DFID Natural Resources Systems Programme

Theme 3
New approaches to participatory technology development

Background

Two interdisciplinary research projects funded by the UK Department for International Development (DFID) through the High Potential Production Systems Research Portfolio of the Natural Resources Systems Programme (NRSP) are working with the same communities in Bihar and eastern Uttar Pradesh in India.

R7839 is managed by Rothamsted Research and involves several project partners: IRCER, Cirrus Management Services Pvt. Ltd. (Cirrus) based in Bangalore (India), GY Associates Ltd. (UK), CABI Biosciences (UK), the Overseas Development Group, University of East Anglia (UK), and IWMI, Colombo (Sri Lanka). These projects were implemented in the command of RPC-V of the Patna Main Canal under the Sone Canal System in Bihar and the Chapia Distributary of the Gandak Canal System at Maharajganj in eastern Uttar Pradesh.

The projects' experience is presented under three themes:

Theme 1 Sustainable and scalable institutional arrangements at the community level that facilitate livelihood improvement

Theme 2 Practical ways forward for participatory land and water management in canal-irrigated areas

Theme 3 New approaches to participatory technology development

Introduction

Project R7839 sought to develop and pilot test a model for participatory technology development (PTD) that could support the sustainable and scalable institutional arrangements that the projects anticipated developing at the local level. We recognised that to do this we needed develop or implement a method to initiate this process that was not dependent on external development professionals and scientists. We considered the form of PTD that would be most likely to achieve this.

Initially differences in understanding within the project team meant that it was difficult to plan a way forward. Examining characteristics of different participatory approaches was a key activity during the first project team meeting in India and a visit to the UK by team members. In reviewing the work of others our concern was that their classifications and methods too often assumed the researcher or development professional as an active participant in research. This seemed a major constraint given our aim to develop a scalable PTD method.

We were seeking a method that would allow an organisation involved in extension to reach their many potential customers. To put the challenge in context, take for example, the district of Maharajganj in eastern Uttar Pradesh where the project is in operation. There are 1,207 villages in the district and 13 Community Development

Centres. Each Centre has an Agriculture Extension Officer. So in total there are 13 Officers across the district to provide information to the villagers. The total rural population in the district is 1,593,461. Therefore on average one Extension Officer is providing support to more than 125,000 people living in rural areas. There are 60 scheduled and rural bank branches in the district. On average one branch has to deal with nearly 26,000 people.

From this simple example it can be seen that a process of PTD that relies upon researchers as 'participants' is not likely to be viable (given there are even fewer researchers than extension workers).

Given this preliminary analysis we sought to reduce costs in the following ways:

1. By reducing the costs of initial technology prioritisation/demand identification activities
2. Developing ways to reduce resources required to stimulate experimentation within communities
3. Developing ways to encourage self-mobilisation within communities.

Self-help groups (SHGs) were identified as a way to enable people to participate by taking initiatives independent of external institutions. The dialectic approach developed by the project to establish SHGs as the primary organisational building block is reported in Theme 1. The purpose of this report is to examine our findings with respect to PTD.

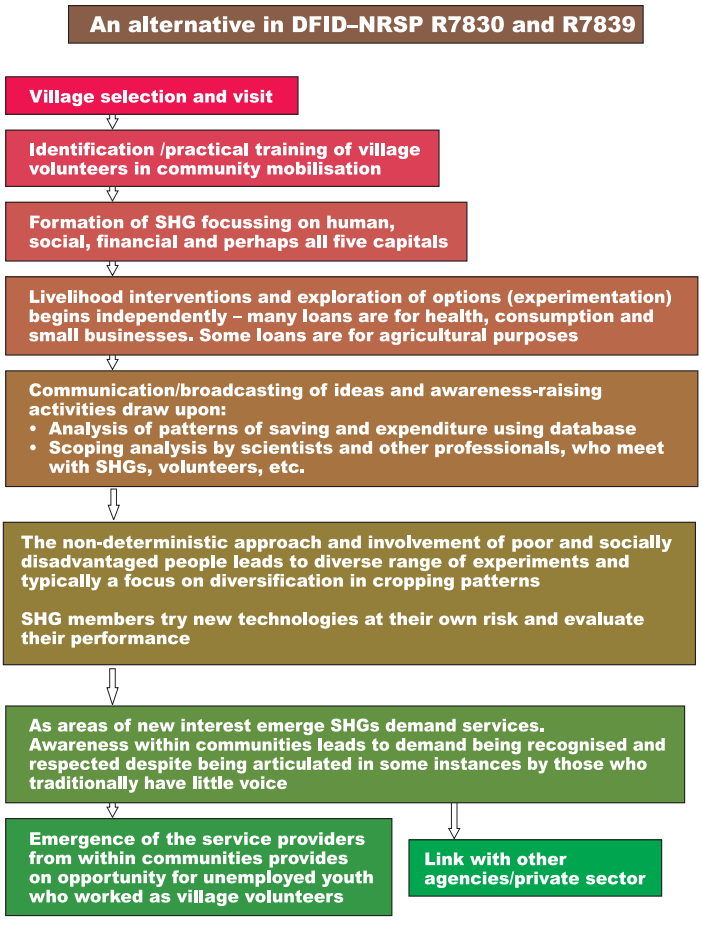
Identification of demand/prioritisation of technologies

Typically research and development projects aim, or claim, to identify the problems of communities through participatory rural appraisal (PRA) and other surveys, individual interviews, livelihood analysis, etc. Such PRA activities involve external professionals and some villagers over a number of days.

Such exercises usually seek to identify problems and then to elaborate solutions (usually in the form of technical interventions) that form the basis of future project or development activities. A typical problem might be that there is not enough food to eat in the community. This then translates into technical interventions to increase food production.

It is reasonable to question firstly, the effectiveness of such exercises in identifying 'demand' – and particularly the demand of those who are currently marginalised within a community, and secondly, their cost. By focusing on technical interventions the analysis does not elaborate on the question of why there is no money to buy food. This is an important question given that, whilst there may be local difficulties in distribution, India produces more than the food required to last for several years.

Initially in our projects it was expected that we would follow a conventional PRA process to identify technical priorities. However, after much negotiation Project R7839 developed a process through which analysis was undertaken by local volunteers (unemployed village members) as part of the SHG facilitation process and without the presence of outsiders (see figure below).



Initial testing involved some comparative and parallel activities. Conventional PRA exercises and a snowball survey approach, followed by a key informant survey and a rank-based quotient analysis were compared with issues identified as being raised in discussions within SHGs. We found close agreement between the issues identified by both methods. This finding gave us some confidence that information collected

through the SHG process could be used to identify demand as an alternative to a more intensive participatory survey processes.

In moving to project site 2 in Maharajganj, Uttar Pradesh, we decided to further test our ideas. At this site project activities began with social development activities and demand identification. Scientists made a scoping visit backed up by a simple survey. Again we found that it was possible to undertake initial demand assesment/reconnaissance activities without using intensive PRA activities that are designed to prioritise demand. Our suggestion is that such exercises are sufficient as a scoping exercise in most situations.

In addition to demand identification, the ongoing SHG methodology encouraged individuals to assess their current situation and to explore possible new livelihood strategies through facilitated livelihood analysis exercises. Given that the process facilitated by the project is underpinned by savings and credit the purpose of the loan can also be used to understand the need of the individual.

Using the database, described further in Theme Report 1, we can see that in total there were 721 persons who, between September 2001 and December 2003, used loans to purchase agriculture inputs. Table 1 shows of the amounts they borrowed. Eleven persons borrowed more than Rs.1,000. In this unit 19 SHG members leased 5 ha land. The loan they took was more than Rs.1,000, but less than Rs.3,000. The total borrowed by 19 persons was Rs.31,000. But the cost of cultivating 5 ha was around Rs.50,000.

Table 1. Characteristics of loans made within SHGs

Amount of loan (Rs)	Number of persons
< 50	94
> 50 but < 100	190
> 100 but < 200	194
> 200 but < 500	206
> 500 but < 1000	26
> 1000 < = 3000	11
Total loans for agriculture	**721**

We see this pattern repeated; for more than 90% of the loans, the amount borrowed only met part of the costs involved in the intervention. Most of the group members have used money or other investments from their own resources to make up the difference. This seems to suggest that the purpose of the loans can provide some insight into areas where group members are investing their own financial resources.

Confirmation of demand through loan profiles of SHGs

Given the non-deterministic approach adopted by the project, SHGs start saving and these savings become available to members as loans, according to their individual needs. The amount and purpose for which the loan was used is recorded. This provided the opportunity to analyse demand, as expressed by the use of financial resources.

The number of loans taken, by purpose, is shown below. From Table 2, we see that in addition to loans for investment in agriculture-related activities, many loans are for health and social needs. Data (not shown) suggest that initially loans tend to be for subsistence needs and as groups mature the loan profile shifts toward investment.

Table 2. Purpose of loans

Purpose of loan	Borrowers
Investment agricultural input or capital	721
Investment in business	486
Investment in livestock	279
Purchase of personal assets	41
Purchase of clothes	139
Investment in education	278
Purchase of food	414
Repairing/construction of houses	61
Treatment /reproductive child health	1429
Personal recreation /travelling	396
Repayment of previous loan	302
Social investment (marriage/funeral etc.)	1303
Total loans	**5849**

We suggest that projects that are technology or activity based, and which seek to control the purpose for which loans are used discourage the involvement of the poor.

From the above analysis it can be seen that the use of the loans broadly confirms the constraints identified above. It does however emphasise an underlying demand for access to inputs for crop production.

These findings suggest that a simple low-cost scoping exercise is sufficient to identify likely technical issues and that the understanding of 'demand' can be further refined through the analysis and interpretation of data collected through the SHG process.

Strategy for communication

Our hypothesis is that people constantly experiment and explore new livelihood strategies, within the scope of the risk that they are able to accommodate.

A key tactical and methodological decision was taken by the project. Rather than engage intensively with group members and communities to develop technologies we conceptualised and agreed to test the following 5-stage process (Box 1). A key step involved the 'broadcast of information', the intention being to raise awareness within communities of ideas in the research domain and to stimulate and support experimentation within communities.

Box 1. Process for raising awareness conceptualised by the project

Stage 1

Identification of technologies and information that may suit needs identified through SHG and scoping activities

Stage 2

Broadcast of information to groups, possibly with some targeting

Stage 3

Analyse response from groups and others, e.g., crops of interest… further refinement of demand

Stage 4

Consider response and develop appropriate materials

Stage 5

1st meeting with no commitments by any party to further meetings

The idea underlying this strategy was that it offered two advantages:

- It ensured that the presence of scientists did not unduly influence the process
- It represented a way to significantly reduce transaction costs.

A particular challenge that faced the project was to ensure that it was able to reach all sections of society. As part of the SHG process most groups met once in a week at a particular time and place.

Once there are regular SHG meetings most of the people in village become aware of them. The project made an evaluation of the SHGs. Four to five months after SHG formation in a village covered by the project, an independent evaluator visited the village. As soon as the evaluator entered the village, he asked villagers at random whether they knew any SHGs. If the answer was, 'Yes', the evaluator asked, 'What happens in the groups? Is it useful or a waste of time?' If 'No', the evaluator asked about village volunteers and what they were doing, etc.

In 90 % of cases surveyed villagers knew about meetings and what type of discussions were held. Many also volunteered information about SHGs and village volunteers. So we can see that the SHG provided an important venue for broadcasting ideas and initiating discussions. The project team used this platform to provide information on crops, water-related issues and livestock to the communities. Members of the project team attended a number of meetings of SHGs and volunteers initially to discuss the choice of crops suitable for the environment and the constraints to adopting them. Once the groups realised that their questions were being answered, and a rapport developed, group members became ready to listen to the scientists.

During the second visit leaflets were distributed among the group members. The other communication product used was the analysis of loans together with group members. For example, a facilitator would ask a group why they were investing money in agriculture, and in which inputs.

What did participatory technology development look like?

In the following section a series of case studies is used illustrate project experiences.

1. Seed quality

Unpredicted outcomes

The demand–identification phase identified the availability of quality seed as one of the constraints of the group members. The project initially promoted ideas related to starting seed production and improving the health of existing seed materials. Although SHG members did not do this, other farmers did produce certified seed. However, demand for seed was still being expressed.

One of the project team members attended a group meeting with three types of rice seeds. One was seed from Sugandha Agricultural University, the second was from locally available sources and the third was a hybrid from a Bangalore-based company. This meeting was with an interest group that involved members from a number of SHGs and other farmers.

Project staff told group members the seeds were from different sources and available for sale. Without knowing its source most of the group members chose the hybrid as the best seed. Project staff told them that it cost Rs.130 per kg and could only be used for a single year compared to a typical local seed that cost Rs.10 per kg and which could be saved for the next season. They emphasised that they could not give any kind of guarantee of production and if groups purchased any seed they would have to bear the risks.

All the farmers and SHG members present said they had access to the cheaper seed at home and wanted to test the hybrid seed that was new to them. Fourteen of the farmers each bought 250–500 g hybrid seed. They tested its germination and all aspects of field performance in a number of small plots.

Whilst the use of such participatory trials is not uncommon, what is less common is the non-deterministic approach used by the project team. The experiment was in response to repeated demand and enquiry. It was not an activity formally planned or conceived through a PRA – indeed a different idea was initially conceived and broadcast.

However, the hybrid trial supported by the project team generated wide interest in the area from a number of different actors.

Emergence of new service providers and linkages to markets

One volunteer attended core group meetings in four villages, and told group members that he had seed for sale. Group members started demanding vegetable seed. In 3 months, he had sold more than Rs.2,000 worth of seed, mostly for vegetables, and earned Rs.800 in the process.

Sometimes the cost of the seed from volunteers was higher than that in the market. When volunteers asked why they did not buy from the market, members said that seeds purchased from the volunteers were of better quality.

Other volunteers started demanding seed from project staff. Again, the project needed to find a way to minimise its involvement, so they met volunteers. It was noted that one volunteer is able to deal with only four or five villages, but they wanted to try in other villages. By operating as a group they could meet the demand. One group of volunteers decided to have meetings on the seed issue every week. They prepared a business action plan. Each one of them started attending the core team meeting in 3–5 villages with seed from authentic sources. They described the seed with a caution that the seed was not guaranteed, but that feedback from the farmers would certainly be communicated to the source of the seed. They also collected demand for seed for the next week or month. As the process developed the volunteers and core groups became aware of the needs of the farmers/sharecroppers. For example, there was heavy demand for seed potatoes.

In other cases many households were involved in small-scale vegetable cultivation in their homestead areas. Poor people wanted to buy a few seeds for Rs.5 or less. It is not normally possible for them to have access to quality seed. However, together there were more than 100 persons who wanted to purchase seed. The volunteers were able to provide quality seed by purchasing in bulk and then selling it in small amounts. These volunteers thus provided a service and earned for themselves.

As these activities developed it was clear that project staff could not continue to support the process, but they facilitated a link between the volunteers and the dealer/wholesalers of the seed. One volunteer took the responsibility for contacting and purchasing quality seed and making it available to other volunteers who sold it to SHG members. This group started a business supplying wheat or lentil seeds. Even with limited capital they managed to develop a business of more than Rs.50,000 in just 3 months. After group members purchased more than Rs.50,000 worth of seed, wholesalers and the representative of seed companies started attending some of the volunteer group meetings.

The emergence of the role of volunteers in provision of services in this way was not specifically planned by the project. However, the decision by project staff that they would not

become involved in meeting the demand for seed directly as a project activity was a clear strategic decision. Our view was that in order to develop a scalable process for provision of seed it was important to understand how to facilitate the development of market based solutions to seed quality issues.

Strengthened social capital

The volunteer group specialising in provision of inputs recognised a demand for insecticides to control rice insect pests. When volunteers approached a dealer, who was aware of the relationship between the volunteers and the network of SHGs, he was reluctant to sell the only product available because as it was not in original sealed packaging and he could not verify its quality.

After 5 days the product became available in sealed packaging and the dealer contacted the volunteers. Subsequent field experimentation by SHGs showed that only half of the recommended quantity of this genuine pesticide was sufficient to control pests compared to the adulterated version of the pesticide with the same name that is available in the market.

A second example relates to seed. The emergence of links with seed companies led to negotiations between the groups and company representatives. At a meeting with seed-company representatives volunteers asked who would guarantee the seed. The representative said that a guarantee could not be given to each individual on the performance of the seed, but, if there was something wrong with the crops of all the people who had purchased seed, then the company would compensate for the loss.

These examples clearly show how networking, together with the emergence of a service provider, has helped SHGs to obtain quality seed and effective inputs. Further, negotiations around management of risk and quality of inputs were negotiated directly between the actors involved, without the project needing to oversee the negotiations.

2. Changing the nature of demonstration

Zero tillage (ZT)

In the Indo-Gangetic plains the wheat crop is very sensitive to the date of sowing. Yield reduction can be as high as 44% if sowing is delayed beyond 23 December. Often, excess soil moisture and labour constraints during the period of land preparation lead to sowing delays.

Despite the widespread recognition of this constraint and promotion of zero tillage (ZT) technology it is not clear how far this technology is being adopted, particularly in eastern India. Initially our experience was that when the project described the appropriate use of fertiliser or availability of seed treatment the information attracted both the landless and the landowners, whereas information on ZT attracted only the landowners. It is easy to conclude (as many do) that this is a reflection of an inherent advantage that the technology offers to richer landowning farmers. However, our experience suggests that this is not necessarily so, and that the method of promotion may be in part at issue.

In our initial trials ZT machines were demonstrated by contacting farmers who were informed that the project was going to demonstrate amachine in their field. They readily accepted when they were told that they would get much more yield than if the field were ploughed and at less cost. Also in the initial stages additional inputs were given in the form of seed and fertilisers. Whilst the technical success of the technology was proven and some awareness was raised, there was no evidence of strong adoption.

To try and stimulate more experimentation IRCER made a machine available to an SHG in a village. The SHG fixed a hiring charge per unit of land. Though the SHG was not able to make any profit, they are trying again in 2004.

Once the technology moved into the community in this way we found that rather than seeing this as an opportunity to get access to inputs, group members and volunteers become more critical of the risk involved in the technology. It also led to discussions around the underlying idea that seed can be sown without ploughing. This idea was new and some wanted to try it on a small area of their land.

After discussing the pros and cons, group members made the machine available for hire. One person took charge of the machine with the understanding that a proportion of the income from hiring it out would come to the group. If the group made a profit the members could decide to purchase the machine. If it worked in the field many other people would either purchase the machine or hire it.

At Maharajganj, three machines were made available to SHGs and two tractor operators. The IRCER team arranged initial training for SHG members and other farmers so they could make effective use of the machines. Familiarisation was done in the presence of the IRCER team on the first day; later, interest groups arranged wheat sowing without any help. Need-based technical support was given by the team. With the help of a tractor owner the SHG arranged ZT sowing giving priority to members' fields.

This represents a major change in approach and not only does it offer a lower cost approach to communication it also appears to stimulate a higher level of engagement and experimentation.

Deep tillage

In the rice–wheat system puddling is used to prepare soil for rice transplanting. Puddling impedes percolation losses of nutrients and irrigation water, and favours rice growth. But, it destroys soil aggregates, increases soil strength in surface and sub-surface layers, decreases hydraulic conductivity and infiltration and results in inadequate charging of the soil profile for the crop following rice. Regular ploughing to the same depth and/or the use of ZT in a previously puddled field drastically changes the soil bulk density and creates a compact zone. This impedes the movement of air, water and nutrients in the soil profile to the crop following rice and the damage caused is significant, especially in southern Bihar where the soil is heavy and difficult to plough when dry.

This hardpan/compact zone must be broken regularly through deep summer ploughing (DSP). A suitable tillage technique would be one that fulfils all these considerations at a reasonable cost while at the same time resulting in optimum yields. The negligible information on crop performance and farmers' response to DSP encouraged the project team to undertake a participatory study to assess the potential for large-scale impact.

As with ZT, initially demonstration plots were prepared by DSP and sown to rice during the 2001 rainy (*kharif*) season followed by winter wheat and other winter crops in the 2001/2/3 post-rainy (*rabi*) season. The plots were established and monitored in the head, middle and tail sections of RPC-V. They involved 9.68 ha (2.42 ha composite plot each) belonging to 84 farmers. Following live demonstrations of the DSP equipment, the plots were deep-tilled with a disc plough through a group contract.

The opinions of all 84 participating farmers were recorded regularly every month during the cropping season. Again the team sought to shift the emphasis and experience into the community and in 2002 the strategic decision was taken by IRCER not to undertake any demonstration, but rather to provide technical support to those wishing to use DSP. This message was conveyed to those who were asking the team to use their land for demonstrations. In 2002, 43 more farmers tested DSP on 12.4 ha land and sowed a rice crop in the rainy season. A local service provider worked to adapt the plough (which was made available by the project) and offered service on a semi-commercial basis. In 2003, farmers themselves prepared another 15 ha by DSP. In 2004 DSP covered 56.8 ha in the project area and 117 ha in adjoining areas.

During the trials, the plots were not just monitored; information from farmers on how they view the DSP/tillage practices, and its effect on plant health and yield was also gathered. This information indicates that farmers are comparing DSP with their usual practices from various aspects including: land preparation and sowing costs, quality of crop establishment, weed growth and species composition, and pest and disease incidence.

All DSP treatments have resulted in yield increases over conventional tillage systems. A maximum rice grain yield of 5.79 t/ha was recorded following DSP with secondary tillage of bullock-drawn ploughing (twice) for puddling. An additional income of Rs.5170/ha was accrued using DSP with direct planting for rice transplanting. This increase came from both extra yield and the savings in costs of cultivation. It was observed that disease, insect, and weed infestations never crossed the threshold limit in DSP, whereas non-DSP fields were badly infested. DSP plots had 64% fewer weeds/m^2 than those conventionally tilled. Similarly, nematode populations were drastically restricted (by 71%) following DSP, especially in the tail reaches of the canal.

The effects lasted into the following season. Following DSP there was a saving of Rs.1,310/ha

for inputs under ZT over conventional tillage during the post-rainy season.

Participatory budgeting with the farmers and others in two villages, Gopalpur and Nisarpura during 2001, revealed that DSP reduced the cost on tillage, weeding, and use of pesticides, and increased yield. The total cost incurred was Rs.3,360/ha compared to Rs.5,560/ha, while the additional income obtained was Rs.5/kg from extra grain, resulting in a total benefit of Rs.6,200/ha.

At the time of DSP 72 % farmers were positive. This was reduced to 57 % by the time of rice transplanting, when the negative opinion increased from 15 to 33 %. However, at the rice tillering stage the positive opinion increased to 64 %. Finally, the negative opinion was almost 0 % at rice harvest. Difficulties in land preparation at the transplanting stage were the reason for the negative opinions. There were no farmers against DSP, and there was a drastic change in attitude from reluctance to partial agreement and finally, by May 2002, to farmers themselves paying for tillage operations .

From these two examples several important lessons emerge. Firstly we found that by encouraging experimentation within communities the process seemed to engage a wider constituency. Again we saw new service providers emerging from within SHGs and existing service providers becoming active participants in the research. The self-mobilisation approach outlined in the Introduction seemed to have been that the role of the scientists and other team members changed dramatically to one of provision of support and backstopping.

3. Livestock

There were meetings of volunteers during which very valid questions were raised. The volunteers and other participants asked about the capital investments and risks involved with hybrids. Local cattle cost less than hybrid cattle. Farmers wanted to know if these factors were considered while recommendation for this technology was given. Again this example highlights the importance of encouraging a thorough analysis of the technique. Undoubtedly the technology would have been 'adopted' by some people if the livestock had been made available on a subsidised basis. Because we did not do this, a process of hybrid cattle evaluation is ongoing.

In the case of chicks however the case is different. The Ramakrishna Mission has developed a variety whose survival rate is better than the survival rate of the indigenous variety. Chicks are available at Ranchi for Rs.12 each. However, for a poor householder who only needs one or two chicks it is not feasible to travel to Ranchi to purchase them.

It was decided in a meeting that one of the volunteers would go Ranchi and purchase 200 birds for sale to the groups. The volunteers took orders from 45 people for more than 200 chicks. Despite the travelling costs the volunteers were able to make a profit because of the size of the order. So the technology promotion became viable as a business, and volunteers took a key role in promoting the technology. But, because the volunteers purchased and sold them in the villages when the weather was cold, nearly 50 % of the chicks died.

There were no complaints from the group members, partly because they saw that the chicks grew faster than indigenous ones and even at the low rates of survival the enterprise was profitable.

Further analysis in different meetings found that the rate of survival was higher where there was electricity. People who knew about rearing chicks earned more than those who did not. This created an opportunity to provide local training.

4. Access by poor to land for crop production

Within the community in which this project operates 50 % of the people are landless and seeking livelihood opportunities. Ironically many landowners, whose main sources of income are often derived from other forms of employment, have difficulty in obtaining labour at key times of the year and in managing their land efficiently. Often the strategy they use to maximise returns is to cut costs and accept lower productivity.

Since the project began, SHG members have started to lease land. This has reduced the labour pool available to landowners, but they are happy to get Rs.14,000 per ha annual lease for their land. SHG members who borrowed to lease land try to increase its productivity. This has led both to crop diversification to high-value crops and increased efforts to increase productivity.

This not only leads to more productive management of the natural resources but also ensures landowners and the landless are happy with this tension-free arrangement.

A further dimension of this example relates to the capacity to invest and take risks by this group. In the beginning they took loans to buy fertiliser and seed, and to hire irrigation equipment. These members are poor and either landless or have marginal holdings. They were not able to lease land because they did not have any credit. They were not able to take big plots to sharecrop because they lacked capital. Group members who are now investing Rs.3,500 were initially borrowing in the order of Rs.25–200 for agricultural inputs. These initial loans were for seed, fertiliser, etc., either for their own small pieces of land or for their sharecropping - now they invest to lease.

It is also important here to note that this happened incrementally over 8 or 9 months of project implementation. It took time to build ownership and confidence in the process and then to start making decisions. After 24 months there were 19 SHG members who rented more than 5 ha of land.

Analysis of cost-effectiveness

Cost of PRA

Cost is an important determinant of scalability. It is difficult to compare costs of group formation across locations and agencies that work in this field. According to the task force on Supportive Policy and Regulatory Framework for Micro-Finance (1999) the cost of promotion and nurturing of groups has been reported by various NGOs, micro-finance institutions and micro-finance providers to range widely from as low as Rs.300 for a group to over Rs.5000 per group depending upon the type of client base, the number of groups already formed in an area and the promoting agency. While the initial costs may seem to be rather heavy, these do generally come down substantially over a period. The cost of capacity building requirement for the personnel of NGOs, micro-finance institutions and micro-finance providers are estimated by NABARD to be around Rs.300 crore over the next decade.

Looking at specific projects, the Tamil Nadu Womens Development Project (TNWDP) (implemented by the Tamil Nadu Corporation for Development of Women) utilised the services of reputed NGOs in the state to form SHGs of poor women, encouraging thrift and credit, a variety of training programmes for capacity development and providing access to institutional finance for income generating activities. The NGO support cost for 5-year intervention worked out under this project is shown in Table 3.

In addition to the above costs, the project provided for cost of training animators, representatives, cluster-level representatives, SHG members and exchange/study visit. The project envisaged continued support to the groups for 5 years. Under the Andhra Pradesh Rural Livelihoods Project (APRLP), the village livelihood worker selected from the community receives Rs.500 per month for nurturing and supporting all the SHGs in the village. This honorarium is paid from the funds of the Village Organisation, which is a federation of all SHGs in the village.

Cost of our approach

If we look at the costs of the facilitation approach we developed, the cost under the research model was Rs 700 per person. The model however is now operating in the private sector through the Centre for Promoting Sustainable Livelihoods

Table 3. Assistance provided to NGOs for group formation in *panchayat* villages TNWDP (costs in Rs.)

Description of support cost	First group	Second group	Third and subsequent groups	Three groups
Group formation	700	520	350	1,570
Monitoring (total for 4 years)	4,400	3,300	2,200	9,900
Establishing sustainable people's organisation	1,320	1,000	660	2,980
Establishing credit linkages through financial institutions	135	135	135	405
Costs per group based on forming 15 groups covering 5 panchayat village (3 groups/panchayat)				**4,952**

(CPSL) and the Sustainable Livelihood Promoting Society (SLPS) and with the benefit of scale the model is being operated at Rs.200 person.

The conventional models assume an expanding involvement of external professionals, so whilst some economies of scale are achieved, staff and related costs will remain. The model developed by our project does not involve external staff at the same level and there is no separate allocation for training and capacity development. The experience of the project has been that the weekly meeting of the Cirrus staff and the volunteers is enough and there is no need for separate training on SHG matters.

Honoraria for the volunteers at the rate of Rs.100 per month per group were provided only for 12 months and the project expected the volunteers to make their service available to the groups for payment. Indeed after initial group facilitation we anticipate the approach will become largely self-financing. Profits from activities such as provision of inputs or managing micro-finance can provide sufficient returns so it becomes worthwhile for volunteers to facilitate the process. In this way we can see that over time the process does not accumulate cost liabilities in the way that other models may.

It is too soon to validate our findings, but in 2004, a group of volunteers got a micro-finance project from an external agency which gives them operational cost to initiate the model. These activities therefore continue despite project withdrawal, providing an excellent opportunity to evaluate whether the model can operate in the private sector.

Costs of demonstrations

As with the cost of group formation it is difficult to accurately cost technology promotion. If a scientist or research associate makes weekly visits to demonstration plots, their daily fee is around Rs.800, and travelling costs are around Rs.1,000 per day. If these visits are made 10 times for one demonstration it would cost Rs.20,000. Once the demonstration ends there is no link between the villages and demonstrating agencies, so the system is not sustainable.

The approach described to encourage experimentation in the case studies above had no additional costs. Information was given in one meeting and then passed through networking. It does, of course, draw upon research, technologies and ideas developed elsewhere at a cost, but then so does a typical extension approach.

Even this very simple analysis demonstrates that the methods pilot-tested in R7830 and R7839 have dramatically different costs from the participatory research approaches they seek to build upon.

Conclusions

The dialectic approach developed by the projects, which focuses on capacity accumulation and self-mobilisation within communities, enables the costs of participatory technology development to be dramatically reduced. Indeed our findings to date suggest that the bulk of these costs can be met through the margins available from commercial activities. These commercial initiatives involve emergence through a self-mobilisation process, of new entrepreneurs together with strengthening the linkages with existing players.

We have seen that understanding the most effective way to broadcast and introduce ideas is a key factor that will determine the cost of research inputs. Again our findings suggest that subsidies can be removed, some costs of demonstration or promotion remain, but these can be limited and targeted effectively.

To enable these opportunities to be further explored, tested, and more widely implemented requires policy support and programmes that enable the new ways of working demonstrated by the projects to be further validated. The kinds of interventions made by the project are not within the capacity of any single organisation. A partnership between research and non-research partners, and those involved in rural development, between actors with varying focus and capacity was required. The project provided a learning platform for actors with different perspectives to share and contribute to a common objective:

- Institutional innovations and understanding of 'the process' are equally or more important than technical innovations and knowledge if the livelihoods of rural poor are to increase
- Research needs to be at the appropriate scale and involve relevant partnerships
- If this knowledge is to be of value in the development process, not only do agricultural research organisations need to

think about how to generate these kinds of experiences, they also need to document, analyse and communicate these kinds of lessons.

We have seen that the SHG process must be provided space to follow a dialectic process. Programmes that seek to promote activity-based groups or to form so-called SHGs for the purpose of disbursement of some form subsidy, product or credit are likely to fail.

It is necessary now to ensure that Government policies do not inadvertently exclude poor and landless people, but enable them to improve their livelihoods through active and profitable involvement in productive agriculture.

Team members

R Kumar, S Chaudhary, Md K Khan, Vijay Kumar Mishra, Centre for Promotion of Sustainable Livelihoods, Patna (formerly staff of Cirrus Management Services Pvt. Ltd., Bangalore)

A R Khan, L K Prasad, S S Singh, ICAR Research Complex for the Eastern Region (IRCER), Patna

J L Gaunt, GY Associates Ltd., Harpenden, UK

S Murphy, CABI Biosciences, Wallingford, UK

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