmer interest in participating.

We conclude that, for the greater part, the project was highly congruent with the model. Project implementation deviated only in failing to promote farmer-to-farmer dissemination. Generally, the project process was a valuable learning experience for all collaborators, and we expect that through this experience we can design and conduct participatory research more efficiently in the future.

Case 2: Potato bacterial wilt management in Nepal

The "Community Approach to Potato Bacterial Wilt Management" project is an effort of a multi-disciplinary team of the Lumle Agricultural Research Centre (LARC) in Nepal. Potato is an important staple and cash crop in Nepal, and one of the most important yield-reducing factors is bacterial wilt (*Ralstonia solanacearum*). Bacterial wilt (BW) management is complicated by the seed and soil-borne nature of the disease, its long persistence in the soil, rapid dissemination and the high cost of chemical control measures. Efforts were made to manage the disease applying an Integrated Disease Management (IDM) approach through community involvement. The elements of the IDM methods adopted were massive awareness among the community members about BW and its seriousness, elimination of infected planting material from the village, a three-year ban on potato cultivation and rotation with non-host crops, use of disease-free seed potato for planting, roguing of self-sown potato in the field, and farmer education on crop hygiene and safe disposal of infected materials.

LARC initiated these activities as a test case in two severely BW-infected villages` (Ghandruk and Sabet). Implementation at the village level commenced in 1990 and was coordinated by the locally formed Cropping System Improvement Committee (CSIC), with the technical guidance and support of LARC researchers. After the partly successful pilot activities in these two villages, the project was extended to two more BW-infected villages (Ulleri and Jhilibarang) in 1993, for which UPWARD provided partial funding. The output achieved for the two stated objectives was as follows:

Objective 1: Assist the village communities in management of BW:
Positive results in two of the four villages (Sabet and Jhilibarang) showed that the IDM method applied through a community approach was very effective in managing BW. Failure in the other villages was due to unwillingness of some farmers to participate in the ban on potato cultivation.

Objective 2: Research and develop methods that are useful for recommendation in areas facing similar problems:
A range of methods for preventing and controlling BW infestation was tested, combined with community organisation approaches and packaged in an IDM methodology.

Viewing the project within the framework for integrative, participatory research suggests that its first phase fell mainly in the R&D realms. The problem identification consisted of a survey conducted by the researcher team during a trek, applying Rapid Rural Appraisal (RRA) methods. The multi-disciplinary team included a plant pathologist, entomologist, agronomist, extensionist and socioeconomist. Farmers functioned as interviewees and informants at this stage. After problems had become clear, possible control methods were investigated by some of the team members during MSc research in the UK; hence no farmers were involved at this stage. Upon return, the IDM methodology was designed and implementation discussed with farmers, resulting in a project plan and formation of a Cropping Systems Improvement Committee. The pilot project implemented in two villages further served as an opportunity to test, evaluate and adjust the methodology promoted. These activities reflect an iterative R&D process within the development, extension and implementation realms, feeding back to the researchers to adapt their methodology before transferring it to two more villages.

The second, UPWARD supported, phase should have been conceptualised as a scaling-up activity within the extension and implementation realms. A point of difference with the Indonesia case study was the continued involvement of the researcher team and the failure to transfer responsibilities to existing extension mechanisms. This was perhaps justified as a means to safeguard quality, but strongly hampers further scaling-up. The project did not anticipate impact at a larger scale at the stage of workplan preparation. Only recently, an extension of the project has been submitted to and approved by UPWARD to focus on extension to a wider area, in which the researchers will gradually hand over tasks to the extension system and the farmers.

The integrative nature of the project is demonstrated by the multi-disciplinary composition of the research team, necessary to tackle both technical and community organisational aspects. The participatory nature of the project is demonstrated by the participation of farmers as respondents in the problem identification phase and as collaborators in the final workplan design and project implementation. The researchers' intensive contact with the villagers favoured the success of the project, at least in two of the four villages. Changed farmer practices in the two successful villages resulted in considerable effects at the farm level, in that cropping patterns were changed temporarily, and after the moratorium was lifted potato cultivation became profitable again. Impact was great from a quality perspective, but limited with regard to geographical extension of the effects attained.

Monitoring and evaluation activities proposed in the current phase of the project should try to identify factors leading to both success and failure of the previous phases, by looking thoroughly at indicators dealing with the human elements of the project, in addition to the agronomic and economic indicators.

Case 3: Potato IPM FFS development in the Philippines

The Project "Community Based Pest Management for Sustainable Vegetable Production" was implemented by the Northern Mindanao Agricultural Integrated Research Center (NOMIARC), the Municipal Agricultural Office (MAO) and UPWARD as part of the Sustainable Agriculture and Natural Resources Management Program (SANREM) funded by the USAID. The project was located in Bukidnon, southern Philippines, a mid-elevation area (1,200-1,500 masl) where vegetable and potato cultivation generate the highest net income per ha, about 8-10 times the net income of maize which is the dominant crop in the area. Nevertheless, interviews at the beginning of the project revealed that more than fifty five percent of the respondents had abandoned potato cultivation since the early 1990s. The main reason was heavy infestation of *Pseudomonas solanacearum* (bacterial wilt). Potato growers receive little support from formal agricultural R&D institutions (Brons and Duna, 1997).

Recent high and stable potato prices sparked renewed interest in potato cultivation on the part of farmers and the potato processing industry. However, SANREM diagnostic activities revealed that potato cultivation practices threaten sustainable use of natural resources because of erosion due to up-down ploughing, downstream water pollution from pesticides, and deforestation by farmers seeking land free from bacterial wilt.

During village-level workshops, researchers, extension workers, farmers and local leaders discussed problems and possible solutions and decided to initiate a potato IPM-project. The project aimed at sustainable integration of potato cultivation in a high-value vegetable-based cropping system. Prerequisites for this were the reduction of bacterial wilt (BW) infestation and increased supply of quality potato planting material. BW management in potato production demands a high degree of organisation because the disease is soil- and tuber-borne and, therefore, difficult to control without collective action.

In the first two years, sixty three farmers (six groups and four individual farmers) experimented with alternative seed sources (True Potato Seed and quality seed tubers), and four groups of farmers in different villages participated in establishment of IPM pilot sites. The objective of the pilot sites was to reduce BW infestation through a moratorium on potato cultivation, removal of potato volunteers and BW host weeds, and other field sanitary measures. In addition, as an attractive alternative to potato cultivation, the project distributed seeds of high-value vegetables among farmers at the IPM site. This activity also included experiments with integrated pest management strategies, such as the conservation of natural enemies to control insect pests. Experience at the pilot sites showed that a vegetable-based production system is very vulnerable to infestation of pests and diseases, suffers from steep fluctuations of product prices;

and requires high capital investment, hence, implying a high degree of risk. Moreover, potato crop management technologies for mid-elevation areas were not readily available, and development of a solid technology and training curriculum should take the entire cropping and post-harvest cycle into account (Brons, 1996).

In the third year, the Farmer Field School (FFS) approach was introduced and the Philippines National IPM Programme “Kasalikasan” joined the project team. The objective of incorporating the FFS approach within the project was to increase farmers’ knowledge about the occurrence of potato pests and diseases, and conduct experiments with farmers to further develop potato IPM technology.

“Kasakalikasan” trainers, who had previously conducted training on cabbage IPM, were recruited to train trainers from the area. A nine-day training of trainers (ToT) event was conducted for a group of twelve trainees consisting of six staff members from the local government administration, four farmers and three UPWARD staff members who were based in Lantapan. The ToT was followed by a season-long FFS of twenty weekly sessions with four different farmer groups.

The expected output of the ToT was a preliminary curriculum for potato and cabbage IPM FFSs, enhanced capacity of the trainees to conduct FFSs, and a workplan for potato IPM FFS implementation in the project area. During the succeeding FFS sessions, the facilitators said that the ToT had been too brief to respond to the need for specific technology and curriculum development adapted to local conditions. Additionally, the trainees had difficulties in internalizing the major concepts of the FFS approach and potato IPM in such a short period. To ameliorate this problem, the project team proposed to involve the “Kasakalikasan” trainer and experts from local research institutes in providing considerable technical and methodological backstopping during the following FFS season. However, due to logistic constraints this backstopping was limited to technical presentations by resource persons during the FFS sessions (Sister and Brons 1997).

The four FFS groups conducted several experiments to test and adapt novel technologies, such as alternative planting materials and different treatments with fertilisation practices, pesticide use, and planting distance. The multiple treatments made it difficult to reach clear conclusions with respect to technical effects, and to enhance farmers’ experimentation skills. The planned technical and methodological backstopping did not materialise, and due to their limited experience with the IPM-FFS approach, the trainers fell back into an instructive rather than a facilitative teaching mode.

The project applied an integrative approach, investigating and promoting issues beyond pests and diseases to fertilisation and other crop management practices. As far as possible within the collaborative structure of the project, an attempt was made to adopt the Integrated Crop Management (ICM) concept as exemplified by the Indonesian sweetpotato project. The project team consisted of members from a range of institutions with a multi-disciplinary background.

The difficulties experienced during the ToT - FFS cycle originated in imprecise formulation of the FFS objectives and insufficient adjustment to local conditions. Consequently, different actors in the project had different perceptions of the realm they were working in and mingled research, development, and extension objectives. Initially, the ToT-FFS was meant as an arena to develop appropriate technology guidelines and concomitant extension exercises that were not yet available. However, trainers as well as trainees interpreted the project more as an effort to promote potato and vegetable cultivation without sufficiently realising the shortcomings of the promoted technologies. This divergence of perceptions occurred due to a lack of participatory problem identification. Consequently, the project did not allow for formulation of clear, operational objectives, agreed upon by all partners, nor for systematic planning and implementation of activities in anticipation of farm-level effects and impact.

Farmers' involvement in the FFS experiments was active, providing experiences to build on in the proposed second project phase. However, due to the complexity of the high-value vegetable - potato production system, the participatory nature of the project fell short at various stages. Particularly the phases of project planning and problem identification were not structured to allow for sufficient farmer participation in technology or training development.

To date the project has evaluated only farm level effects, such as yields and pesticide use by FFS trainees. A more detailed analysis is needed of how farmers experiment and how this has changed as a result of the project. Further analysis of how farmers acquire information and organise seed production will provide valuable insights on the strengths and weaknesses of the project approach.

Three cases compared

The three cases described provide a valuable opportunity for comparison of how strategic planning and implementation can favourably influence the course of a project and its accomplishments. The success of the Indonesia project can be attributed to common understanding of the project's various goals, and agreement among all collaborators about how to accomplish them. In the Nepal project, clear understanding among collaborators also existed, but was geared towards short-term goals and activities at the project sites only. Scaling-up was not anticipated in the R&D process, and no mechanisms were identified to achieve large-scale impact. The Philippines project dealt with a highly complicated production system and a mix of entangled technical and organisational problems. Because the problems were not carefully defined and prioritised, FFS trainers fell back to topics and concomitant exercises from the cabbage IPM-FFS approach. Consequently, they were less open to developing new extension methods and considered technology dissemination more important than technology development. Greater investment in strategic planning and coordination could have added considerable value to the project process and output.

Integrative, participatory research approaches enhance effectiveness and efficiency of more conventional research activities. They accelerate technology dissemination through early integration of farmers in testing and adapting technologies and in the development of extension methods. By clarifying the roles and responsibilities of the actors in the research, development and extension realms, this approach seeks to enhance the capacity of farmers, extension workers and researchers to work together to build local capacity for problem-solving, thus improving rural living standards through innovation aimed at sustainable agricultural production.

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