Proceedings of Technical Review and Planning Workshop:

"Assessing the Impact of Resource Conserving Technologies in the Indo-Gangetic Plain; Identifying Agricultural Knowledge Systems and Overcoming Blockages to Enhance Uptake of Agricultural Technologies to Optimise Pro-Poor Development"

5-7 May 2004, Hotel Eastern Residence, Banani, Dhaka, Bangladesh

Facilitated by CABI Bioscience and hosted by CIMMYT

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Part of the DFID funded project:

Reaping the Benefits - Assessing the Impact and Facilitating the Uptake of Resource Conserving Technologies in the Rice Wheat Systems of the Indo-Gangetic Plains

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Many thanks to our NGO representatives, from Imagine Nepal and Dipshika Bangladesh, for offering their experiences.

Above all, many thanks to all the Project team members who made excellent presentations and for fruitful discussions.

We hope that this workshop document contains useful reference material for all those who participated in the workshop as well as for those that did not attend the workshop and wish to learn from our experiences.

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1. INTRODUCTION

A technical review and planning workshop was held from the 5-7 May 2004 in Dhaka, Bangladesh under the DFID/CABI funded project "Reaping the Benefits - Assessing the Impact and Facilitating the Uptake of Resource Conserving Technologies in the Rice Wheat Systems of the Indo-Gangetic Plain".

1.1 Workshop Purpose

This workshop provided the opportunity for all those involved in the implementation of this project to meet, debate findings from Output One:

"Assessing the impact of improved technologies on social well-being and system productivity for each social group within each community at selected benchmark sites."

…and to share ideas and plan future strategies for addressing Output Two of this project:

"Agricultural Knowledge Systems Identified in Regions Concerned, Uptake and Adoption Blockages Ascertained and Strategies Developed to Overcome these and Optimise Pro-Poor Development"

The workshop had two objectives:

Workshop Objective One: To share the results of project Output One; livelihood impact studies of selected technologies on farmers.

Workshop Objective Two: To identify blockages in the local knowledge transfer systems and develop locally relevant strategies to optimise the uptake of relevant RCTs across all socio-economic groups of farmers to optimise pro-poor development.

The workshop programme is presented in Appendix 2.

1.2 Workshop Participants

The participants were agricultural scientists from the Banaras Hindu University (BHU), Varanasi and Narendra Deva University of Agriculture and Technology (NDUAT), Faizabad, India; Nepal Agricultural Research Council (NARC); CABI Pakistan and Wheat Research Station (WRC) Bangladesh. These scientists were joined by representatives from Dipshikha and Imagine, local NGOs working in Bangladesh and Nepal as well as scientists from CIMMYT offices in Kathmandu, Delhi, Mexico and Dhaka. All the participants are involved either directly or indirectly with the DFID funded project – "Reaping the Benefits". The workshop was facilitated by Tahseen Jafry and Sam Page of CABI Bioscience and hosted by CIMMYT Bangladesh. The full list of participants is in Appendix 1.

2. LIVELIHOOD IMPACT ASSESSMENTS: TEAM PRESENTATIONS

The first day of the workshop was concerned with capturing research results on livelihood impact assessments (LIAs) of resource conserving technologies (RCTs).

Output one: *"Assessing the impact of improved technologies on social well-being and system productivity for each social group within each community at selected benchmark sites."*

LIAs were conducted on RCTs, with farmers in villages in four countries across the Indo-Gangetic Plain: India, Pakistan, Nepal and Bangladesh. The aim of the LIAs was to determine how improved RCTs have affected the livelihoods of farmers and their families. To do this effectively, farmers were grouped according to the following classification:

Landless: Farmer does not have land and must do paid labour in order to get money to buy food or rent land on which to grow food.

Marginal: Farmer grows food crops but does not have sufficient land for household food security, s/he must do paid labour in order to buy inputs as well as food to make up the short-fall.

Self-sufficient: Farmer has just enough land to guarantee household food security under normal conditions. S/he must do paid labour in order to buy inputs.

Cash cropper: Farmer has enough land to guarantee household food security and a surplus on which s/he can grow cash crops. S/he can use the proceeds from cash cropping in order to buy inputs.

Table 1 lists the participating institutions, their project sites in each of the four countries and the RCTs that they have chosen for assessment. The methodology for conducting the LIAs is reported in a separate project document.

Table 1: Participating institutions, sample sites and technologies being assessed

Country	Institution	Village	Technologies being assessed
Pakistan	CABI Pakistan	Pindi Rateen Singh	Zero till machine
		Malomahey	Zero till machine
		Budha Goria	Zero till machine
Nepal	NARC/CIMMYT	Belwa	Power tiller/ *improved vegetable seeds
		Benauli	Power tiller/ *improved vegetable seeds
India Varanasi (1)	BHU	Bhurkura	Zero till machine/ PVS improved seed
		Kharhat	Zero till machine/ PVS improved seed
India Faizabad (2)	NDUAT	Vishnu Purna	Zero till machine
		Dammar Jot	Zero till machine
Bangladesh	WRC	Daulatpur	Improved wheat variety/ *threshing machine
		Jagdal	Improved wheat variety/ *threshing machine

*The wheat threshing machine and the improved vegetable seed have been included by the Bangladeshi and Nepalese teams in order to directly involve women in the project.

Each of the teams was asked to summarise their main research findings in terms of the impact that their chosen technologies were having on the socio-economic situation, human capital, biological/natural resources and institutional support. The main issues raised by each team are listed below. The full power point LIA presentations are available on CD from s.page@cabi.org

2.1 Pakistan Team (CABI Pakistan): LIA of zero tillage machine

All categories of farmers

- Found inconsistency in data to do with adoption and uptake: most farmers have stopped using zero tillage due to problems with soil type/hardpan, pests – rice stem borer and grasshopper – is this reality or the farmers' misconception?
- Institutional rivalry has reduced up-take of zero tillage
- No scientist-farmer interaction
- Lack of follow-up support
- The predicted Figure of 1,000,000 hectares under zero tillage is unreliable
- Need to clarify the statistics to find out the real picture of what is happening on the ground.
- Findings based on the results of 4 project villages

Marginal and landless farmers

- Poor farmers disadvantaged because they must buy their inputs from middlemen, whereas cash cropping farmers can get inputs at no extra charge from extension.

Women

- Women from cash cropping and subsistence farming families not interested in training in agriculture but marginal and landless women are very interested and their husbands support this

2.2 Nepalese Team (NARC/CIMMYT): LIA of power tiller & improved seed

Landless farmers

- Labourers like the power tiller - although there is less work to do with land preparation, there is now opportunity to do more skilled work such as growing vegeTables, while training as a power tiller driver improves their status and job prospects.

Marginal farmers

- Disadvantaged when trying to access power tillers and seed
- Have low priority in terms of hiring the power tiller when it is owned by the local cash cropping farmer
- Power tiller can be used to till small, fragmented plots
- Unable to access new, improved seed
- Women interested in obtaining seed for vegetable production

Self-sufficient farmers

- Want low interest loans to buy a power tiller
- Unable to access new, improved seed

Cash-cropping farmers

- Prefer the higher status associated with tractor ownership
- Concerned about availability of spare parts for power tillers
- Able to travel to town/India to buy new, improved seed
- Concerned about seed quality

Women

- Like power tillers because they do not have to dig out the corners of fields, carry food to tractor drivers alternatively, they do not have to feed livestock (bullocks)
- Women are more interested in vegetables production, rather than rice and wheat
- Women want to drive power tillers – "If boys can drive it so can we"!
- Cultural barriers prevent Muslim women from participating as much as Hindu women.

2.3 Indian Team 1 (BHU): LIA of zero tillage machine

Landless farmers

- Extension support is required
- Fear of wage cuts and loss in food security
- Lack of awareness and training
- Lack of education and trust
- Social problems related to risk and status

Marginal farmers

- Cost of hiring zero tillage machine and buying seed
- Lack of technical information
- Timeliness
- Low status – machine controlled by the owners
- Lack of credit, confidence and co-operative approach, can't work together

Subsistence farmers

- Cost and quality of the zero tillage machine
- Lack of credit availability
- No information on marketing available
- Sometimes other farmers do not pay when they hire out their machines
- Non-interactive information sources

Cash cropping farmers

- Problems with availability, quality and maintenance of zero tillage machines
- Want a multi-crop machine to allow them to increase cropping diversity
- Need more improved seeds
- Have many interactive information sources

2.4 Indian Team 2 (NDUAT): LIA of zero tillage machine

Landless farmers

- Lack of awareness and training
- Lack of recognition by officials
- Lack of access to loans and information

Marginal farmers

- Similar to landless plus;
- Poor availability of zero tillage machine
- Can't be used in small, fragmented plots
- Lack of information in local language
- Not women friendly

Self-sufficient farmers

- Poor information and machine availability
- Poor technical competence of responsible government departments
- High cost of machine, no subsidy available
- Not women friendly

Cash cropping farmer (owner)

- Can only use during the rabi (dry) season
- Problems with repair and maintenance
- Does not want to share information with anyone else
- Machine cannot be used in small fragmented lands

2.5 Bangladesh Team (WRC): LIA of improved wheat seed

All farmers

- Shortage of improved wheat seed
- Non- familiarity with improved varieties
- Extension always work with the same group of better-off farmers
- Problems with manual threshing of wheat
- All farmers get a yield increase with *shatabdi* variety

Marginal and landless farmers

- Both men and women want information and training
- Never visited by extension, yet productivity may be the same or more than cash cropping farmers
- Marginal farmers are in the majority

2.6 Main constraints on access to improved technologies

Each team was asked to list the main constraints affecting each of the four socio-economic groups of farmers, when trying to access improved technologies; these constraints are listed in the following Tables 2 to 6:

Table 2. Pakistan Team (CABI Pakistan): Main constraints to accessing zero tillage machines

Landless	Marginal	Self-sufficient	Cash-cropper
Zero tillage			
• Lack of information • Lack of agricultural extension support • Availability • Income to hire and purchase • Not innovative • Some do have TV and radio • Do not take risk	• 70-80% have TV and radio • Cost • Availability • Lack of interest and innovation even if thy have TV and radio • Availability of subsidy by most farmers • Information e.g. TV. and radio programmes not presented at the right time. Often early in the day when people are busy farming. • Newspapers do not have the right information in Urdu • Lack of back-up support	• Availability • Subsidy • Information • Newspapers do not have their right information to meet their needs e.g. not in Urdu • 70-80% have TV, radio • Lack of back-up support by NGOs, Govt	• If interested no problems with access • 100% have TV, radio, newspaper • Although information is available need better quality of information

Table 3. Nepal Team (NARC/CIMMYT): Main constraints to accessing power tillers and improved seed

Landless	Marginal	Self-sufficient (possible owners)	Cash-cropper (potential owners)
Power Tiller:			
• Unavailable at peak time/lack of machines • No credit to poor people • No information especially in remote areas • Driver license – very difficult to obtain	• Unavailable at peak time/lack of machines • No credit for poor people • No information especially in remote areas • Fragmented and small holdings • Driving license difficult to obtain	• Fragmented and small landholdings • Repair and maintenance problems • Availability of spare parts	• Insufficient social prestige compared to tractor ownership • Operation problems/lack of operator • Repair and maintenance problems • Availability of spare parts
Improved seed:			
• High price of seed • Cash not enough to buy • Small needs • Supplier too far away • Information • Poor seed storage technology	• High price of seed • Cash not enough to buy • Small needs • Supplier too far away • Lack of information • Poor seed storage technology	• Supplier too far away • Lack of information	• Supplier too far away • Lack of information

Table 4. Indian Team 1 (BHU): Main constraints to accessing zero tillage machines

Landless	Marginal	Self-sufficient	Cash-cropper
Zero tillage:			
• Fear of cut in employment, wages and food security • Cost of effective machines, • Part time vocation jobs, • Lack of awareness and training, • Lack of education/trust • Risk • Social problems	• Cost of hiring seed • Lack of technical education/training • Lack of risk bearing capacity • Timely availability • Credit facility • Lack of confidence • Lack of cooperative approach	• Cost of machine hiring • Quality of machine/seed • Credit facility • Timely availability • Lack of proper information • Marketing • Non-payment of hiring services by others • Ineffectiveness of non-interactive sources	• Availability of machine • Quality of maintenance • Right kind of information • Multi-crop machine • Marketing of seed • Ineffectiveness of non-interactive sources

Table 5. Indian Team 2 (NDUAT): Main constraints to accessing zero tillage machines

Landless	Marginal	Self-sufficient	Cash-cropper
Zero tillage			
• Lack of awareness and training • Credit constraints • Lack of resources • Lack of recognition • Lack of information • Lack of resources (cash)	• Lack of awareness • Cost of machines • Poor purchasing capacity • Poor information flow (including quality and quantity of information) • Availability in time • Lack of literature in local language • Poor risk bearing capacity • Not gender friendly decision making	• Availability of machine in time • Lack of technical know how (skills) • Poor information flow • Poor technical competence of government depts. • High cost of machines • Lack of confidence • Not women friendly • No access to subsidy	• Seasonal – rabi only use of machine • Repair and maintenance • Availability of machine • Subsidy on machines • Lack of sharing information

Table 6. Bangladesh Team (WRC): Main constraints to accessing improved wheat seed and threshers

Landless	Marginal	Self-sufficient	Cash-cropper
Improved wheat seed:			
• Non-availability of seed • Lack of information • Unable to buy (high price) • Cannot take risk	• Non-availability of seed • Lack of information • High price • Cannot take risk	• Non-availability • Cannot take risk • Lack of information	• Non-availability • Lack of information
Thresher:			
• Unable to buy • Not available for hire • Lack of information • Lack of interest	• Unable to buy • Does not take risk • Lack of information • Lack of interest	• High price • Cannot take risk • Locally not available • Maintenance is difficult • Lack of credit	• Low quality • Maintenance is difficult • Locally not available

2.7 Discussion of main issues raised in the presentations

- *Why do some technologies just take off by themselves? For example why has maize suddenly become so popular in Bangladesh without any support from research and extension?*

Maize was introduced by NGOs who needed corn for their chicken projects. The farmers were given free seed and provided with a ready market so that they could meet the challenge. This suggests that farmers need to be convinced that there is a clear economic advantage to the adoption of any new technology.

- *Why has zero tillage been adopted so widely in India, compared to Pakistan, where many farmers have recently stopped using this technology?*

Farmers in Pakistan have complained that zero tillage causes soil compaction and an increase in pests such as rice stem borers. They also complained of a lack of follow up on the part of extension agents. It seems that the extension service in Pakistan is not at all supportive of zero tillage, whereas research and extension in India is actively promoting this technology. Indian farmers prefer zero tillage because it controls the invasive weed *Phalaris minor* and increases their wheat yields by allowing them to advance the planting date by several weeks.

- *Can zero tillage be used by marginal farmers in India?*

The zero tillage machine is pulled by a tractor and is therefore difficult to use in small, fragmented plots. The Chinese power tiller that is being promoted in the Terai region of Nepal is less costly and can be used in small or fragmented plots, thus making it more accessible to marginal farmers.

- *How can we convince policy-makers of the value of new technologies such as zero tillage and power tillage?*

Scientists need to provide appropriate information in forms that are easily accessible and can be understood by policy-makers, such as newspaper and magazine articles and opportunities to meet farmers who are successfully using the new technologies.

- *How can we ensure that farmers are able to access good quality seeds of improved varieties in countries such as Nepal, where the national system is non-operational?*

Farmers should be given information on seed selection and storage, encouraged to make exchange visits and set up seed fairs where they can obtain new genetic material.

2.8 Emerging issues relevant to project Output One

The team presentations and discussion that followed indicate that a number of issues are emerging to do with the impact of RCTs on farmer livelihoods. These can be summarised as:

- Improved technologies are mainly benefiting the better-off farmers.

- Landless and marginal farmers who are struggling to obtain food self-sufficiency cannot take the risk associated with new technologies unlike larger farmers who can gain directly from the adoption of improved technologies.

- Improved technologies that reduce the need for labour can provide an opportunity for landless and marginal farmers to diversify into other more profitable work such e.g. in Nepal becoming power tiller drivers and obtaining factory work. But this needs to be supported by promoters of the technology as well as the community.

- Because if its compact size, power tillage is more appropriate to women and farmers with small, fragmented plots of land than tractor-driven, zero-tillage machinery.

- There are institutional constraints to reaching the poorer farmer groups. Much of this is related to institutional bureaucracy that does not allow for participatory approaches and the failure of government extension services to interact with marginal and landless farmers.

- Low status, marginal farmers do not have the same priority as larger farmers when it comes to the hiring out of tillage machines. This reduces their ability to plant wheat early, which is the main advantage of zero/power tillage.

- Social issues, such as, lack of trust, fear of food insecurity, low/no risk bearing capacity, low status, lack of confidence and lack of support are the main constraints faced by poorer farmer groups in terms of technology adoption. Larger farmers on the other hand face a different set of problems, which are more technical in nature, such as, non-availability of machines or improved seed to purchase, poor maintenance and repair service, lack of technical training and the inappropriateness of the machine under certain conditions.

- It is quite clear that lack of relevant knowledge for different farmer groups is a major problem. This is a double-ended problem. Information is not reaching farmers but also information on research findings is not reaching the relevant decision-makers. This will be discussed in more detail in the sections that follow.

- Regarding the adoption of zero tillage machines, the data from Pakistan is inconsistent with that from India. The information from Pakistan reveals that adoption is declining due to issues such as soil hard-pan development and an increase in rice stem borer/grasshopper attack, whereas data from India indicates that adoption is on the increase, particularly in areas where there are problems with the dry season weed, *Phalaris minor*. This inconsistency will be clarified by the Pakistani team in due course.

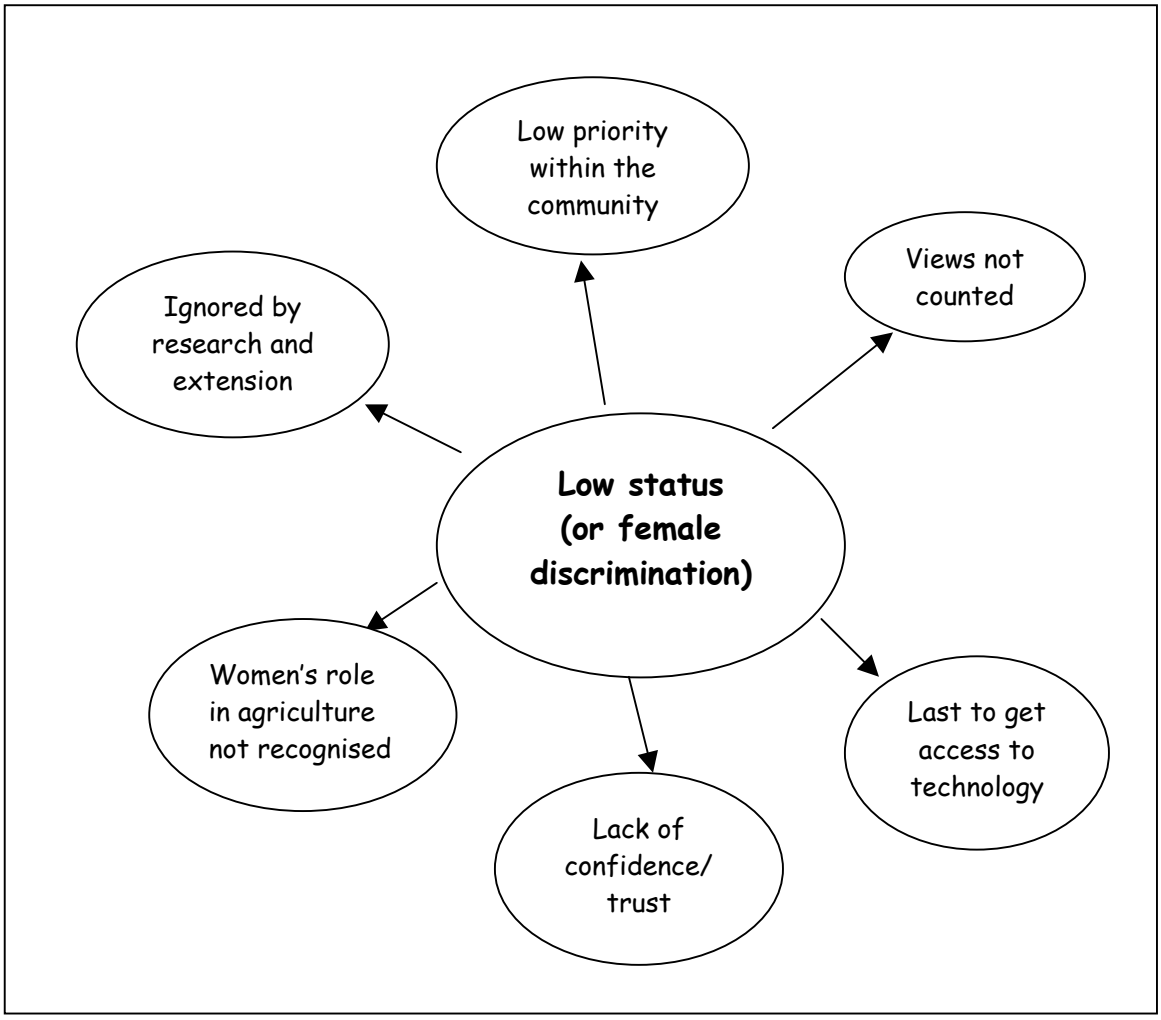
3. UNDERSTANDING THE CAUSES OF INEQUITABLE ACCESS

3.1 Underlying constraints on the pro-poor

Marginal or landless farmers and women have been identified as having gained the least benefit from improved technologies by all the investigatory teams. Considering that the basic philosophy of this project is to "optimise pro-poor development", this problem needs to be analysed further:

According to the results of the LIAs there are three underlying problems that are preventing the pro-poor, i.e. marginal, landless and women farmers, from accessing improved technologies. These are "low status" or "female discrimination", "lack of education/ illiteracy" and "poverty". Each of these three underlying problems has serious repercussions in terms of accessing the knowledge that is required to access and utilise improved technologies successfully. For example, farmers who are considered to be of low status or women tend to be ignored by research and extension as well as by influential members of their own community. This means that they will lack confidence and be the last to gain access to new technologies, such as zero or power tillage machines, as described by the teams from Nepal and India. See Figure 1.

Figure 1. Effects of low status or female discrimination



All teams have reported that poorly educated and illiterate farmers cannot get information and are rarely visited by extension. While poverty leads to fear of food insecurity and loss of income thus preventing farmers from taking the risks associated with implementing improved technologies, see Figures 2 and 3:

Figure 2. Effects of poor education/illiteracy

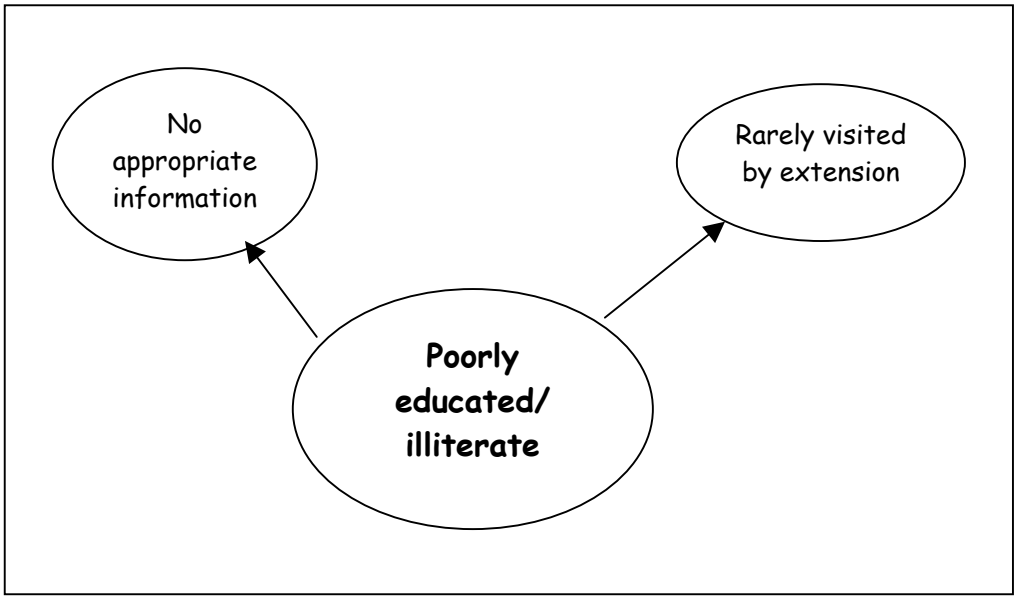
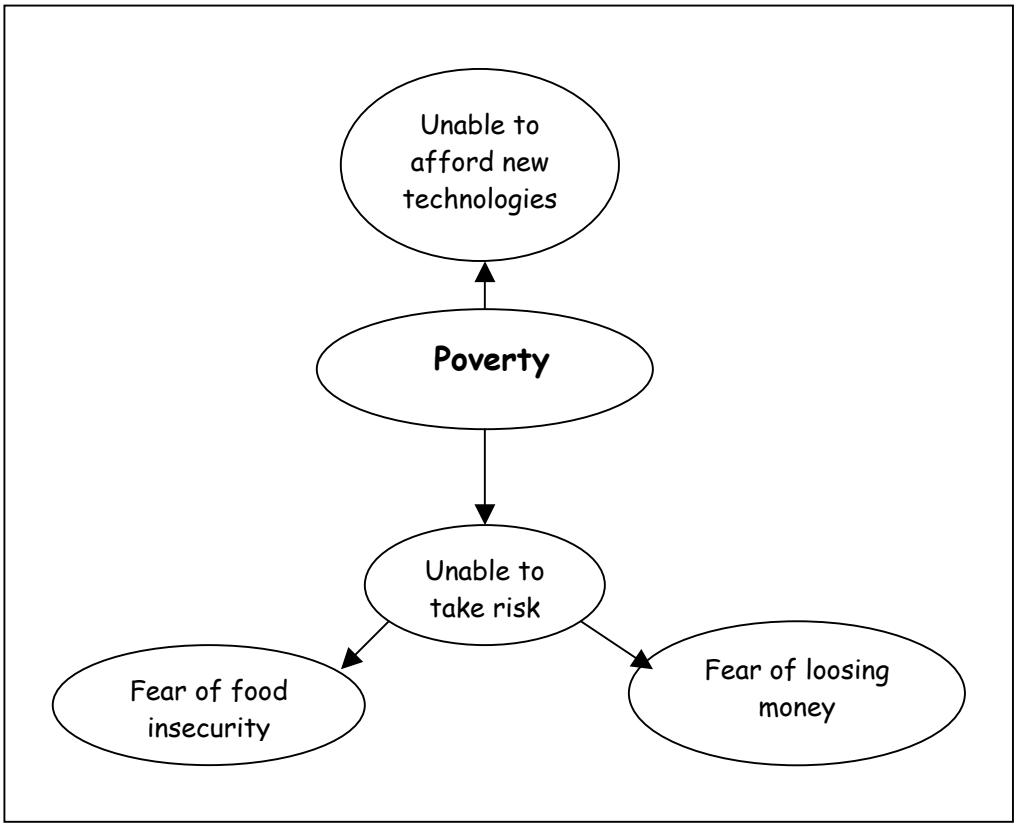


Figure 3. Effects of poverty



We must address all three of these underlying constraints in order to promote equitable access to improved technologies.

4. KNOWLEDGE MAPPING: TEAM PRESENTATIONS

Prior to the workshop, the project teams had conducted participatory exercises to capture and analyse the best sources of knowledge available to different socio-economic groups of farmers (see template in Appendix 3). Here is a summary of their research findings, that include the main issues that were raised by the farmers. The full power point presentations are available on CD, contact s.page@cabi.org

4.1 Pakistan Team (CABI Pakistan): Results of knowledge mapping exercise

- Landless are not interested in agriculture because they prefer to get higher paying industrial jobs in nearby Sialkot.
- Lack of appropriate information in the media
- Poor quality programmes and inappropriate timings
- NGO cover is limited
- Extension only visit food surplus and subsistence farmers
- Institutional rivalry is hampering development

4.2 Nepal Team (NARC/CIMMYT): Results of knowledge mapping exercise

- The number of information sources declines with decreasing wealth. Thus food surplus male farmers have access to most information sources due to more personal contacts resulting from their wealth as well as more time to reach out to these sources.
- Subsistence and marginal women farmers have access to more sources of information than wives of food surplus farmers do, because they must work to survive. Some women have more information than others depending on their mobility.
- Food surplus women farmers have less access to information because of the respectability that richer families associate with “staying at home”.
- Landless male farmers rely on their employers for information.
- Most male farmers (all categories) do not cite family, especially wives as a major source of information. Whereas women farmers (all categories) cite the family, especially husbands as a major source of information. This is due to "gender stereotyping" whereby (all) women are considered to know very little about agriculture – at least not as much as men.
- In general men have access to more sources of information/knowledge than women do. One of the major reasons for this is the subjugation of women.

4.3 Indian Team 1 (BHU): Results of knowledge mapping exercise

- How to go beyond farmer- scientist interaction?
- Need sustainable long-term strategy for dissemination.
- Adoption only occurs with farmer-scientist interaction, our help-line is very popular with farmers.
- Marginal and landless women are often bolder than men!
- Need for local “ambassadors” to promote new technologies amongst their peers.

4.4 Indian Team 2 (NDUAT): Results of knowledge mapping exercise

- Dept of agriculture and agro-industries is the least effective
- Need better links with scientists and extension
- Enhance linkages with NGOs
- Are women interested – it is the culture that prevents them from moving forward

- Blockages were literacy, cultural, motivation, food security, technical,
- Extension always working with the same people
- Male dominance
- Poor female participation

4.5 Bangladesh Team (WRC): Results of knowledge mapping exercise

- More sources of information are available to marginal and landless females than wives of subsistence and cash croppers – probably because there are many NGOs working with these groups.
- Marginal and Landless farmers are involved in group discussions.
- Food surplus and subsistence women do not take part in training whereas marginal and landless women do.
- Men like group discussions and women prefer personal contact.
- All groups value information received from family, friends, and neighbours most highly.
- Radio is not effective because they forget what they heard.
- Posters are more effective because they walk past often.
- Women do not attend demonstrations.
- Women are excluded from all research and extension activities.
- Women from food surplus and subsistence households do not get any agricultural information, apart from that which is supplied by their husbands.
- Marginal men and women do not have time to attend farmers' fairs.
- Marginal and landless farmers do not have radios or TVs.

4.6 Unblocking Knowledge Pathways

Following the presentations on knowledge pathways and blockages, participants were asked to give at least three important points to do with unblocking knowledge pathways, the results of which are shown below:

Table 7: Three important points to do with unblocking knowledge pathways

India, NDUAT	India, BHU	Nepal, NARC/CIMMYT	Pakistan, CABI Pakistan	Bangladesh, WRC
• Weak linkages with NGOs • Subsidy issues • Technical issues in dissemination • Changing motivation • Availability of machine	• Need for scientist-farmer interaction • Multi-group interaction • Development of local leaders especially for female group	• Linkages with extension office • Cultural barriers • Appropriate information for dissemination	• Farmer-scientist interaction – farmer participatory approach • Institutional rivalry • Capacity building of farmers	• Literacy • Cultural system • Motivation • Food security • Technical option • Extension always with the same group

4.7 Summary of the main findings from the knowledge mapping exercise

Access to information by male farmers in all five project areas is constrained by access to other resources such as wealth, status and the ability to take risk. This means that food surplus/cash cropping male farmers have a wide range of information sources at their disposal, while knowledge pathways for the other three categories of farmers are blocked to varying degrees. Even the mass media such as newspapers, radio and TV is inaccessible to these farmers due to their illiteracy, non-use of the vernacular or lack of receiving equipment. In other words those farmers who need most information to help increase productivity are being excluded from official channels of information. Of most concern is the fact that marginal and landless farmers are rarely, if ever visited by extension as they and many of their colleagues in research prefer to work with food surplus or self-sufficient

farmers because these farmers are literate and able to bear the risk associated with the adoption of improved technologies.

In the case of women the converse is true: the stay-at-home wives of food surplus farmers have the least access to information, while women married to marginal and landless farmers are motivated to get information from wherever they can so that they can work alongside their husbands in the field in order to survive. This need is not recognised by the extension service who rarely, if ever, visit women on the assumption that women are not involved in agriculture. Nevertheless, marginal and landless women in project areas in Bangladesh seem to be obtaining high levels of relevant information from local NGOs. Information transfer for the poorest women seems to be less clearly defined in the other project areas, where their husbands are said to be the prime source. A situation that is untenable, particularly where these men are also excluded from the mainstream of information flow.

It is clear that researchers cannot continue to rely on conventional methods of information transfer in order to disseminate new technologies to the poorest farmers and women.

5. FACILITATING EQUITABLE ACCESS : Looking at alternative approaches

The need to promote equitable access to improved technologies is the over-riding concern of this project. It is evident that we need to look at alternative approaches to technology transfer if we want to include the pro-poor in the development process. However, there seems to be some reluctance on the part of extension workers and some scientists, to work with landless and marginal farmers, including women.

5.1 Involving landless people in technology transfer

Many landless farmers are afraid that new technologies may cause unemployment, the following role playing exercise was performed to demonstrate two different approaches to technology transfer: Development model 1 consisted of a conventional approach to technology transfer in which the improved technology, i.e. a threshing machine, was benefiting the most affluent farmer. While in Development model 2 the benefits of the new technology were shared between the affluent farmer and some landless people. In the discussion that followed this exercise it was agreed that Development Model 2 was the most equitable in terms of ensuring that labourers as well as cash-cropping farmers gain from improved technologies.

Scientists should challenge current approaches to technology dissemination that favour the “better-off” farmers at the expense of the poorest ones. This paradigm shift requires innovative thinking in order to find ways of improving the situation of marginal and landless farmers, without causing resentment amongst cash-cropping and self-sufficient farmers. This may mean taking new, improved technologies directly to marginal and landless farmers in the first instance, as well as encouraging feed–back and providing appropriate training, with help from other stakeholders who are experienced at working with poor, non-literate people.

Role-Playing Exercise

Development Model 1.

Food surplus farmer: "I've just bought a new threshing machine, it cost 3,000 Taka, but now I can save money by employing less labourers".

Labourer: "The big farmer has bought a threshing machine so he doesn't need me any more".

Food surplus farmer: "I like this threshing machine – before it took 5 days to thresh all my wheat and I paid 12 labourers 50 Taka per day. Now I can thresh all my wheat in just one day with 4 labourers so I am saving 2,800 Taka every year.

Labourer: "I hate that threshing machine – now that the farmer is sharing it with 8 of his neighbours I am loosing 40 days' employment, that's 2,000 Taka every year. I am afraid that my children will go hungry".

Development Model 2.

Labourer: "The Wheat Research Centre has just loaned me and 2 of my friends a threshing machine and someone from Dipshika is going to help us make a business plan".

Food Surplus Farmer: "The labourers are providing me with a good service, they can thresh all my wheat in 1 day instead of 5 days so I am saving 2,400 Taka every year".

Labourer: "We are threshing wheat for 30 farmers now, so we are making 18,000 Taka every year – that's 6,000 Taka each. We have bought our own threshing machine. I am very grateful to the WRC for helping us".

5.2 Why work with marginal farmers?

Marginal farmers constitute the majority in all four countries involved in this project and yet these unfortunate farmers are normally excluded from all official research and extension activities. Table 8 compares available resources and productivity in terms of yield, production cost and gross margin, between cash-cropping and marginal farmers in Daulatpur, according to data collected by the Bangladesh team.

Table 8. Comparative productivity in wheat production between cash-cropping and marginal Farmers in Daulatpur, Bangladesh

Available Resources	Cash-Cropping Farmers	Marginal Farmers
Landholding	>5.5 acres	<1.5 acres
Reading ability	Literate	Illiterate
Attendance at demonstrations	Frequent	Never
Livestock	Cattle, bullocks, buffalo, goats	None
Contact with extension	Frequent	None
Ownership of machinery	Tiller and thresher	None
Yield of improved wheat variety	1.7 ton/ha	1.7 ton/ha
Total variable production costs/ha	12,264 Taka	11,235 Taka
Gross margin/ha	**15, 823 Taka**	**17,062 Taka**

This Table indicates that marginal farmers can be highly productive despite having few resources when compared with their cash-cropping counterparts. By supporting marginal farmers in the adoption of new technologies these capable farmers can move towards self-sufficiency and look forward to a more secure future for themselves and their families. Many of the activities planned in

Output two of this project will involve empowering marginal farmers to demand equal access to new technologies.

5.3 Involving women in the extension process

Women constitute the most inaccessible group so far as information transfer is concerned, with Muslim women being more secluded than their Hindu counterparts. While wives of food surplus/cash-cropping farmers and self-sufficient farmers have expressed almost no interest in farming, the complete opposite is true for women married to marginal and landless farmers. Women need scientific information on livestock rearing, as well as on vegetable production for food security and cash income. Furthermore, it is not true to say that women are not involved in the production of rice or wheat, as they are responsible for certain crucial, home-based tasks such as the raising and transplanting of rice seedlings, the threshing, drying and winnowing of wheat and rice and the selection and storage of seed. Women need expert scientific advice on all these topics.

The problem is how to get such information to women in marginal and landless households. Most of these women cannot read books, pamphlets or posters and have no control over the programmes listened to or watched on radio or TV. One new and highly successful method of reaching these women has been to make videos that focus on specific farming tasks that interest them. Such videos can be shown to groups of women in their own homes. One enterprising NGO in Bangladesh has gone a step further and provided non-literate women with all the training and resources that they need to make their own videos on important topics, such as rice drying, seed selection and grain storage. Another method of transferring knowledge to women that has been successfully employed by CIMMYT and WRC in Bangladesh involves “whole family training”. This method provides for the husband and wife to be equally involved in the training sessions, which can, for example, give guidance on all the important tasks that are required for the production of a first class wheat crop.

Output Two of this project provides scope for participating scientists to team up with NGO workers in order to modify some of the above and/or invent new methods of getting important information on the use of new technologies through to women farmers.

There are many non-government organisations (NGOs) in each of the four participating countries that have experience of working with the poorest farmers and women. In the following section we will look at ways of incorporating their experiences into mainstream extension methods to the benefit of this project.

5.4 NGO presentations

Each investigatory team was requested to bring a representative of the NGO with whom they are collaborating in this project. In the event NGO representatives came only from Bangladesh and Nepal. The representative of CARITAS in Pakistan was unable to attend while nether of the India teams have been able to locate a suitable NGO so far.

5.4.1 Imagine Nepal

- Imagine Nepal is a non-hierarchical network of practitioners and enlightened communities throughout Nepal.
- Appreciative inquiry is a holistic approach to promoting self-help amongst the socially excluded and the poorest of the poor.
- It works with the intuitive and spiritual nature of non-formally educated people, beginning by allowing them to “Discover” their life-giving forces and “Dream” or imagine what could be, then

facilitating the "Design" and construction this dream, and finally to "Deliver" the outcome in terms of participating in a tangible development process.

- It builds on physical, social, financial and human capital
- Nepalese communities have used this process to rehabilitate the environment, manage micro-credit and up-grade health-care facilities.
- This methodology could be used to empower poor women to find ways of generating sufficient income to hire or buy a power tiller.

5.4.2 Dipshikha, Bangladesh

- Dipshikha is an NGO that works to improve the livelihoods of women, landless people and marginal farmers.
- They promote income-generating projects by conducting risk assessments, providing training, developing business plans and extending micro-credit to groups of poor people.
- They do agricultural research on-farm and provide an extension service to marginal farmers.
- They promote many agricultural projects, including small-scale livestock rearing, vegeTable production and service provision.
- They have developed successful strategies for training illiterate people.
- This NGO can assist researchers who are seeking to share the benefits of new technologies with marginal, landless and women farmers.

Both of these NGOs are concerned with empowering the poorest people through a series of confidence building measures, such as training in appropriate techniques to improve agriculture and income generation and other activities designed to promote self-esteem.

5.5 Learning from NGO approaches

In section 2.9 we discovered that there are three main underlying problems, i.e. "low status" or "female discrimination", "poor education/illiteracy" and "poverty", which are preventing the poorest farmers and women from accessing improved technologies. With the help of colleagues from NGOs such as Imagine and Dipshikha it will be possible to implement activities that will empower low status farmers, facilitate knowledge transfer to the non-literate and eliminate the risks associated with the adoption of improved technologies. For example, low status farmers and women can be empowered when they are made aware of their human rights, when outsiders appreciate their indigenous knowledge or when they receive appropriate knowledge and are able to generate their own income, see Figures 4 and 4a. Non-literate farmers can gain knowledge when strategies are put into place to ensure that information is shared within the community in a form that everyone can understand, see Figure 5. The problem of poverty can be addressed by eliminating the risks that are associated with the adoption of improved technologies. This means providing relevant training, encouraging resource sharing, improving access to low interest loans and ensuring that neither food security is undermined nor input costs increased when farmers are persuaded to adopt improved technologies, see Figure 6.

Figure 4. Ways of empowering low status people

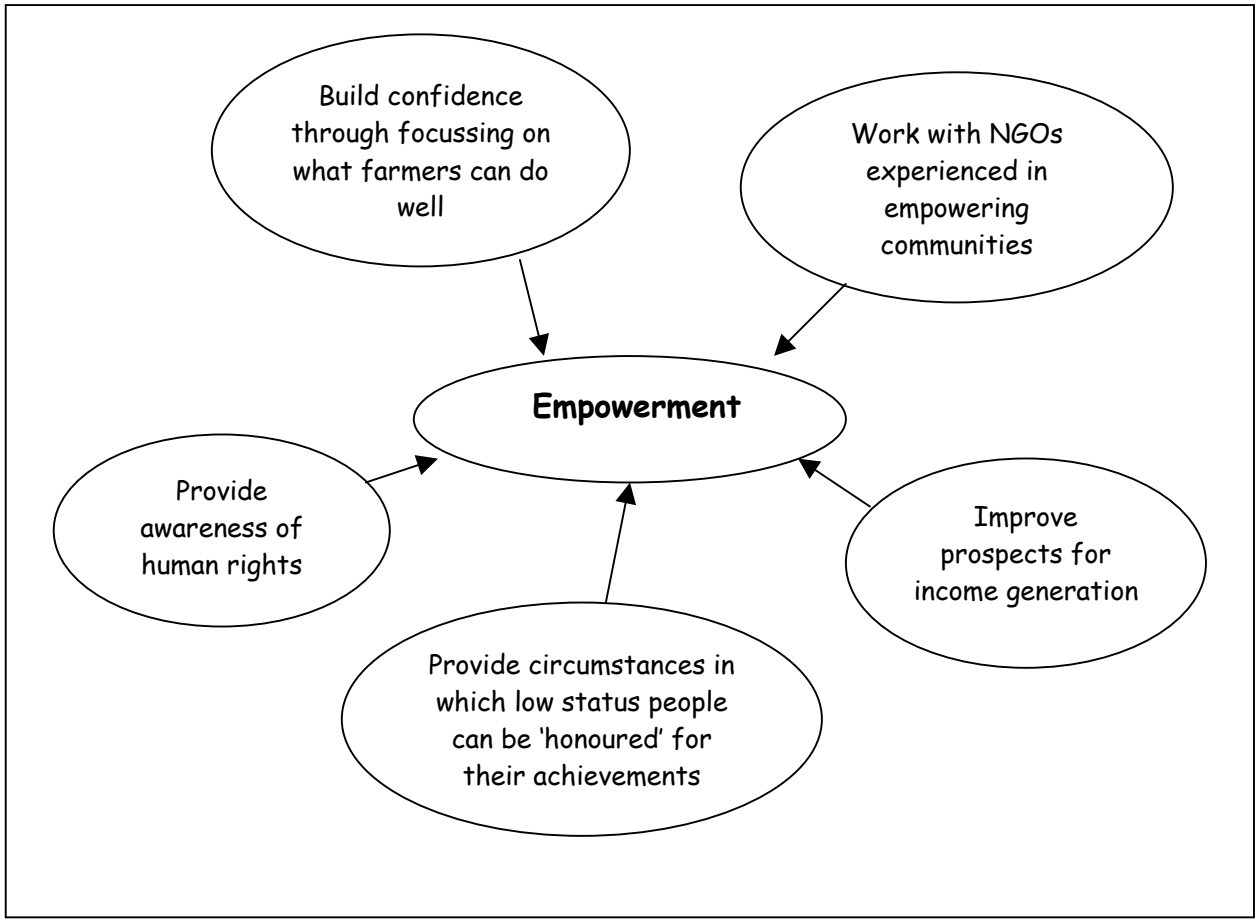


Figure 4a. Ways of empowering women

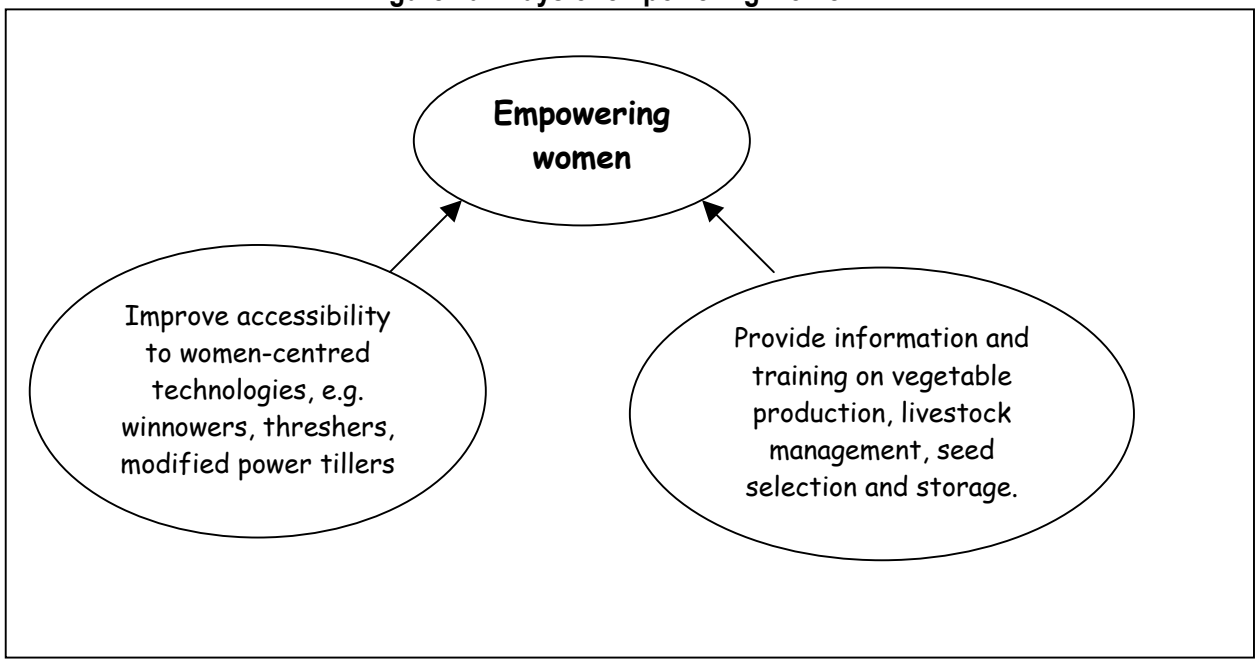


Figure 5. Ways of improving knowledge

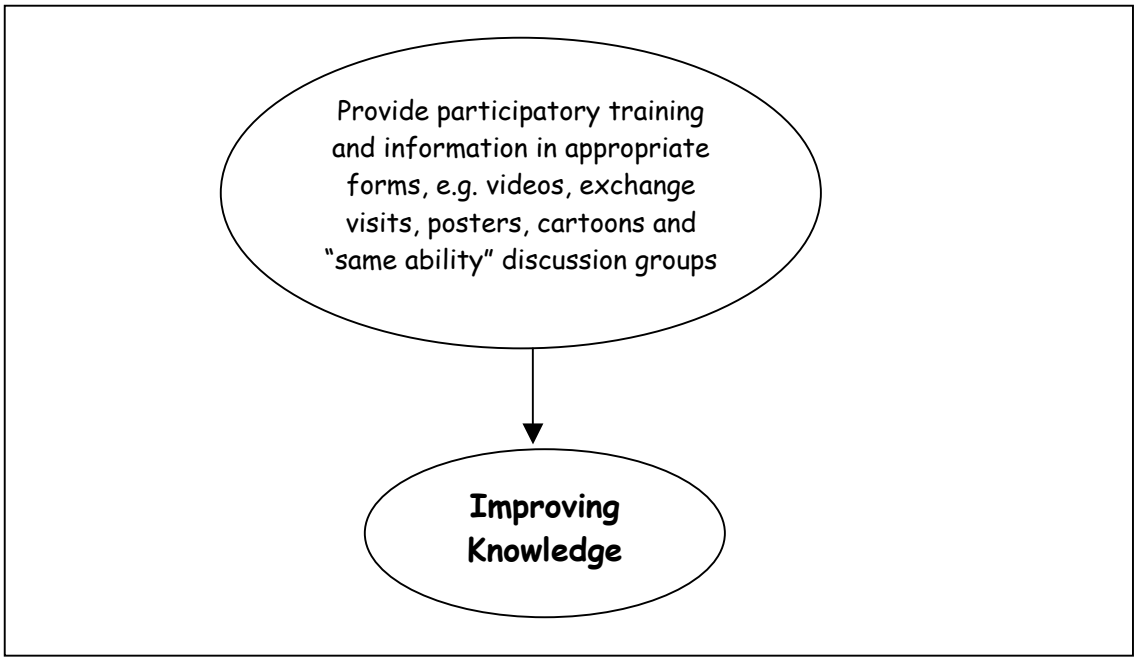
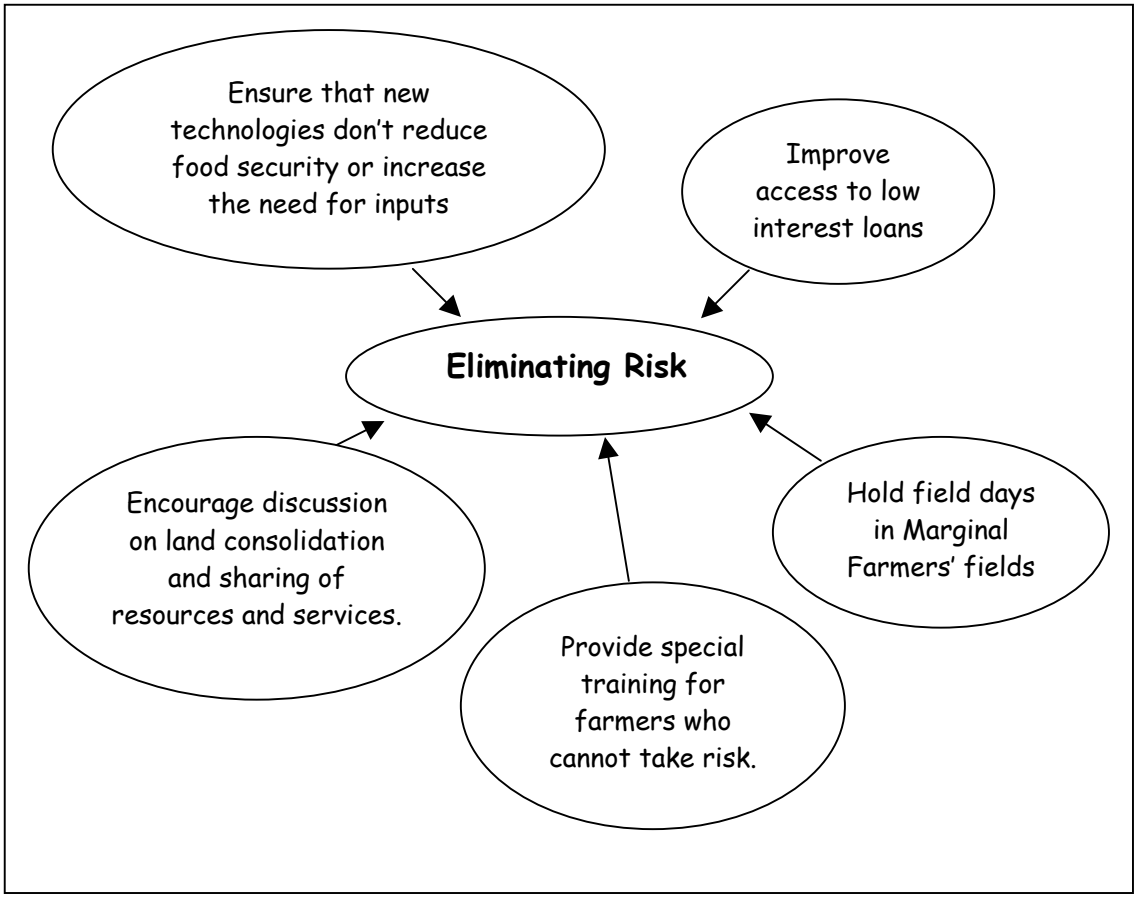


Figure 6. Ways of eliminating risk



5. TEAM WORK ON UNBLOCKING KNOWLEDGE PATHWAYS

In order to determine ways of unblocking knowledge pathways and promoting the flow of information between all stakeholders involved in the process of disseminating new technologies, each team was asked to provide answers to the following questions;

- *How to improve the impact of the media?*
- *How to link with NGOs?*
- *How to improve links with extension?*
- *How to improve direct links with marginal farmers?*
- *How to influence policy makers?*

All four teams listed a range of processes that could help to unblock existing, or open up new knowledge pathways between scientists and all other stakeholders, see Figure 7 and Tables 9 to 11.

Figure 7. Pakistan Team (CABI Pakistan): Unblocking knowledge pathways

Q.01: How to link with NGOs?
Q.02: How to improve links with marginal farmers?

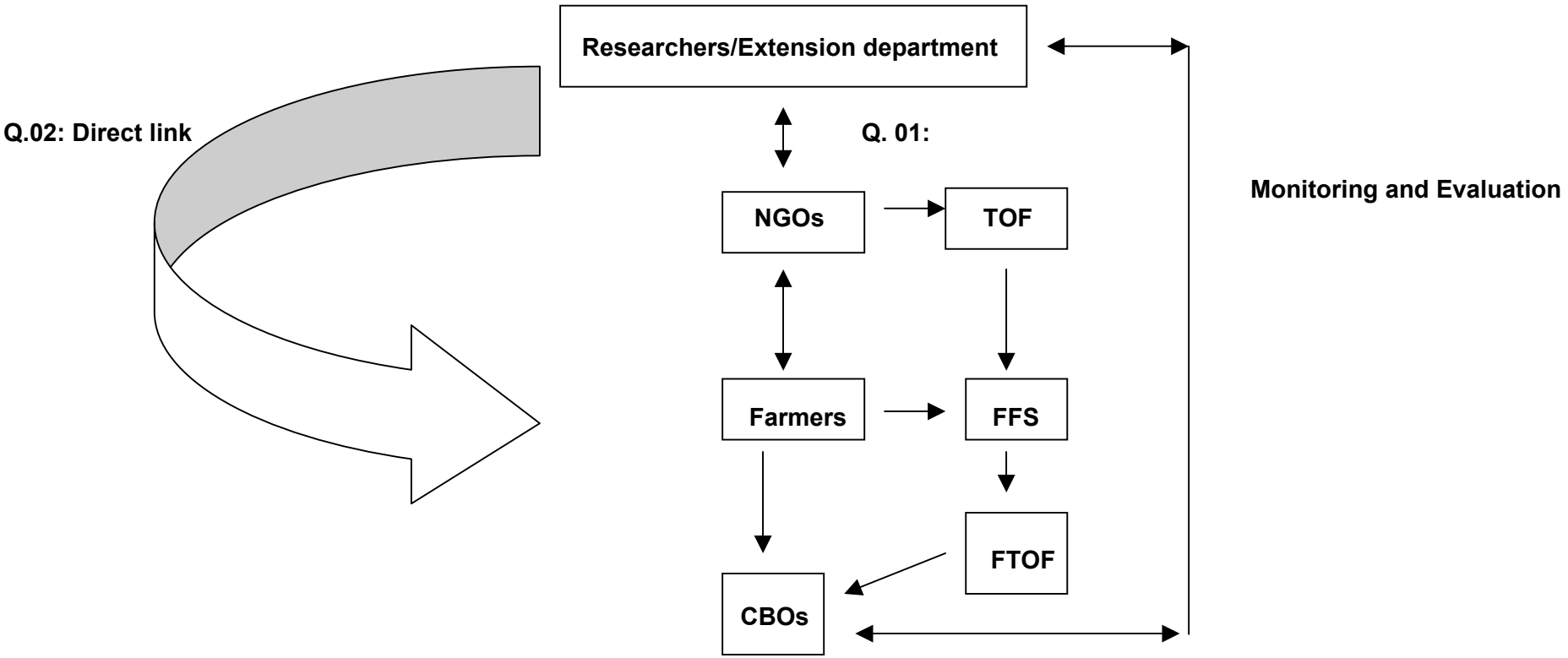


Figure 7. (cont.) Pakistan Team (CABI Pakistan): Unblocking knowledge pathways

Q.03 How to improve links with extension?

Researchers (Motivated and share the latest scientific information) → **Extension worker(TOF)**

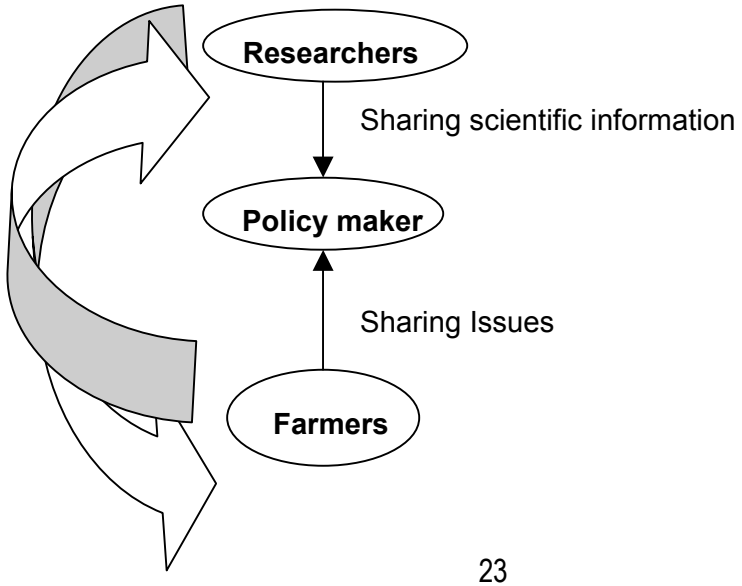
Huge network for approaching people

Farmers(FFS)

Farmers (FTOF)

Q.04: How to influence policy-makers?

Empowering farmers through sharing Scientific information and Building their capacities AND Farmers shared their issues



Q.05: How to improve the impact of the media?

1. Proper timing of agricultural programmes.
2. Sharing relevant information.
3. Site specific information.
4. Telecasting farmer oriented activities.
5. Using simple and local language.

Table 9. Nepal Team (NARC/CIMMYT): Unblocking knowledge pathways

Media	NGOs	Extension	Marginal farmers	Policy-makers
• FM radio –local simple language • Season/time • Appropriate technology at the right time • Strong linkage with media and institutions • Press conference • Sensitise the media about technological advancements • Encourage private sector to involve media about technological advancement • Site visit for media people	• Collaborative project with local NGOs • Interactive meeting • Incentives to NGOs • Provisions to bring NGOs in local priority areas	• Collaborative projects and commitments • Sensitisation to extension personnel involved • Appreciation for contribution • Updating knowledge of extension regularly • Periodic interactive meetings	• Consideration as important stakeholders • Full participation in PTD (planning, execution and M/E) • Training visits • Flow of information • Valuing the indigenous knowledge • Women's group approach	• Site visits and demonstration of the technology as a regular programme • Brochure preparation for policy makers • Farmer-policy maker interaction in central level • Documentary shows of the successful technologies

Table 10. Indian Teams (BHU & NDUAT): Unblocking knowledge pathways

Media	NGOs	Extension	Marginal farmers	Policy-makers
• Skill orientated publication in local language • Involvement of popular personality • Catchy headlines • Frequent coverage • Site coverage • Special issues/columns • Farmers interviews on radio/TV/print	• Identification of appropriate NGO in target area • Frequent NGO/Stakeholder meeting • Publicity of sharing benefit • Making NGOs technically equipped	• Frequent interaction • Exposure visits at appropriate times • Involvement of local administrators • Multidisciplinary approach • Timely knowledge/up gradation	• Development of local leaders • Development of women group • Ensuring participation of MF in every programme • Development of mf friendly technology	• Communicating the benefits through local leaders • Community approach • Displaying impact • Publicity through supported data • Inviting policy makers in lead functions

Table 11. Bangladesh Team (WRC): Unblocking knowledge pathways

Media	NGOs	Extension	Marginal farmers	Policy-makers
• Everyday agricultural programme on media • Attractive and popular ads on TV and radio • Fixed page on agricultural programmes in newspaper	• Collaborative programme • TOT fro NGOS • Follow-up monitoring and evaluation • Mutual trust and respect and sharing opportunities	• Joint meeting with top officials • Joint programme • Joint meeting at field level for execution of programme • TOT for extension • Joint demo/field day • Joint monitoring and review	• Trough training and motivation • Demonstrations with kits • Frequent visits • Group discussion	• Meeting and discussion • Provide document • Demonstrate technology • Overseas visits.

6.1 Major themes in knowledge dissemination

It is clear that there are major constraints to disseminating knowledge to all socio-economic groups of farmers. The presentations by the teams indicate that there are ways of unblocking or creating new knowledge pathways and getting information directly to the poorest farmers. Common themes were emerging from the presentations. These are classified as follows:

Media Support

- Video
- Internet site visits
- Radio
- T.V

Literature

- Booklets
- Pamphlets
- Leaflets
- Posters
- News paper articles

Farmer Participatory Interaction

- Promotion at Farmer Field School
- Exposure visits
- Training
- Farmer groups
- Farmers fair
- Mother and baby trial

Building Partnerships

- Working with NGOs and extension
- Workshop with policy makers
- Field day for policy makers

Marketing

- Business planning
- Sales promotion

The themes presented above form the basis of the next phase of the Project. All the teams were asked to develop action plans to unblock knowledge pathways based on the above classification. These plans are detailed in the following section.

6. ACTION PLANNING FOR OUTPUT TWO

The final day of the workshop was devoted to action planning in order to address the theme of Output Two, see below. The planned activities will begin in July 2004 and end in May/June 2005.

***Output Two**: "Identifying Agricultural Knowledge Systems and Overcoming Blockages to Enhance Uptake of Agricultural Technologies to Optimise Pro-Poor Development".*

7.1. Team presentations

The teams have shown that the pro-poor, i.e. women, landless and marginal farmers, have the least access to knowledge. They also recognised that scientists, extensionists, NGOs, the media and policy-makers have important roles to play in unblocking knowledge pathways that lead to the poorest farmers. The teams were asked to use their experience of local agricultural knowledge systems to plan a series of activities that will full-fill Output Two in terms of ensuring equitable access to improved technologies. These action plans were required to have tangible outputs with indicators that can be measured. Each team has now had time to revise its own action plan, making it appropriate to their situation and these are shown in Tables 12 to 16 :

Table 12. Pakistan team (CABI Pakistan): Action Plan for Output Two

Major Activity	Sub-activities	Start date	Finish date	Outputs (in terms of unblocking knowledge pathways for the poorest farmers)
Preparation of Farmers skill oriented video regarding O-tillage machine, varieties and farming community issues.	• TOT/FFS implementation and time to time coverage of the field activities.	Nov. 2004	April, 2005	Video available.
Leaflet/ pamphlet/ NGO's Bulletin, development and dissemination.	• Literature collection on RCT. • Translation in to Urdu. • Editing and formation of communication material. • Printing. • Distribution.	July, 2004	Sep. 2004	Awareness creation.
Local News Articles	2 article i.e. 01 in each crop season on RCT, varieties, pest/disease issues. • Literature collection on rice-wheat RCT, varieties, issues etc. • Write up as newspaper article. • Printing and publishing.	RICE: May, 2005 WHEAT Sep.2004	June, 2005 Oct,2004	Awareness creation.
Conduct TOT/FFS(02 in non user villages) on 0-Tillage machine. **Exposure Visits of Marginal Farmers to R & D institutes, Manufacturers, Model Farms using 0-Tillage.**	• Curricula development workshop on 0-Tillage machine. • NGO staff trained as TOT. • Marginal farmers trained as FFS. • Marginalized farmers organized by NGO in non-user villages. • One visit from all the 04 project sites.	Oct, 2004 Jan, 2005	April, 2005 March, 2005	First step: Total = 60 • Capacity building of marginalized farmers = 50 • NGO staff = 10 • Exposure visits helped the MF for getting knowledge on the new technologies and adopting them.
Conversion and registration of MF CBO into CCB. (01 CCB/project site)	• Motivation. • Animation. • Social organization into small groups and • Registration with Government Welfare department.	May, 2005	Sep, 2005	• Organized groups used for technology dissemination. • Farm service centre establishment (Rental service centre) • Exploring future development activities for poor farmers.
Stakeholder Workshop	• Preliminary activities in arranging the workshop for policy makers, NGO representatives, farmers etc.	June 2005	July 2005	• Motivation for unblocking the knowledge pathways. • Creation of awareness among the different stakeholder regarding RCT and poor farmers issues. • Consensus development on the technology related issues.
Documentation	• Data analysis • Compilation of report.	Oct, 2005	Dec, 2005	• Documented data for future planning while implementing any project.

Table 12. Pakistan team (CABI Pakistan): Action Plan for Output Two (cont.)				
Major Activity	**Sub-activities**	**Start date**	**Finish date**	**Outputs (in terms of unblocking knowledge pathways for the poorest farmers)**
Seminar	• Preliminary activities for arranging 01 day seminar for policy makers, NGO representatives, farmers etc.	Nov, 2005	Dec, 2005	• Motivation for unblocking the knowledge pathways. • Creation of awareness among the different stakeholder regarding RCT and poor farmers issues. • Consciences development on the technology related issues.
Activities for lapsed users of resource conserving technologies (0-tillage) in Shaikhupura and Sailkot.				
Data collection on the pace of sale of 0-tillage machine.	• Meetings with manufacturers at Daska. • Data collection on survey forms.	June, 2004	June, 2004	To confirm the use of 0-tillage machine.
Survey for data verification	• Selection of 10 villages from each project district, where 0-tillage technology has been introduced or being used by the marginal farmers.	July, 2004	Dec, 2004	Verified data available.

Table 13. Nepal Team (NARC/CIMMYT): Action Plan for Output Two

Major Activity	Sub-activities	Start date	Finish date	Outputs (in terms of unblocking knowledge pathways for the poorest farmers)
1. Training	Women's vegetable Cultivation Group 1) Group formation with the poorest as leaders.(Poor women have even better outside access and mobility than the cash cropping women) 2) Seed management training 3) IPM training 4) Off season vegetables 5) Marketing 6) Seed fair 7) Link / network group with other sources of information (improve other pathways)	1) End July 2) 1st Week Sept 3) 1st Week Oct 4) 1st Sep 5) 1st Nov 6) Last February 7) Ongoing		30 Women trained in vegetable cultivation with minimum 50% from marginal and landless women farmers
	Men's / RCT 1) ID marginal and landless male farmers for PT repair training 2) ID above individuals for new HMG program for PT loans 3) ID local / district level pumpset mechanics for PT repair training 4) Training a. 1st b. 2md c. 3rd d. 4th	1) End July 2) End July 3) End Sept 4) a. Last Aug b. Last Oct c. Last Jan d. Last May		Sources of information for poor women farmers increased 40 people trained in Pt repair with 50% chosen from marginal and landless class
2.a Regional Level FM Radio programs and spots Private Sector FM radio spots 16 nos. with help from NARC Public Info Division in Bhojpuri	Get 20 FM/AM Chinese radios to each women's group 1) Meeting with FM station to chalk out timings 2) Meeting with Umesh Manandhar about his program development and rates 3) ID issues/content and experts for program development 4) Writing and recording 5) Radio listening groups 6) Get other NGOs interested in forming groups. Airtime a. Winter vegetables b. Winter crops wheat etc c. Spring vegetables d. Summer rice	1) End of July 2) End July 3) End June 4) End July 5) First Aug 6) Aug 7) a. Mid Aug b. Sep c. Feb d. Apr		Through Listener letters and Listener groups obtain feedback about how far we are reaching Information reaching a much wider audience
2.b Regional Level AM Radio	1) Meeting with Krisi kariyakram folks in Kathmandu Krisi Kariyakram (AM) radio show. Invite radio personality to come to site and interview farmers for program i. vegetable Programs - 6 programs ii. PowerTiller machinery programs - 6 programs 2) Begin programming process similar to FM	End of June End of Aug		Through Listener letters and Listener groups obtain feedback about how far we are reaching Information reaching to a much wider audience

Table 13. Nepal Team (NARC/CIMMYT): Action Plan for Output Two (cont.)

Major Activity	Sub-activities	Start date	Finish date	Outputs (in terms of unblocking knowledge pathways for the poorest farmers)
3. Demonstrations	1) Off season vegetable production using / accessing CHT 2) Off season summer vegetables 3) Zero Till demonstration with PT using new wheat varieties 4) Bed planting vegetables / potatoes	1. Aug 2. Feb 3. Oct 4. Oct	Dec	50% of LL and marginal women farmer in each village will have a demonstration plot with free inputs Demonstration in 3LL and 3 marginal farmers fields with free inputs
4. Spare Parts	1) ID one poor pumpset mechanic and one tractor spare parts dealer in parwanipur area to receive PT spare parts. 2) Giving 20,000 NR PT/PTSD/reaper spare parts to each 3) Link / Visit to Kathmandu wholesale providers 4) Link via radio programs	1. End of Juy 2. End of Sept 3. End of October 4) First program		Two new suppliers of spare parts in the Birganj area
5. M&E	1) Implement 6 monthly L&A meetings 2) Get feedback from farmers/listeners on the radio program (request for letters / responses via the radio program)	1) Meeting held every 6 months 2) On-going with radio program		

Table 14. Indian Team 1 (BHU): Action Plan for Output Two

Major Activity	Sub-activities	Start date	Finish date	Outputs (in terms of unblocking knowledge pathways for the poorest farmers)
Women	1.Dialogue with existing Women's groups 2.Establish new Women's groups 3.Conduct training 4.Create multi-stakeholder linkages 5.Identify Female friendly tools (ZT) 6.Make video of Impact 7.Recognise achievement	1.6.04 1.7.04 1.9.04 1.9.04 1.9.04 1.10.04 1.7.04	30.6.04 30.9.04 30.3.05 30.10.04 30.3.05 31.12.04 30.11.04	Ensuring participation of women at all levels. Enhancement of confidence and change in mindset. Female-friendly tools (ZT) Video Pamphlets for knowledge
Landless	1.Establish Farmers groups 2 Ensure participation 3.Create multi-stakeholder linkages 4.Identify cost effective tools (ZT) 5.Make video of Impact 6.Recognise achievement 7.Conduct training	1.6.04 1.6.04 1.7.04 1.9.04 1.9.04 1.9.04 1.10.04	30.6.04 30.9.04 30.10.04 30.3.05 30.3.04 30.12.04 30.03.05	Providing opportunity for greater access to new technology. Making them active partners of the linkage group. Enhancement of confidence and change in mindset. Cost-effective tools Video, posters and radio talk
Marginal	1.Establish Farmers groups 2.Create multi-stakeholder linkage 3.Identify cost effective tools (ZT) 4.Make video of Impact 5.Conduct training 6.Recognise achievement	1.6.04 1.6.04 1.9.04 1.9.04 1.9.04 1.10.04	30.3.05 30.3.05 30.10.04 30.3.05 30.03.05 30.03.05	Ensuring participation at all levels and making them active partners of the linkage group. Enhancement of confidence. Video, Pamphlets, Posters, Radio/TV talk
Big/Subsistence	1.Create motivation to purchase machine 2.Create motivation to do seed production 3.Create multi-stakeholder linkage 4.Conduct training 5.Make video of Impact 6.Recognise achievement	1.6.04 1.6.04 1.9.04 1.9.04 1.9.04 1.10.04	30.11.04 30.11.04 30.3.05 30.03.05 30.3.05 30.12.04	Ensuring their role in the flow of information as "Ambassadors" of technology. Video, Pamphlets, Posters, Radio/TV talk

Table 15. Indian Team 2 (NDUAT): Action Plan for Output Two

Major Activities	Sub Activities	Start date	Finish date	Outputs (In terms of unblocking knowledge path ways for the poor farmers/non adopters)
1. Capacity building	* Farmers training	-	First forth night of Nov., 04	Skill orientation in ZT wheat
	* Service provide training	-	Oct., 04	Entrepreneurship development
	* Farmers-scientist interaction	-	Jan., 05	Face to face problem solution
	* Expose visit cum-travelling seminar	-	End Feb., 05	Knowledge exchange
	* ZT based TOT	-	Nov., 1st week, 04	Technology awareness
	* Field day	-	Oct., 04	Seeing is believing
	* Farmers' fair	-	March, 05	Acquiring knowledge
2. On-farm activities	* First line demonstration on			
	- ZT Rice	June, 04	Nov., 04	Comparative performance
	- ZT Wheat	Nov., 04	April, 05	Comparative performance
3. Print media	* Poster in Hindi-1	-	Sept., 04	Awareness on ZT technology
	* Folder in Hindi-1	-	Sept., 04	Knowledge up gradation
	* Booklet in Hindi on ZT practices-1	Aug., 04	Sept., 04	Technical understanding
	* Views in news papers	Through out the year		Awareness
	* Popular scientific articles	Through out the year		Technical awareness
	* Documentation of impact -Reaping the Benefits of RCT (ZT in rice & wheat)	-	May, 05	Status and impact assessment
4. Electronic media	* Co-operators interview and opinion/scientists talk through			
	- Radio	Oct., 04	May, 05	Wide spread of technology
	- TV	-	Feb., 05	Wide spread of technology
	* Video film production	Oct., 04	April, 05	Awareness creation
5. Group formation	* Creation of active group for			
	- Practising male farmers	-	Sept., 04	Developing local leadership
	- Practising female farmers	-	Sept., 04	Developing local leadership
6. Involvement of NGO's	* Technology dissemination	Nov., 04	April, 05	Promotional awareness
7. Improving linkage with field extension system	* Involvement of district authorities & line Dept.			
	- In programme planning	-	Oct. 04	Subsidy and input movalization
	- In Extension activities like			
	- Field day	-	Oct. 04	Extrapolation and area expansion
	- Farmers' fair	-	March, 05	Extrapolation and area expansion
8. Ensuring participating of policy makers	* Field day	-	Oct. 04	Translating impact into priority area viz. food and environmental securities and diesel/water saving
	* Farmers' fair	-	March, 05	

Table 16. Bangladesh Team (WRC): Action Plan for Output Two

Major Activity	Sub-activities	Start date	Finish date	Outputs (in terms of unblocking knowledge pathways for the poorest farmers)
Activity 1: Set up a Participatory Wheat Seed Production Program for Marginal Farmers	1. Farmer groups selection by NGO (Dipshikha)	August	August	
	2. Farming families training (10 families in each village) and 5-6 NGO workers in wheat seed production (1 day) - Sowing plan - Distribution of Shatabdi seed - Input application (fertilizer+ irrigation)	October 04	October 04	Up gradation of farmers knowledge about wheat seed production technology
	3. NGO will monitor sowing activities in Nov. Using calendar & planning card and supervise other activities - weeding - irrigation - top dressing - rogueing	November 04	March 05	Establishment and practical teaching of wheat seed production procedure to the resource poor farmers
	4. 2nd training for seed processing and storing - harvesting - threshing - cleaning - storage	February 05	March 05	Up gradation of farmers knowledge about wheat seed preservation technology
	5. Monitoring and data collection on amount of seed produce by each farmers, and calculation of profit (Researcher/ NGO will do this)	January 05	April 05	
	6. Make a video covering all activities then distribute it to NGOs, Extn., CIMMYT and CABI	Nov 04	April 05	Booklets (pictorial) for non-literate, video and reports
Activity 2: To demonstrate the ability of a marginal farmer to pay back 50% of the cost of wheat–rice thresher within 1 year. (Machine will be provided from the project)	7. 2 Marginal farming families rent WRC thresher (8000-10000 Tk.) for one year (one in each village)			Solve threshing problem and increase cash earning
	8. Farmers selection by NGO & scientist	Oct. 04	Oct. 04	
	9. NGO provides business plan and keeps record of progress made on family development card	Oct. 04	May. 05	
	10. Training will be provided by WRC in October-November for rice and in March for wheat threshing	Oct. 04	Mar.05	Up gradation of farmers skill on use of threshing machine
	11.Documention of all activities by scientists (paper/ article published in local news paper, Ag. magazine, or scientific journal, brochure made and given to policy makers	Oct. 04	May 05	Booklets, and reports
	12.Record farmer's view on the success of the threshing machine on video and supply it to policy maker	Oct. 04	May 05	Video
	13.Planning meeting with NGO (Dipshikha)	June 05	July 05	Review past achievement planning for future

7.2. How will these activities unblock knowledge pathways for the poorest farmers?

The activities highlighted in the five country action plans aim to unblock knowledge pathways for the poorest farmers, including women and also for policy-makers by doing one or more of the following:

Empowering farmers

- Working with NGOs to facilitate access to the poorest farmers and women.
- Arranging exposure visits and farmer-to-farmer exchanges.
- Setting up separate discussion groups for women, marginal and landless farmers
- Participatory experimentation with improved technologies at Farmer Field Schools.

Improving knowledge

- Training extension and NGO workers to work alongside scientists.
- Videoing activities relating to new technologies for use by women's groups.
- Establishing radio-listeners' groups especially for women.
- Producing booklets, pamphlets, leaflets and posters in the local language and with pictures for non-literate farmers.

Reducing Risk

- Providing specific training for risk-prone farmers.
- Creating markets to reduce the risk associated with new technologies.
- Helping with business planning for the poorest farmers.
- Holding field days in marginal farmers' fields.

Informing policy-makers

- Writing newspaper and magazine articles to be read by policy-makers.
- Arranging exposure visits.
- Facilitating workshops with policy-makers.
- Producing material for radio and TV.
- Providing invitations to field days.

Many of the experiences and resources that will be produced during the implementation of Output Two will have a wide application amongst rice-wheat farmers throughout the region.

8. WORKSHOP OUTCOMES AND CONCLUDING REMARKS

8.1 Workshop Outcomes

This technical review and planning workshop provided an opportunity for project teams from four countries, Bangladesh, India, Nepal and Pakistan to present, discuss and debate their research findings on the DFID/CABI funded project *"Reaping the Benefits – Assessing the Impact and Facilitating the Uptake of Resource Conserving Technologies in the Rice Wheat Systems of the Indo-Gangetic Plain".* The text below is a reflection of the main findings and issues that emerged from the Workshop. It is a compilation of discussion points that were being raised during and after team presentations. It is not an exhaustive list but it captures the main essence of the 3-day programme in Dhaka.

- Development of new technologies for the rice wheat systems is essential to meet the food needs of the people who live on the Indo-Gangetic Plain. It is clear that some farmers, i.e. those who are able to take risk, are benefiting more from these new technologies than others. Nevertheless, some poorer and marginalized groups do have indirect benefits from new technologies e.g. in Nepal – training to become a power tiller driver led to improved status within the community.

- Constraints to accessing technologies by farmers can be summarised in the following way; small and marginalized groups face problems related more to social constraints e.g. low status, poverty and food insecurity whereas the larger farmers have problems relating more to technical issues e.g. availability of spare parts and machinery.

- While it may seem irrelevant to be concerned about poor farmers whose plots may be too small to benefit from zero tillage technologies, it is necessary is to involve them in the technology dissemination process to enable them to make decisions regarding future changes in labour requirements. In order to ensure that self-sufficient and marginal farmers gain from improved technologies, their involvement and diversification into supporting roles needs to be facilitated by those who are responsible for introducing it.

- Effective knowledge systems only seem to exist for the better-off, cash-cropping farmers. Although marginal farmers constitute the majority, they are rarely, if ever, visited by extension. Women are totally excluded from all official information channels. Women from self-sufficient or cash-cropping families are not interested in receiving information, while those in marginal or landless families are highly motivated to seek out information from wherever they can. The problem can be considered from two perspectives: Firstly information is in an inappropriate form for most farmers and secondly information on farmers needs does not reach those policy makers who can affect changes that might improve access to improved technologies.

- In order to develop a win-win situation for all stakeholders involved in technology dissemination, the project teams developed detailed action plans to unblock knowledge pathways. The main issues to be tackled include empowering farmers, improving knowledge, reducing risk and informing policy-makers.

8.2 Concluding remarks

To conclude, this workshop has achieved a number of objectives. These include:

- New relationships being formed between team members from different countries.
- Learning from NGOs in the identification and analysis of blockages to technology uptake
- Development of local/situation specific strategies and action plans to overcome blockages in technology uptake and adoption.

Above all, this workshop was invaluable to the Rice-Wheat project because it has allowed the project partners reach a common platform from which we can progress onto the next phase of the project.

Appendix 1.

Table 1. List of Participants

Name of Participants	Organisation	Email address
Etienne Duveiller	CIMMYT Kathmandu	e.duveiller@cgiar.org
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Tahseen Jafry	CABI Bioscience, UK	Tahseen@gmx.net
Sam Page	CABI Bioscience, UK	s.page@cabi.org

Appendix 2.

Workshop Programme

Wednesday 5th May 2004

Workshop Objective One

"To share the results of project output one; Livelihood impact studies of selected technologies on farmers".

Time	Session	Facilitator/Presenter
0900-0915	Welcome and Opening Address	Dr Razzaque
0915- 0930	Introduction to Workshop programme and Wednesdays programme	Sam Page
0930-0945	Livelihood Impact Studies – Overview	Tahseen Jafry
	Project Team Presentations	
0945-1015	Pakistan – CABI Pakistan	Bushra Rasheed Gulam Ali
1015-1045	Nepal – Nepal Agricultural Research Council/Nepal CIMMYT	Ganesh Sah Scott Justice
1045-1100	**Tea Break**	
1100-1130	India – Banares Hindu University	Arun Joshi, Ramesh Chanda V K Chandola
1130-1200	India – Directorate of Extension Narendra Deva University of Agriculture and Technology	R V Pandey Abha Singh Tribhuwan Singh
1200-1230	Bangladesh – Wheat Research Center	Md Elahi Baksh, Md Jahangir Kabir, M. Harun Ur Rasheed
1230-1300	Discussion and summary of main findings	Tahseen Jafry and Sam Page
1300-1400	**Lunch Break**	
1400-1415	Equitable Access: Introduction of Issues	Sam Page
1415-1530	Role Playing Exercise	Sam Page, Tahseen Jafry, Etienne Duvellier, Shahid Parvez
1530-1545	**Tea Break**	
1545-1630	Plenary of Group Discussions	Sam Page
1630-1700	Summary of the days progress, outline for day two and close	Sam Page

Thursday 6th May 2004

Workshop Objective Two

"To identify and develop locally relevant strategies to optimise the uptake of relevant RCTs across all socio-economic groups of farmers. To discuss the ways forward and how to overcome the blockages that have been identified by farmers".

Time	Session	Facilitator/Presenter
0900-0915	Welcome, introduction on Output Two and overview of Thursdays programme	Sam Page
0915- 0930	Knowledge Pathways – Overview	Tahseen Jafry
	Knowledge Mapping Studies - Project Team Presentations	
0930-0945	Bangladesh – Wheat Research Centre	Md Elahi Baksh, Md Jahangir Kabir, M. Harun Ur Rasheed
0945-1000	India – Directorate of Extension Narendra Deva University of Agriculture and Technology	C M Singh R V Pandey Abha Singh Tribhuwan Singh
1000-1015	India – Banares Hindu University	Arun Joshi, Ramesh Chanda V K Chandola
1015-1030	**Tea break**	
1030-1045	Nepal – Nepal Agricultural Research Council/Nepal CIMMYT	Ganesh Sah Scott Justice
1045-1100	Pakistan – CABI Pakistan	Bushra Rasheed Gulam Ali
1100-1130	Discussion and summary of main findings. Introduction to NGOs	Tahseen Jafry and Sam Page
1130-1245	Productivity Exercise	Sam Page
1245-1300	Summary	Sam page
1300-1400	**Lunch Break**	
1400-1415	Introduction to NGOs	Tahseen Jafry
1415-1445	Lessons from Caritas, Pakistan	Ashar Nasir
1445-1515	Lessons from Imagine, Nepal	Buddhi Tamang
1515-1545	Lessons from Dipshika, Bangladesh	Kolpona Kispatta
1545-1600	**Tea Break**	
1600-1700	Identifying and comparing different models for knowledge transfer	Sam Page and Tahseen Jafry
1700-1715	Summary of the days progress and outline for day three	Tahseen Jafry

Friday 7th May 2004

Workshop Objective Two (continued)

"To identify and develop locally relevant strategies to optimise the uptake of relevant RCTs across all socio-economic groups of farmers. Preparation of action plans to overcome knowledge transfer blockages to optimise pro-poor development".

Time	Session	Facilitator/Presenter
0900-0915	Welcome and overview of Fridays programme	Sam Page
0915- 0930	Knowledge Pathways – Overview	Tahseen Jafry
0930-1100	Video Discussion	Sam Page
1100-1115	**Tea break**	
1115-1200	Brain storming sessions on overcoming blockages	Tahseen Jafry
1200-1230	Overview of findings	Tahseen Jafry
1230-1330	**Lunch**	
1330-1430	Development of team action plans	Sam Page
1430-1445	Pakistan – CABI Pakistan	Bushra Rasheed Gulam Ali
1445-1500	India – Banares Hindu University	Arun Joshi, Ramesh Chanda V K Chandola
1500-1515	Nepal – Nepal Agricultural Research Council/Nepal CIMMYT	Ganesh Sah Scott Justice
1515-1530	India – Directorate of Extension Narendra Deva University of Agriculture and Technology	C M Singh R V Pandey Abha Singh Tribhuwan Singh
1530-1545	Bangladesh – Wheat Research Centre	Md Elahi Baksh, Md Jahangir Kabir, M. Harun Ur Rasheed
1545-1600	**Tea Break**	
1600-1700	Summary of the way forward, questions and answers	Sam Page Tahseen Jafry Etienne Duvellier Shahid Parvez
1700	Summary of workshop Thanks and Close	Sam Page Craig Meisner

Appendix 3.

Template for baseline data collection to unblock knowledge pathways

This exercise should be completed with 3 male farmers and 3 female farmers from each of the 4 socio-economic groups. Exercise 1 consists of 3 simple steps. Answers to the questions should be tabulated in Tables for ease of interpretation at the workshop.

Knowledge Mapping Exercise

Step 1: Ask the farmers from each socio-economic group to list the various sources of information available to both male farmers and female farmers in these groups.

Step 2: Ask the farmers to tell you which sources of information listed by them works best for them, and to tell you why some work better than others.

Step 3: Compare the sources of information given by the farmers in each socio-economic group with those on the list of all possible sources of information that you collated in Step 1. If some groups make no use of sources of information on this list, then ask the farmers of this group if they know of this source and/or why they do not use it. What are the perceived blockages in accessing this source of information?

Step 1: List of the various sources of information available to both male farmers and female farmers in each group. Start with the Food Surplus farmers and work through the Table. Take a note of all sources of information mentioned by all groups (this may look like the indicative list given below). You will need to refer to this list in Step 3.

Table 1. Sources of information identified by farmer groups

Food Surplus		**Subsistence**		**Marginal**		**Landless**	
Male	Female	M	F	M	F	M	F
E.g. Poster							
E.g. Farmer meeting							

Step 2: Ask the farmers to tell you which sources of information listed by them works best for them, and to tell you why some work better than others.

Table 2. Assessment of sources of information by farmer groups

Food Surplus		**Subsistence**		**Marginal**		**Landless**	
M	F	M	F	M	F	M	F
E.g. Poster – works well because I go past it every day							
E.g. Farmer meeting poor because I don't have the time							

Step 3: What are the blockages in getting knowledge to farmers (men and women).
Compare the sources of information given by the farmers in each socio-economic group with those on the list of all possible sources of information that you collated in Step 1. If some groups make no use of sources of information on this list, then ask the farmers of this group if they know of this source and/or why they do not use it. What are the perceived blockages in accessing this source of information?

Table 3. Identification for blockage of sources of information

Food Surplus		**Subsistence**		**Marginal**		**Landless**	
M	F	M	F	M	F	M	F
						E.g. did not mention demonstrations – "I don't get invited."	
					E.g. did not mention pamphlets – "I can't read."		
E.g. did not mention training – "I already know all I need to know."							

Example Indicative List of Information Sources

Vehicles of information:

Farmer contact
Demonstrations
Scientist-farmer interaction
Exposure visits
Training
Kisam mela
Farmers meeting
Relatives/friends/neighbours
Street drama
Travelling seminar
Seminar/workshop
Group discussions

Electronic Media
T.V
Radio
Internet
Video
Help line/call line

Print Media
Posters
Newspapers
Pamphlets/leaflets
Publications

Sources of information:
Government/public sector
Private sector including sellers, retailers, manufacturers
NGOs