A STUDY ON
KNOWLEDGE, ATTITUDE AND PRACTICE (KAP)
OF
RESOURCE FARMERS OF FoSHoL-CARE

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Prepared for

CARE-Bangladesh

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Acronyms

BADC	Bangladesh Agriculture development Corporation
BMDA	Barind Tract Multipurpose Authority
BRRI	Bangladesh Rice Research Institute
DAE	Department of Agriculture Extension
DoL	Department of Livestock
FGD	Focus Group Discussion
FoSHoL	Food Security for Household Livelihood
HH	Household
IPM	Integrated Pest Management
KAP	Knowledge, Attitude and Practice
MP	Murate of Potash
NGO	Non Governmental Organization
PC	Project Coordinator
PM	Project Manager
PSU	Primary Sampling Unit
RF	Resource Farmer
SAAO	Sub Assistant Agriculture Officer
SME	Small and Medium Enterprises
TC	Technical Coordinator
TSP	Triple Super Phosphate
UP	Union Parishad

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Executive Summary

In order to improve upon the food security of targeted households of High Barind Tract areas of Bangladesh, CARE initiated the FoSHoL project. To be implemented in three selected districts with the help of PNGOs, one of the objectives of the project is to turn 'advanced farmers' into 'resource farmers'. Toward the necessary change, it is understood that 'advanced farmers' are quite ahead of other farmers and are predisposed to be 'resource farmers'. It is also accepted that these farmers need more information and training of different sort to emerge as 'resource farmers'. Hence the need of this consultancy which was to identify existing knowledge, attitude and practice of advanced farmers so as to emerge as resource farmers. In so doing, it appeared important to study the technical and social skills of the advanced farmers. KAP framework was used to understand the status of technical and social skills. Both qualitative and quantitative data were collected, analysed and interpreted to prepare the report.

Extent of technical knowledge on different dimensions of rice production was measured using appropriate tools and yardsticks. It emerged that the concept of balanced fertilizer is somewhat known to the folks but balancing as such is being neither practiced nor being found practicable. Whole host of reasons are there: absences of soil testing facilities, non availability of fertilizer on time were mentioned. More importantly, the functions of different fertilizers vis a vis soil conditions are yet to be known to them. It emerged from qualitative interviews that the farmers are aware about the effect of non-balancing of fertilizer on soil which is otherwise considered 'mother' as most of the Bangladeshis designate their country as the 'motherland'.

It emerged that Boro varieties are more known to the farmers than T.Aman verities. Pests on crops are known but comprehensive management of pests in the style of Integrated Pest Management is not at all known. Organic pesticides are heard of but not really ventured.

Seed related picture is far from satisfactory. Ideal seed bed is heard of so is quality of seed and preservation of seed for quality. These concepts, techniques and technologies are beyond the reach of the farmers; as a result, there is enough opportunity through FoSHoL to make available the requisites.

Inter cropping and relay cropping is not quite practiced though not unknown. Similar is true for compost and green manure.

Crop production is not the only answer for food security. Therefore, homestead gardening, fish farming, livestock farming and poultry farming were investigated. These are being carried out quite professionally though diseases of different kinds are a constant threat and complain, so is the absence of required services and facilities.

Advanced farmers poised to be resource farmers are well linked with other farmers of the community, DAE workers and NGOs. They do command a respect in the farming community. Most impressive and encouraging thing is the urge for information among these farmers. They are wide open to new and newer ideas and amenable to logic and reason. While they do appreciate information, it is equally true that they hardly can make themselves available for that information. Therefore, there remains a need to 'get and remain' connected with them. It is to be noted that these farmers are literate to certain extent therefore audio-visual ways could be useful to them. Radio as a vehicle to disseminate information was enquired with them but they did not find the idea quite practical. CARE is carrying out workshops and seminars for them which is praiseworthy but should be extra careful in finding out the lowest common denominator of knowledge of the participants and design the

interventions accordingly. PNGOs can be a great help to CARE in carrying out the specific analysis of the farmers of different districts. There was a similar initiative to RFs by DAE.CARE can very well making itself available to DAE for 'lessons learned' and thereby building upon the experiences.

If the basic inputs for agriculture are soil, seed and the farmer, then CARE should prioritise these in formulating any training or intervention. The Barind Tract is a special area while Nachol is famous for its peasants-revolution led by a woman. The Santal women of the tract are historically oriented to be unbounded. Therefore, special emphasis should be given to be connected with the women.

CHAPTER I

INTRODUCTION

1.1. Background

Civilization began with agriculture. When human communities began to grow and multiply agricultural production with the help of science and technology, human society changed forever. These changes were brought about through knowledge and understanding of cause and effect relationships. Knowledge means the factual understanding of an issue that effects human attitude reflected in behavior. Attitude is the psychological state of an issue or subject. Attitude means opinion, action of knowing of a person or a group of people. Practice means performance and presentation of an individual or group of people and organization. CARE has been implementing a very challenging project called FoSHoL, in partnership with poor agriculture producers at village level. Food Security for Household livelihood (FoSHoL) project plans to contribute to improvements in the livelihoods by increasing the availability, access and utilization of food in targeted households at High Barind Tract areas covering parts of the 3 districts of Chapainawabganj, Rajshahi and Naogaon.

1.2. Food Security

Adequate amount of agriculture production can effectively ensure the domestic food requirement of countries like Bangladesh. Modern and technical knowledge about agriculture production and its continuous practices by the farmers is considered to be instrumental for adequate food production of the country.

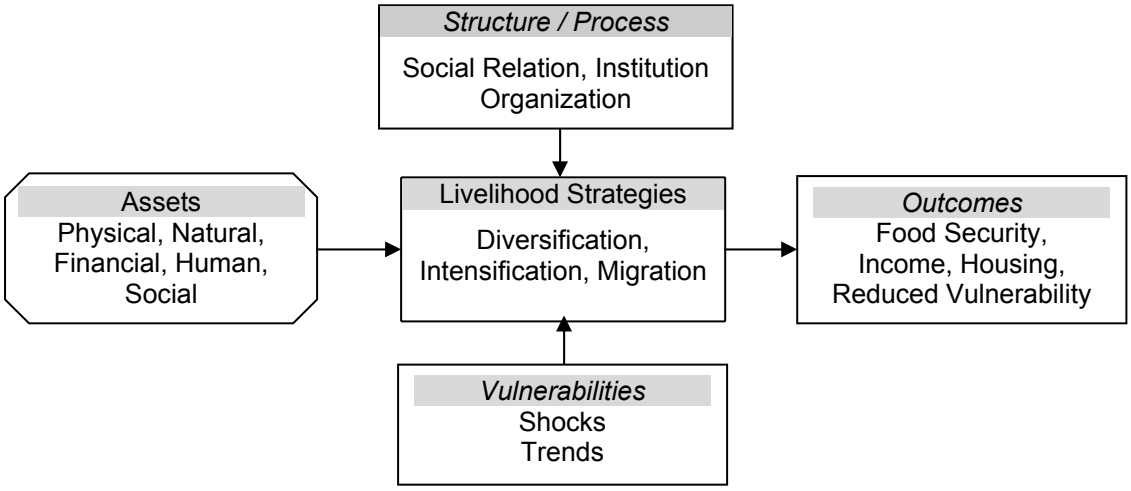
In the project area, only 30% of farmers own less than 1 ha have 18 % of the cultivable area. In Bangladesh however, the 50% of the small farmers owing less than I ha have 32 % of the cultivable land. In this situation the adopted strategy is maximum food production from minimum land. Only crop production, on the other hand, is not sufficient for food security. Crops, livestock, poultry, fisheries--all are important aspects of food production. Once upon a time, there was no population pressure and need for food could be met by cultivating a single crop. At that time, generally most of the lands were uncultivated. People quitted land as fallow; as a result land was automatically conserved. But now, population is increasing day by day therefore agriculture land has become increasingly needed for diversified food production and also need to create a culture for diversified food production. Comprehensive homestead development is a natural extension of homestead gardening. Homestead gardening directly contributes to food security at household by supplying nutritious food and earning. Fish farming is one of the direct outputs of aquaculture productions. Aquaculture products are significant factor in providing food for poorer segments of the society. Livestock farming and poultry farming also contribute the food security of the poor households.

Food security is the basis of livelihood security. Households become “food insecure” when they are unable to mitigate negative impacts of food availability; food access and the food utilization. *Food availability, food access, and food utilization are the three main dimensions of food security*. **Food availability** is achieved when sufficient food is constantly available to all individuals who are supplied through HH production, domestic outputs through improved irrigation, properly input supply, food storage and sharecropping condition. **Access** is ensured when households have adequate resources to obtain appropriate foods and it does depend on income available to HH, price of food and income distribution to HH members through better marketing, storage, processing, and sharecropper condition. **Food utilization** is just the biological use of food, requiring diet with energy, nutrients, water and sanitation facilities, healthy sanitation infrastructure, proper food nutrition and promotion of health education.

1.3. Sustainable Livelihood Analytical Framework

Livelihood Analysis Framework represents the linkages to desired outcomes and potential risks. The potential risks can be shocks and trends, non-availability of technical output, economic conditions and socio economic condition of the farmers. As has been said, food availability, food access, and food utilization are three main factors of livelihood security. Food availability derives from domestic output, household production using natural resources – water, land, and air. Household purchasing capacity is the key of food access, and food utilization incorporates many issues like food intake, quality and dietary food, food safety etc.

Figure 1.1: Livelihood Security



It is important to note that any kind of shocks can upset the livelihood options. Disaster can be considered as regular event for livelihood and necessitates to identify practical livelihood options for post disaster period.

Livelihood security approaches have evolved from thinking of the root causes of food insecurity. Food security is the basis of livelihood security. Households become "livelihood insecure" when they are unable to mitigate negative impacts of food availability, food access and the food utilizations. Food availability is achieved when sufficient food is constantly available to all individuals and it supplied through HH production, commercial imports or other domestic outputs. Access is ensured when households have adequate resources to obtain appropriate foods and basically it depends on income available to HH, price of food and income distribution to HH members.

1.4. Social Capital

Social Capital is a key element in the Sustainable Livelihoods Framework. Social capital is made up of three interacting and mutually re-enforcing elements: Trust, norms of reciprocity, and networks of civic engagement. Reciprocity may be balanced and generalized, such as exchanges of items or services of equivalent value; Networks, characterized by interpersonal communication and exchange, are both horizontal and vertical.

1.5. Knowledge, Attitude and Practice

Knowledge is information of which a person, group of people, organization or other entity becomes aware of something. It is gained through learning, education or by experience or perception and thinking. Knowledge is essential that the local RFs are fully informed of what

is proposed. Poor knowledge about agriculture technology, poor communication with resource specialist, resource organization, and lack of updated information about modern technology of agriculture of the farmers of Barind tract area are causing hindrance to food availability at household level. Attitude is the mental state about any issue or subject. Attitude is manifested through practice by changing behavior of a person or organization. Attitude is essential that the RFs think sincerely, that the adoption of this innovation will be beneficial for the group or community. In the project area most of the farmers have a positive attitude toward diversification of food production. But they have constraints to produce more for agriculture production. Practice generally depends on knowledge, economic stability, and socio- economic condition of farmers. Practice is finally a question of realizing what is proposed. The mission for the extension services is then to identify with analysis the requirements and expectations of the farmers, in order to adjust the offers of services to be delivered, which are based on the opinion of the groups of resource farmers.

1.6. Concept of Resource Farmer

Resource farmer is the advance farmer among a farmer's group at the village level. The RFs are expected to providing the knowledge and information that enable a farmer to understand and make decision about a particular innovation and are seen as a change-agent through whom knowledge of technical and social nature are to be disseminated. The RFs will eventually contribute to improvements in the livelihoods by increasing the availability, improving access and utilization of food to targeted food insecure households by applying a "family approach", and technological knowledge and practices which will allow both the spouses from the selected food insecure households to participate in project activities. To that effect, some farmers have been identified as advanced farmers by the project (FoSHoL) and are being trained and equipped to emerge as Resource Farmers.

CHAPTER II

PURPOSE OF THE ASSIGNMENT

2.1. Purpose of the Assignment

The main purpose of this consultancy was to undertake an assessment of designated Resource Farmers' existing Knowledge, Attitude and Practice for identifying the needs to develop their capacities so that they can act as local extension agents for transferring knowledge and innovations to the communities they belong to. The critical importance of extension- work can be understood better if its three main elements are considered:

Knowledge ⟷ Communication ⟷ Farm Family.

2.2. Objectives

The objective of the present consultancy was to explore the following aspects of resource farmers:

i. Resource Farmers (RF) current status of knowledge, application of knowledge and practices with regard to crop farming, animal husbandry and fish culture and also on other subjects that can help project participants to improve food security.

ii. RF's existing linkage status with agencies of innovative technologies such as BARI, DAE, DoL, BADC, BMDA, NGOs, seed and fertilizer dealers.

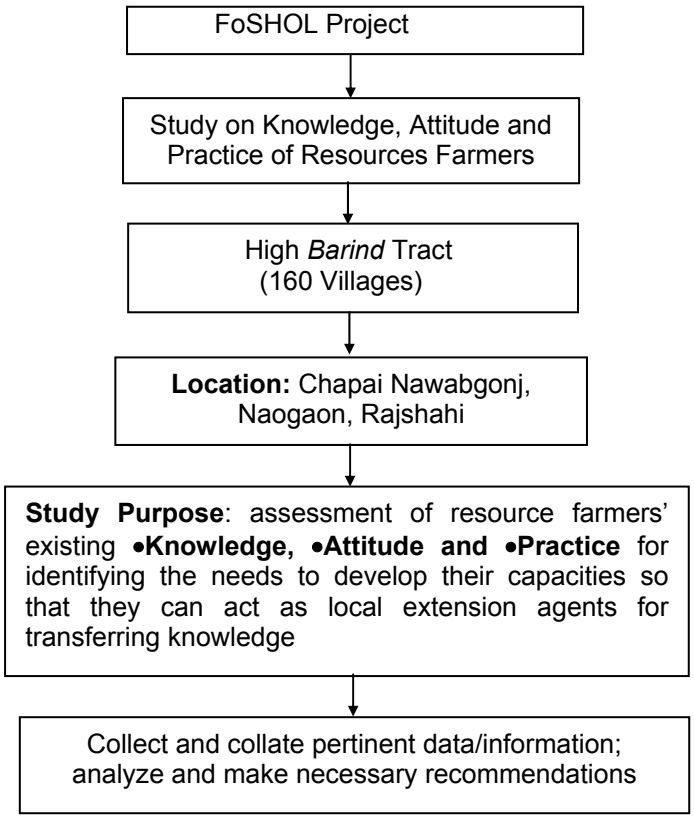
iii. Status of RFs participation in different platforms (meetings and field/study days, visits to government officials and commercial agents, NGOs and NGO platforms, etc.) at local and upazila levels.

iv. Status of RFs ability to take initiatives and responsibilities independently and confidently in introducing new technologies and ideas and provide recommendations.

v. Forward recommendations on what will best facilitate transfer of knowledge to the end users i.e. the communities to which the resource farmers belong. Provide recommendations on the areas of improvements, and on how to further strengthen the linkages.

2.3. Survey Design

In order to realize the objectives of the consultancy: "KAP Survey Design" was accepted as the framework. A schematic idea of the design is presented below:



CHAPTER III

METHODOLOGY

"KAP Survey Design" as the design for this assignment has been implemented by employing quantitative and qualitative techniques. Before using the techniques, however, relevant literature on agriculture, FoSHOL, CARE, study areas, farmers of the areas and prior studies were consulted to set the stage for this study. In this study, a multi method and iterative approach was adopted to make the survey fruitful. Starting with SOW, the study-team reviewed all the secondary information and different documents on project including the project proposal, and LFA protocol.

3.1. Quantitative Study: Sampling and Sample Size

A statistically valid sampling approach had been adopted in selecting a representative sample of respondents. Basing on the nature of the study and the socio-economic context of the target respondents, a two-stage random sampling strategy was adopted. At the first stage, PSUs were chosen wherefrom respondents were selected at the second stage. The designated Resource Farmers (RF) were adopted as Primary Sampling Unit (PSU). At the first stage, from three CARE administrative districts, 30 RFs (out of 270) were selected for primary data collection. The key respondents were the Resource Farmers. Wherever, the key respondents such as resource farmers were changed, the sample RFs were replaced. In the second stage, in the sample upazilla and districts, for many categories of respondents, the entire universe was covered.

For proper representation of the Knowledge, Attitude and Practice of Resources Farmers appropriate weighting system i.e. Ratio Method was used.

For obtaining a representative sample size of RFs, probabilistic sampling approach as delineated below was adopted:

$$n = \frac{Z^2 CV^2}{e2}$$

Where,

- n = Sample size
- Z = Standard normal variate at 95% confidence level.
- CV= coefficient of variation, 5%
- e= Precision level, 2%

The obtained sample size was 25. However, in order to ensure more representativeness 30 RFs were interviewed. To this end, a semi structured interview schedule was prepared, which was pre-tested before final administration.

3.2. Qualitative Study

Key Informant Interview (KII): KII have been conducted with govt. officials such as DAE, DoL, BADC, BMDA, fertilizer dealer, CARE and other NGO. Altogether **06 KIIs** were carried out.

Focus Group Discussion (FGD): FGD has been conducted at the village level with the groups of resource farmers. Each group consisted 5-7 participants. These FGDs were moderated by a trained person who was provided with a topic-guide emanating from the objectives of the study. A total of 3 FGDs were conducted in each site i.e. a total of **3x3=9 FGDs** were conducted in the study.

The final Sample Sizes, category of respondent and DCIs used for the Study is presented below:

Respondent Categories	Sample Size	Data Collection Method administered
Resource Farmers	30	Interview schedule
Resource Far	3 * 7 = 21 (Participants)	FGD
Service Providers & CARE	6	KII

3.3. Data Collection

Both qualitative and quantitative instruments were used in the study. The instruments are in depth interview, key informant interview, and focus group discussion. Primary and secondary data were used for the assessment. Prior to their usages, the primary data collection instruments were pre tested in two villages of Nachole upazilla under Chapai Nawabganj district. The instruments were simplified after the pre test, finalized and shared with CARE. Pre tests were carried out with resources farmers, govt. officials, CARE-staff, staffs of partner NGOs and local opinion leaders.

A team of trained male and female field investigators collected quantitative and qualitative primary data using data collection instruments (Annex A). These include interview schedule to assess Knowledge, Attitude and Practice, FGD for assessing social capital and communication status of RFs, and KII with the government officials, NGO staff and service providers. The data collection strategies included all possible techniques and methods to ensure highest level of participation and involvement of all respondents.

In the field data collection, a total of 30 RFs were visited in 29 villages of 24 unions under 12 upazillas of 03 districts. Fieldwork was carried out from July 7 to July 15, 2006 by a trained team of 05 investigators concurrently working in multiple locations.

3.4. Data Analysis

Different methods were used to process quantitative and qualitative data. Survey data was processed using electronic methods. A number of items in the survey instrument were pre coded using rating scale. Frequency tables were generated using the component wise technological knowledge, dissemination and practice of knowledge, opinion expressed by respondents.

Again, qualitative data from KIIs, FGDs were manually processed by listing the salient points, grouping the topics, culminating into themes and ending up to the objectives of the assignment.

Broad methods of KAP survey were adopted to collect all relevant information in line with the objectives of the study and the variables and indicators developed for the purpose. The analysis was carried out using appropriate information compilation and analysis formats which were designed by the Team Leader and the core-members. The Team Leader provided his expert inputs into the design, analysis and report-writing process.

3.5. Geographical Coverage

The sample respondents were selected from Barind Tract under three FoSHoL districts. CARE has been implementing the FoSHoL project in partnership with NGOs. Following table provides the list of sample respondents interviewed in the study:

Name of selected Resource Farmers	Father/ Husband's name	Village	Union	Upazila	District	NGO
Md. Alam		Bakhrabad	Shofapur	Mohadevpur	Noagaon	Apex
Badrinath	Hridoy	Enyetpur Adivasi para	Mohadevpur	Mohadevpur	Noagaon	Apex
Md. Monsur Ali		Sagor	Dibor	Patinitala	Noagaon	Apex
Sri Krishna Pahan	Jadab Pahan	Hemayetpur Pukurpara	Shofapur	Mohadevpur	Noagaon	Apex
Srimati Tulsi Rani	Sri Monindranath	Hatimondola	Shofapur	Mohadevpur	Noagaon	Apex
Anguri Begum	Shetabul Hossain	Refugeepara	Khajoor	Mohadevpur	Noagaon	Apex
Md. Farouk Hossain	Late Abul Hossain	Chalkgopi	Ganeshpur	Manda	Noagaon	BDO
Md. Mainul Hossain	Late Jasim Uddin	Hazigobindapur	Kusumba	Manda	Noagaon	BDO
Sri Purana Chandra	Rajessor Chandra	Chandrakona	Tetulia	Manda	Noagaon	BDO
Md. Siddiqur Rahman		Thonthonia	Kusumba	Manda	Noagaon	BDO
Sri Gopal Soren	Logen Kalko	Aghore	Bahadurpur	Niamatpur	Noagaon	BDO
Sonaton	Hopna	Champatala	Baliadanga	Chapai Sadar	Chapai Nawabganj	CARE
Birandra Nath Bormon	Gopal Bormon	Nasirabad	Nachole	Nachole	Chapai Nawabganj	CARE
Azizul Islam	Late Aftab Hossain	Bohoroil	Nezampur	Nachole	Chapai Nawabganj	CARE
Sofia Begum	Late Nuha Islam	Bohoroil	Nezampur	Nachole	Chapai Nawabganj	CARE
Md. Monsur Rahman	Md. Abdur Rahman	Balutongi	Doldoli (3)	Bholahat	Chapai Nawabganj	Luster
Md. Abul Kalam Azad	A. Quddus	Kharakpur	Doldoli (3)	Bholahat	Chapai Nawabganj	Luster
Md. Abul Zabber	Md. Ruhul Amin	Kazigram	Rohanpur (Nandipur)	Gomostapur	Chapai Nawabganj	Luster
Ms. Beauty	M. Salim Khan	Deeppara	Rohanpur	Gomostapur	Chapai Nawabganj	Luster
Enamul Hoq Sarker	Md. Jaynal Sarker	Birgram	Birgram	Dhamoirhat	Noagaon	RIC
Md. Montaz Ali	Md. Afir Uddin	Jogaddal	Dhamoirhat	Dhamoirhat	Noagaon	RIC
Md. Abur Rahim	Md. Shahabuddin	Telipara	Hotikdanga	Dhamoirhat	Noagaon	RIC
Md. Mozammel Hoq	Md. Najibul Hoque	Purulia	Goala	Sapahar	Noagaon	RIC
Md. Abdus Satter	Md. Abu Sayeed	Binodpur	Sapahar	Sapahar	Noagaon	RIC
Md. Mahbubur Rahman	Md. Nuru Miah	Babupur	Tilna	Sapahar	Noagaon	RIC
Mozharul Islam	Md. Eshaque	Deopara	Tilna	Sapahar	Noagaon	RIC
Tuku	Md. Tariqul Islam	Kazipara	Godagari	Godagari	Rajshahi	UDP
Ms. Saifura khatun	Md. Akhter Hossain	Shabdipur	Matikata	Godagari	Rajshahi	UDP
Mahbubur Rahman	Mafiz Uddin	Bill shahor	Talondar	Tanore	Rajshahi	UDP
Ms. Jesmin Begum	Monirul Islam	Lalpur	Talondo	Tanore	Rajshahi	UDP

3.5. Quality Control

In addition to the field staffs, one of the members of core team and one research associate of HDRC was in the field to ensure quality of data collection.

3.6. Data Entry

Five Data Entry operators were deployed for 10 days to complete data entry and processing the same. Data entry was completed by using access software and data were analyzed using the SPSS software. Frequency outputs were generated individually.

3.7. Limitation of the Study

The profile of the survey respondents shows that 43 percent of them have less then secondary level of schooling. These low levels of education could have implications on their understanding of the issues, questions and answers. During interview with the RFs, very few respondents could extend their full cooperation as they were engaged in agricultural works. They were very interested on the issues but simply could not afford enough time.

CHAPTER IV
FINDINGS ON TECHNICAL ISSUES

4.1. Socio-economic Characteristics of Resource Farmers

The study was conducted in three districts namely Rajshahi, Naogaon and Chapai Nawobganj. The number of respondents was 30 out of which 80 percent were male and 20 percent were female. Majority (57%) of the RFs were aged above thirty, 43% being below thirty. The highest share (57%) of educational qualification was Secondary level followed by 33% Primary and 3% with Technical/Vocational training and remaining 3% being illiterate. Majority (90%) of the respondents were married.

4.2. Knowledge, Attitude and Practice about Agricultural Technology

Before presenting the findings about the Sample Resource Farmers (RFs) current status of knowledge, attitude and practice (KAP) about agricultural technologies it would be appropriate to clarify some measurement related methodological issues. A total of 17 broad agricultural technologies were considered in the present KAP study (see box 4.1). Each of these 17 broad technologies was treated as separate variable (or issue); and each comprises of few indicators. For example, the variables "balanced fertilizer" courts of 5 indicators (components) namely urea, TSP, MP, Gypsum, and Zinc Sulphate. The knowledge status of an individual RF about balanced fertilizer was assessed first based on his/her knowledge about each component (indicator) separately and then the status of `full knowledge' about balanced fertilizer was estimated based on individual's knowledge about all the components (indicators) (i.e.; deviation from any component was treated as a lack of full knowledge). Similar procedure was adopted in estimating status of "practice" and "attitude". `Practice' meant practicing by the farmer in his/her own enterprise – in other words, `practice' was treated as one side of `attitude'. The other side of the attitude was "dissemination of knowledge and skill to other farmers". The actual questions asked to the RFs in the data collection process can be seen in the Annex.

Box 4.1: Broad variables of Knowledge, Attitude and Practice

01. Balanced fertilizer (5)
02. Modern variety (9)
03. Integrated Part Management (IPM) (5)
04. Improved Seed (4)
05. Line Transplanting (3)
06. Ideal Seed Bed (4)
07. Production of) Quality Seed (7)
08. Seed Preservation (4)
09. Organic Pesticides (5)
10. Inter-cropping (1)
11. Relay Cropping (1)
12. Compost (4)
13. Green Manure (3)
14. Homestead Gardening (1)
15. Fish Farming (8)
16. Livestock Training (6)
17. Poultry Farming (3)

Parenthesis indicate number of indicators (components) considered under the variable/ issue.

The overall KAP situation of the resource farmers about agricultural technology is discouraging with only 0.307 values for coefficient of knowledge, 0.185 for coefficient of practice and 0.103 for coefficient of (knowledge) dissemination. Therefore, the coefficients of knowledge gap, practice gap and dissemination gaps are 0.693, 0.815 and 0.897 – all high by any standard. These also imply that there exist a high demand and scope to address these high KAP gaps in the FoSHoL Project. The KAP analysis by separate broad variables of agricultural technology is presented in the following sub-section.

KAP Coefficient of Agriculture Technology

Variable	Knowledge	Practice	Disseminating
Balanced Fertilizer	0.033	0.033	0.033
Modern Variety	0	0	0
IPM	0.033	0.033	0.033
Improved Seed	0.433	0.4	0.233
Line transplanting	0	0	0
Ideal seed bed	0.133	0.1	0.067
Quality seed	0.067	0.033	0.033
Seed preservation	0.4	0.4	0.167
Organic pesticide	0.1	0	0
Inter cropping	0.97	0.36	0
Rely cropping	0.633	0.3	0
Organic pesticide	0.833	0	0
Green Manure	0.1	0.067	0.067
Fish Farming	0	0	0
Livestock Farming	0.067	0.067	0.067
Homestead gardening	1	1	0.83
Poultry Farming	0.433	0.367	0.233
	5.235/17	**3.16/17**	**1.763/17**
Coefficient value	E=0.307	E=0.185	E=0.103

4.2.1. Balanced Fertilizer

Resource Farmers' knowledge about balanced fertilizer was assessed on the basis of whether they know the recommended dozes of different fertilizers for cultivation of paddy in 1 bigha of land. The recommended dozes of different fertilizers, according to Fertilizer Recommendation Guide for Barind tract areas are Urea 30 kg/bigha, TSP 25 kg/bigha, MP 20 kg/bigha, Gypsum 15 kg/ bigha and Zinc Sulphate1kg/ bigha.

Farmer's knowledge about balanced fertilizer is far from satisfactory with only 3.3% had full knowledge about all the components of balanced fertilizer. Farmers' knowledge varied by components of balanced fertilizer. About 98% of the farmers have no knowledge about appropriate dozes of TSP, MP, and Gypsum. 93% and 77% have no idea about appropriate dozes of Zinc Sulphate and Urea. As compared to the other components, farmers' knowledge is slightly better about urea. The reason could be that Urea is more important to them in rice production than TSP, MP, Gypsum and Zinc Sulphate.

The farmers were positively concerned about the balanced dozes of fertilizers and 50 percent of the farmers perceived that use of fertilizer increases their production and the rest 50 percent could not opine about the balanced use of fertilizer.

Farmers expressed some constraints about the use of balanced dozes of fertilizers. Twenty three percent of the farmers told that fertilizers are costly and not available on time. Only 10 percent of the farmers reported that they disseminate their knowledge to others about balanced dozes of Urea and 6.7 percent about Zinc Sulphate to neighboring farmers. However, due to lack of knowledge, they could not disseminate about other fertilizers. Though the farmers lack proper knowledge about *balanced* fertilizer they opined that balanced fertilizer could help them in getting higher yield while excessive use of fertilizer affect rice plant and its yield.

Farmers' practice of different fertilizers in balanced form in rice very low. About 17 percent of the farmers use Urea in appropriate doze and only 3.3 percent of the farmers use TSP, MP and Gypsum and 6.7 percent use Zinc Sulphate in appropriate doze. Low level of practice of different fertilizers in balanced form is largely attributable to their lack of knowledge (73.3%) followed by high cost of fertilizers (16.7%). The farmers usually practice their local tradition and they are not aware of balanced dozes of fertilizers. Some of them are interested in soil testing before using recommended fertilizers but soil testing facilities are not available to them.

Fig 4.1: Status of knowledge about balanced fertilizer by components

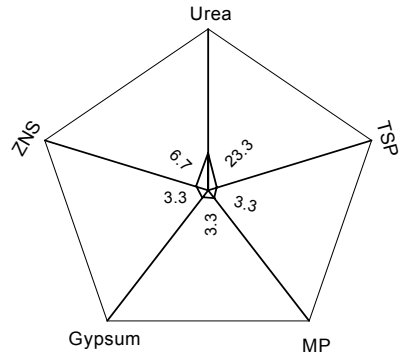


Fig 4.2: Status of practices about balanced fertilizer by components

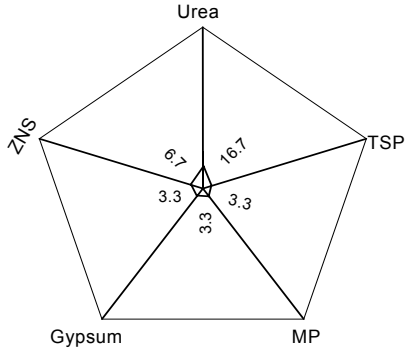


Fig 4.3: Status of disseminates about balanced fertilizer by components

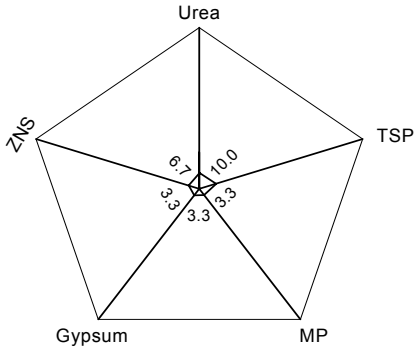
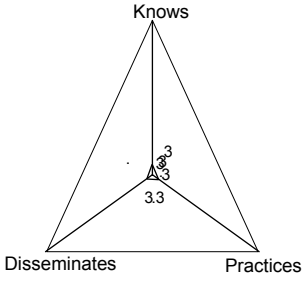


Figure 4.4: % distribution of respondents by complete (full) knowledge, practice and dissemination balanced fertilizer

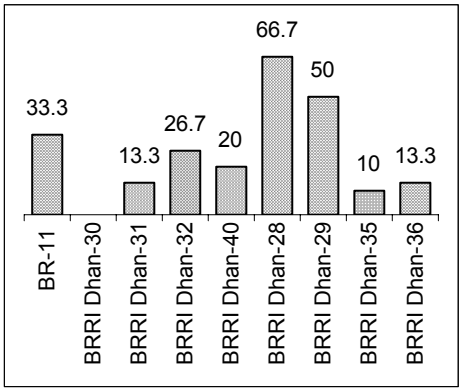


Recommendation: Rice production is very much influenced by using balanced dozes of fertilizers. Appropriate doze and appropriate timing of fertilizer application should be taken into account at practice stage. Farmers should be given intensive training on balanced fertilizer and different demonstration on balanced fertilizer should be set at farmer's field, so that, farmers can learn it by doing themselves. Initiatives may be taken for soil testing before using fertilizer. In every upazila, there are soil-testing kits to know the status of soil and accordingly fertilizers may be recommended for every farmer individually. Different field days may also be arranged at demonstration sites to involve large number of farmers. At the same time, linkage should be developed with fertilizer dealers and retailers.

4.2.2. Modern Variety (MV)

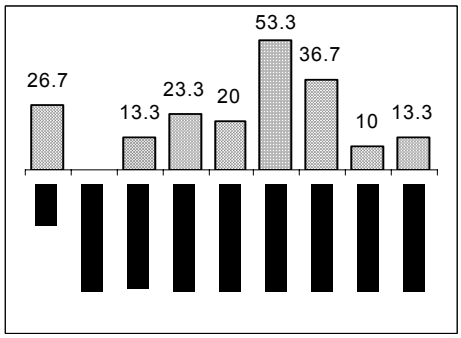
Modern varieties of rice include varieties released by Bangladesh Rice Research Institute (BRRI). In this study, only 9 varieties were considered to evaluate farmers' knowledge, attitudes and practice. Out of 9 varieties, 5 varieties were for T. Aman and 4 varieties were for Boro. The reasons for selecting only 9 varieties were based on the assumption that these varieties were released few years ago while the latest varieties were avoided as these are not yet known among the mass farmers.

Figure 4.5: Existing status of knowledge about modern variety



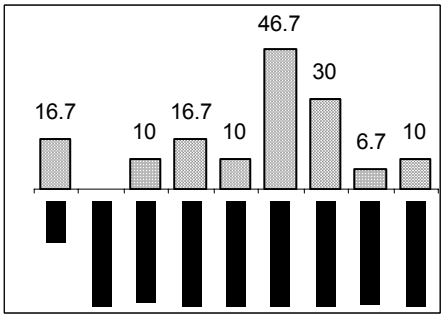
The RFs knowledge on recommended T.Aman varieties was not high. About 33 percent of the RFs know about BR-11, about 13 percent know about BRRI Dhan-30; about 26 percent know about BRRI Dhan-31, 27 percent know about BRRI Dhan-32 and 20 percent know about BRRI Dhan-40. As far as the Boro variety is concerned, the most popular variety was BRRI Dhan-28 with about 67 percent process knowledge about this variety, followed by 50 percent for BRRI Dhan-29. In comparison to these two most popular varieties, only 10 percent of the RFs know about BRRI Dhan-35 and 13 percent know about BRRI Dhan-36. It may be further mentioned that the RFs are more concerned about the modern Boro varieties and they had less knowledge about modern T.Aman varieties. This can be explained through the fact that the farmers are getting higher yield from BRRI Dhan-28 and BRRI Dhan-29 in the Boro season. T.Aman varieties are not quite popular as they are less concerned with the modern T.Aman varieties. Though there are many modern varieties of T.Aman available but these are not much popular among the farmers. The farmers however had much positive attitude towards the modern varieties of Boro than T. Aman. About 97 percent of the RFs thought that modern varieties increased their production though 50 percent thought that the MVs are costly and 10 percent opined that cultivation of modern varieties is time consuming. There is no clear indication in favour of this idea but still 46 percent of the RFs disseminate about BRRI Dhan-28 and 30 percent disseminate BRRI Dhan-29. About 17 percent disseminate BR-11, 10 percent disseminate BRRI Dhan-31 and about 17 percent disseminate BRRI Dhan-32 to their community members. This indicates that they are highly motivated about these varieties and therefore, they disseminate this to other farmers. The dissemination to other farmers was higher for Boro than T. Aman because of very positive attitude towards Boro MV due to higher yield than the T.Aman.

Figure 4.6: Existing status of practices about modern variety



The farmers mentioned higher rate of practice of Boro varieties than the T. Aman. About 53 percent of the RFs cultivated BRRI Dhan-28 and 36.7 percent cultivated BRRI Dhan-29. For other Boro varieties 13.3 percent cultivated BRRI Dhan-36 and only 10 percent cultivated BRRI Dhan-35. For T.Aman, 26.7 percent of the RFs cultivated BR-11 and it was13.3 percent for BRRI Dhan-31, 23.3 percent for BRRI Dhan-32 and only 20 percent for BRRI Dhan-40. The major constraints mentioned for not cultivating the modern varieties include high cost of seed, non-availability of seed, and lack of knowledge about the modern varieties.

Figure 4.7:Existing status of knowledge of dissemination about modern variety



Recommendation: The RFs in the study area had comparatively more knowledge and practice on Boro varieties than T.Aman. Some interventions are needed towards demonstration and training on the modern varieties to popularize the modern varieties of T.Aman. At the same time farmers should be linked with other stakeholders like DAE, BADC and input traders to ensure timely availability of modern varieties of seeds.

6.2.3. Integrated Pest Management (IPM)

Integrated Pest Management (IPM) consists of five components, namely modern cultivation, biological control, pest resistant varieties, mechanical control, and chemical control. The RFs knowledge was assessed against each of the components and also on overall knowledge on IPM. Out of these five components, the RFs were mostly concerned about chemical method of pest control and 86 percent of the RFs are aware of this method of pest control. Among other control methods, 60 percent know about biological control, 32 percent know about mechanical control, 10 percent know about pest resistance variety and only 3.3 percent know about modern cultivation. In case of overall knowledge of IPM i.e. knowledge about all the components, only 3.3 percent had full knowledge.

Figure 4.8: Status of knowledge about integrated pest management by component

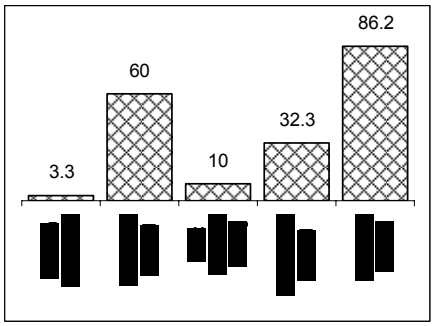


Figure 4.9: Status of practices about integrated pest management by component

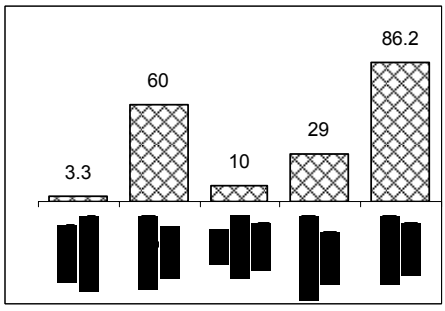
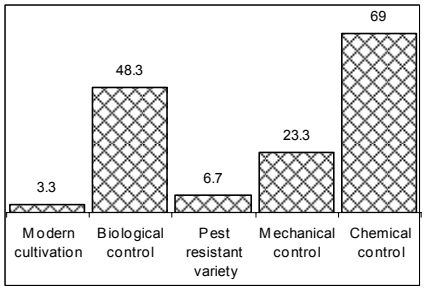


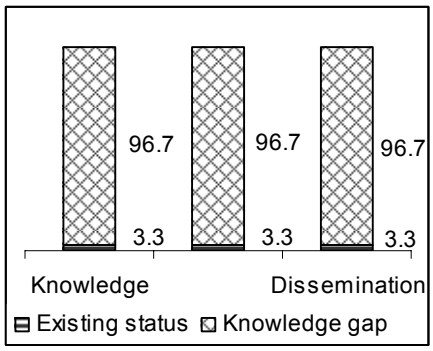
Figure 4.10:Status of dissemination of knowledge integrated pest management by component



Resource Farmers have shown a positive attitude toward IPM. About 83 percent of the RFs considered this technology best fitted for pest management of rice. Among the respondents 53 percent considered that through IPM they can get higher yield. But 40 percent of the RFs considered that using this technology requires much time which makes it difficult for them to adopt the technology in crop production system. Considering another point, 43.3 percent of the RFs opined that it requires much labour in using this technology. Only 3.3 percent of the RFs disseminate the technology to their community members. By individual component, the highest (69%) proportion of the RFs disseminate chemical control of pest management followed by biological control (48%), mechanical control (23.3%), pest resistance variety (6.7%), and modern cultivation (33.)

IPM was found to be not a popular technology for rice cultivation in the study area. The highest proportion (86.2%) of the RFs uses chemical control measure for pest management in rice. Among the RFs 60 percent use biological control, 29 percent use mechanical control, 10 percent use pest resistance variety and only 3.3 percent use modern cultivation method for pest management in rice. But the combination of the components, only 3.3 percent of the RFs used IPM as a holistic method for pest management in rice cultivation. According to the farmers the constraint behind not practicing IPM was high cost (53.3%), lobour intensive (30%), and lack of knowledge (40%).

Figure 4.11: % distribution of respondents by complete (full) knowledge, practice and dissemination – integrated pest management by component

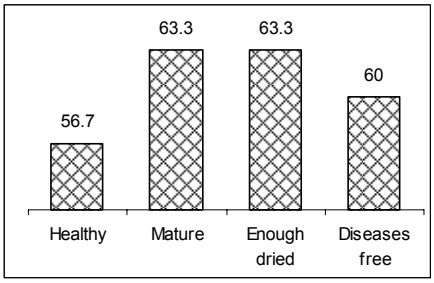


Recommendation: RFs are not much aware of the concept of IPM as a holistic approach of pest management. Intensive training on IPM should be arranged for the RFs to facilitate their understanding and practice in crop cultivation.

6.2.4. Improved Seed

Resource Farmers knowledge about improved seed was assessed on the basis of whether they know the characteristics of good quality seed. About 57 percent RFs said that healthy seed is improved seed. About 64 percent of the RFs thought that mature seed is improved seeds, 60 percent know enough dried seed as improved seed. 43.3 percent of the RFs know about all the component of improved seed.

Figure 4.12: Status of knowledge about improved seed by criteria



The RFs expressed their concern about improved seed. About 80 percent of the RFs mentioned that improved seed increases production. However, improved seeds are not always available. Their positive concern about improved seed is also evident in that 30 percent of them disseminate the idea to their community that healthy seeds are improved seeds. Similarly about 47 percent disseminate the idea of mature seed as improved seed, about 37 percent disseminate the idea of dry seed as improved seed and about 27 percent disseminate that disease free seed is improved seed. Among the RFs, 23 percent disseminated fully information about all types of improved seeds in their community.

Figure 4.13: Status of practices about improved seed

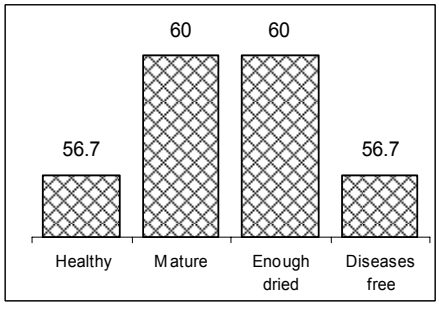


Figure 4.14: Status of discrimination of knowledge about improved seed by criteria

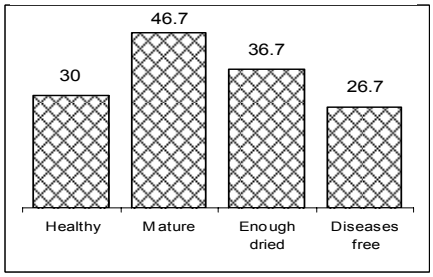
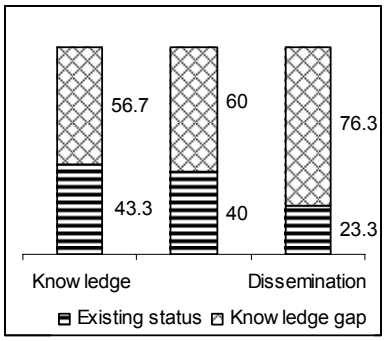


Figure 4.15: % distribution of respondents by complete (full) knowledge, practice and dissemination – improved seed



The use of improved seed is largely prevalent among the RFs. About 57 percent of the RFs used healthy seed as improved seed, 60 percent used mature and dry seeds, and 57 percent used disease free seeds. The main reasons for not using improved seed include lack of knowledge (46.7%), non-availability of seed (46.7%), and high price (33.3%).

Recommendation: To create awareness and knowledge of the RFs about improved seeds, adequate dissemination activities and training should be conducted. It is necessary to develop linkages with BADC, seed dealers and DAE to ensure availability of improved seeds and to enhance farmers capacity and knowledge to appropriately use improved seed.

4.2.5. Line Transplanting

Line transplanting is one of the modern methods of rice cultivation. It helps farmers gaining more yields and facilitates better management practices. The RFs were asked whether they know about this method in rice cultivation. About 50 percent RFs had the knowledge about the line spacing as 8// x 6// (20 cm x 15 cm), means line to line distance 8// and plant to plant distance of 6//. Among the RFs about 23 percent know the distance as 8// x 8// (20 cm x 20 cm), means line to line distance of 8// and plant to plant distance of 8//.

Figure 4.16: Status of knowledge about line sowing

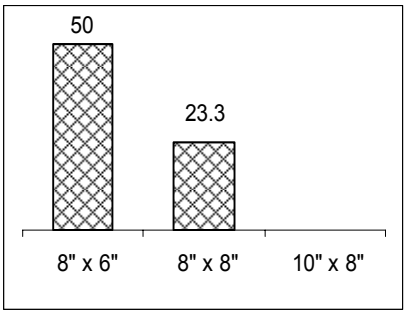


Figure 4.17:Status of practices about line sowing in paddy cultivation

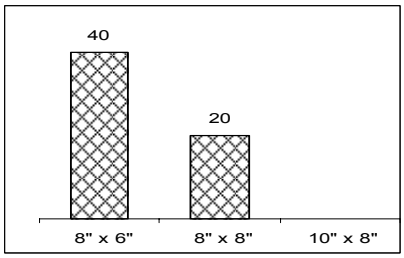


Figure 4.18: Status of knowledge to disseminate about line sowing

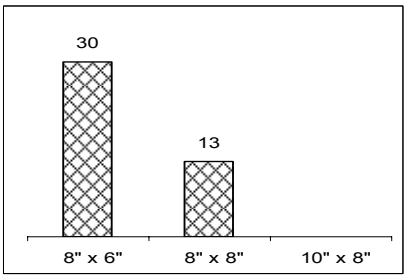
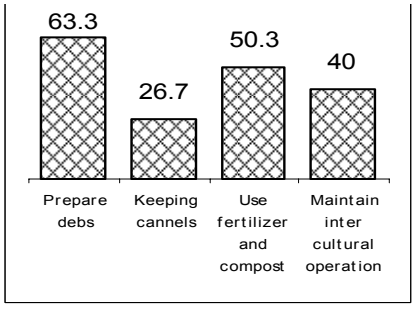


Figure 4.19: Status of knowledge about preparation of an ideal seedbed by steps



It was observed in the study that there exist different practices of maintaining the space between lines and between plants for line transplanting of rice. The RFs attitude about line transplanting was focused through their dissemination of the technology among others in the community. Among the RFs, 30 percent disseminate the technology as 8// x 6// (20 cm x 15 cm) and only 13.3 percent disseminate as 8// x 8// (20 cm x 20 cm). Farmers were found much concerned about line transplanting method in rice cultivation: 50 percent of them said that it helps them to tackle weeds in the rice field, 47 percent said that it gives more air and light, 13 percent considered it for tall ears, and 3 percent opined that it helps soil fertility. Farmers when conceived about the idea, they then disseminated it to other community members.The RFs used both the practice, i.e. 8// x 6// (20 cm x 15 cm) and 8// x 8// (20 cm x 20 cm). About 2wo-fifth of the RFs used to practice 8// x 6// (20 cm x 15 cm) and 20 percent used 8// x 8// (20 cm x 20 cm) in their rice cultivation. The main constraint in line transplanting reported by the RFs is high lobour intensity which in turn, necessitates more money and more time. About 57 percent mentioned that it is labour intensive, 43 percent said that it requires more money to meet labour cost, 40 percent expressed their lack of knowledge and 23 percent did not practice it due to high time consumerness of the practice.

Recommendation: The RFs knowledge, attitude and practice level regarding line transplantation differ. To upgrade their knowledge appropriately designed training programme for the farmers with demonstration of the technology and conduct of field days at the demonstration site during rice cultivation should be arranged. Provision should be their to exchange and share ideas among the community members during group meeting.

4.2.6. Ideal Seed Bed

An ideal seedbed is necessary to grow healthy seedling of rice. Healthy seedling is a precondition for increased yield. The RFs KAP, in this regard, was assessed on different dimensions of ideal seed bed. About 63 percent of the RFs prepare bed for growing seedling, 27 percent kept cannels beside the seed bed. About 53 percent RFs apply organic fertilizer in seed bed preparation and apply chemical fertilizer when necessary and 40 percent maintain intercultural operation during seedling growing. But only 13.3 percent RFs know about doing all relevant activities pertaining to the preparation and raising an ideal seed bed. This indicates that only a few portions of the RFs know about preparing an ideal seedbed for seedling raising of rice.

Figure 4.20: Status of practices about preparation of an ideal seedbed by

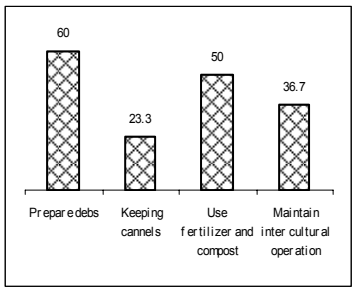
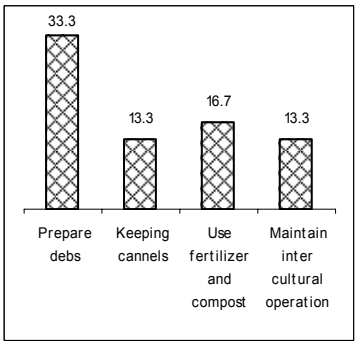


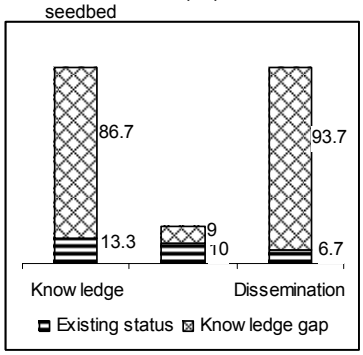
Figure 4.21: Status of knowledge to disseminates about preparation of an ideal seedbed



The RFs gave positive feedback about necessity of ideal seed bed. Majority farmers (63.3%) felt that seedlings are healthier if grown in ideal seedbed. Among them, 30 percent of the RFs said that crop yield increases if seedlings are obtained from an ideal seedbed. It is mainly due to adequate knowledge to prepare ideal seedbed and growing seedling that only about 7, percent of the RFs disseminate this technology to other community farmers.

Only about one-tenth of the RFs practice the full concept of ideal seedbed i.e. they prepared ideal beds, kept canals beside the beds, used organic and inorganic fertilizer, and maintained intercultural operations. Beside this 60 percent of the farmers reported that they only prepare bed for seedling growing, 23 percent kept only canals beside bed, 50 percent use organic and inorganic fertilizers, and 37 percent maintain intercultural operation. The main constraints for not practicing the full concept of preparation of ideal seedbed was lack of knowledge (53.3%), and time consume ness in preparing seedbed (20%).

Figure 4.22: % distribution of respondents by complete (full) knowledge, practice and dissemina-tion – preparation of an ideal seedbed

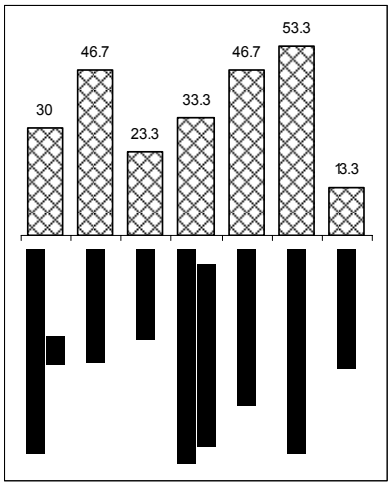


Recommendation: To switch from the traditional practice to ideal practice of seedbed preparation and seedling raising, farmers should be given training on this technology. More motivational programme, demonstrations and group meetings on ideal seedbed preparation technology should be organized.

4.2.7. Production of Quality Seed

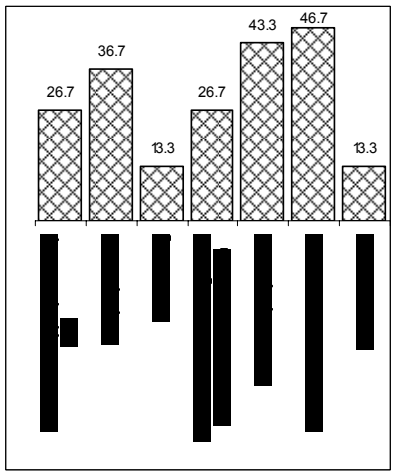
Production of quality seeds depends on a number of interrelard factors. The RFs knowledge on the seed production technology was assessed against each factor and also on the combination of all factors. In terms of individual factors responsible for production of quality seed, 30 percent of the RFs reported to have knowledge about selection of appropriate field for seed production, about 47 percent know about use of proper seed, 23 percent know about line sowing, 33 percent know about fertilizer management and intercultural operation, 47 percent know about harvest at proper time, 53 percent know about proper harvest methods, and 13 percent know about grading of seed. But in terms of knowledge about all the methods for quality seed production, only about 7 percent was found to have such full knowledge. Therefore, it may be concluded that most RFs did not have a complete knowledge about quality seed production technology.

Figure 4.23: Status of knowledge about quality seed by steps to produce quality seed



The RFs attitude towards the technology of seed production is reflected through their extent of dissemination of the technology to the community members. Only 3.3 percent of the RFs reported to disseminate this technology to others. This low extent of dissemination is attributable to their lack of knowledge about the technology. Seed production technology involves various factors, from sowing to harvesting, and then to processing. Though 53 percent of the RFs thought that through this process they may increase their production but due to lack of proper knowledge most could not say clearly about the technology.

Figure 4.24: Status of practices about quality seed



In the quality seed production, the RFs practice was expressed in terms of different phases of seed production and also the overall package of seed production. About 27 percent of the RFs focused on land selection for seed production, 37 percent on use of proper seed, 13 percent on line sowing, 27 percent on fertilizer management and intercultural operation, 43 percent on harvest at proper time, 47 percent on proper harvest methods, and 13 percent on grading of harvested seed. Considering the package of the technology, only 3.3 percent of the RFs practice the overall package of the quality seed production technology. The main constraints for not practicing the technology were lack of knowledge (73%), need for extra care (37%) for seed production with which they were not much familiar, and high financial cost (37%).

Figure 4.25: Status of knowledge to disseminates about quality seed

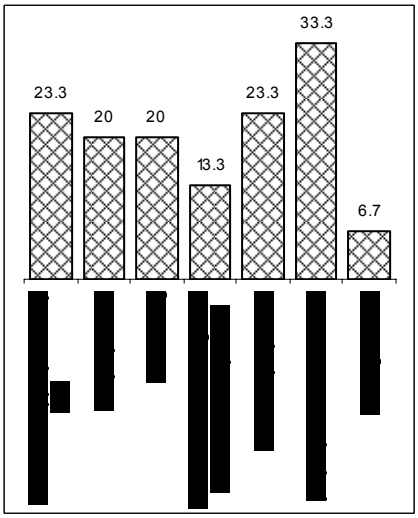
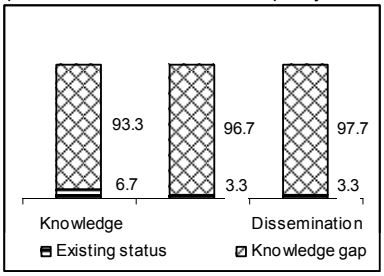


Figure 4.26: % distribution of respondents by complete (full) knowledge, practice and dissemination – quality



Recommendation: The RFs knowledge on quality seed production is low and varies by components. Traditional practice they follow is not appropriate for quality seed production. To bring their knowledge updated, massive training programme needs to be taken. Moreover,

they have to understand every step important for seed production. Different motivational programme should be encouraged including visits to the fields of the contract growers of BADC and/or other seed producer. Accordingly group meeting should be conducted for better understanding of various steps of quality seed production.

4.2.8. Seed Preservation

Seed preservation is a technique where seeds are preserved in a controlled situation maintaining humidity, viability and germination capacity of seeds. Farmers' usually follow some indigenous techniques within their reach to preserve seed. The RFs knowledge was assessed on some of the selective techniques of seed preservation. About 83 percent of the RFs know that seeds should be preserved in air tight container, 63 percent know the necessity to maintain humidity, 57 percent know the need to take precautions from insect attack, and 77 percent know that seeds should be dried in sunshine after rainy season. Overall, 40 percent of the RFs had the full knowledge (i.e; knowledge about all the components) about seed preservation in improved way.

The RFs attitude towards seed preservation was expressed by their extent of disseminating the technique to their community farming fellows. About 60 percent of the RFs have said that they disseminate the idea to preserve seed in air tight container, 40 percent disseminate about maintain humidity, 23 percent disseminate about precautions from insect attack, 53 percent disseminate about drying seeds in sunshine after rainy season. In terms of all the components, only 17 percent of the RFs reported dissemination of the technology. About 47 percent of the RFs thought that seed preservation needs extra care and 40 percent thought it is costly.

RFs themselves practice different methods of seed preservation known to them. About 83 percent of the RFs reported to practice seed preservation in air tight container, 63 percent maintain humidity, 57 percent took precautions from insect attack, and 77 percent took steps to dry seeds in sunshine after rainy season. Among the RFs, 40 percent practice all the scientific methods of seed preservation.

Recommendation: The RFs are knowledgeable about the indigenous methods of seed preservation. However, full knowledge about scientific methods of seed preservation is low. Efforts should be given to update their knowledge about the modern methods for quality seed preservation. Accordingly, the RFs should be imparted with training on modern seed preservation technology.

Figure 4.27: Status of knowledge about seed preservation by criteria

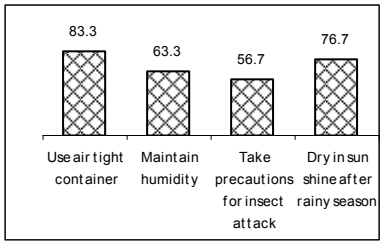


Figure 4.28: Status of practices about seed preservation by criteria

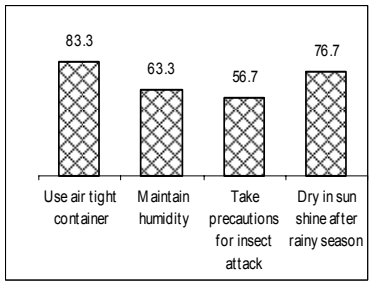


Figure 4.29: Status of knowledge to disseminate about seed preservation by criteria

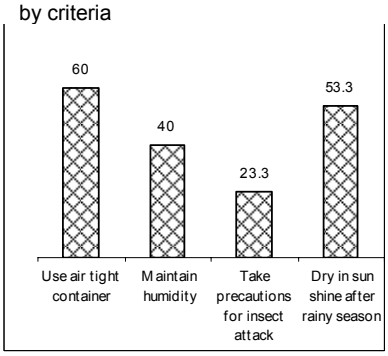
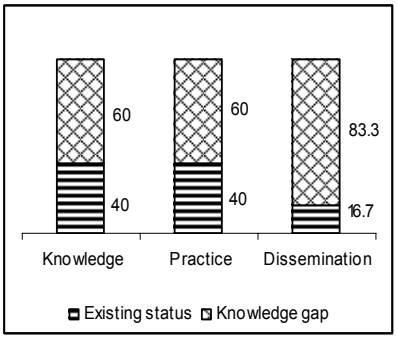
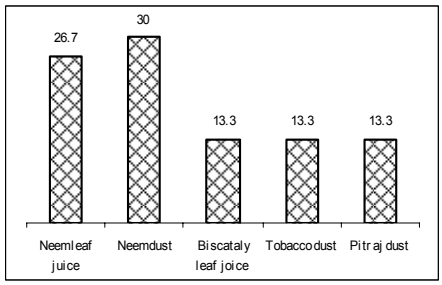


Figure 4.30: % distribution of respondents by complete (full) knowledge, practice and dissemination



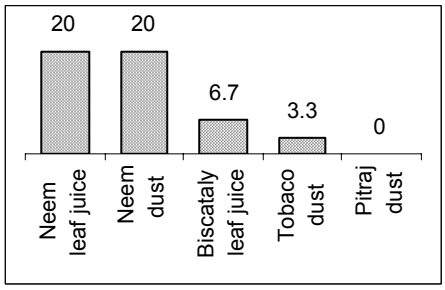
4.2.9. Organic Pesticides

Figure 4.31: Status of knowledge about organic pesticides by components



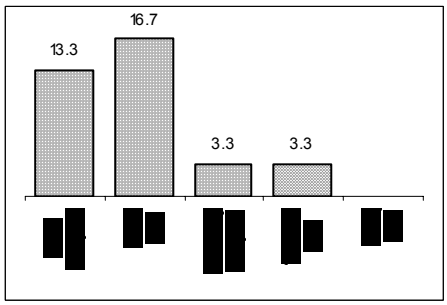
Different plant sources are used as organic pesticides. Farmers are encouraged to use organic pesticides instead of chemical pesticides. In the modern cultivation methods, chemical pesticides are widely used. Efforts were made in the study area to assess the knowledge of the RFs about some selective organic pesticides. About 27 percent of the RFs know about Neem leaf juice, 30 percent about Neem dust, 13 percent each about Biscataly leaf juice, tobacco dust and Pitraj dust. Only 10 percent of the RFs were found to have knowledge about all the items of organic pesticides.

Figure 4.32: Status of practices about organic pesticides by components



Organic pesticides were not widely known among the RFs. Majority (90%) of the RFs did not know the benefit about these pesticides. Only 13 percent of the RFs disseminate the idea about Neem leaf juice as pesticides to other community farmers, 17 percent about Neem dust, and only 3 percent disseminate about Tobacco dust and Pitraj dust as organic pesticides.

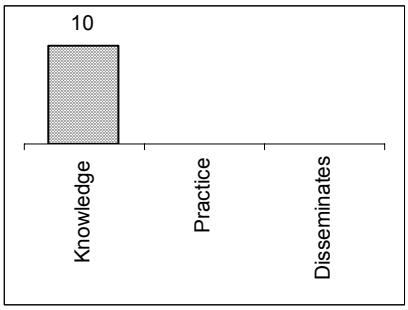
Figure 4.33: Status of dissemination of knowledge about organic pesticides by



In the study area organic pesticides are not widely used. Only 20 percent of the RFs reported that they use Neem leaf juice and Neem dust as organic pesticides. Only 6 percent use Biskali and 3 percent tobacco dust. None use Pitraj dust as organic pesticides. This is due to their lack of knowledge about the pesticides and also the crops against which the pesticides use would be beneficial.

Recommendation: Use of organic pesticides should start from some selective crops. Farmers should be given training on the use of organic pesticides. At the same time, they should be trained as to how to prepare organic pesticides. The idea may be popularize among the farmers by motivating them to increase the use of organic pesticides.

Figure 4.34: % distribution of respondents by complete (full) knowledge, practice and dissemination - organic pesticides



4.2.10. Inter Cropping

Inter cropping is not a popular practice in the study area. The RFs had a very shallow knowledge about inter cropping and less than 3 percent of the RFs know about inter cropping. It might so happen that farmers are not used to practice inter cropping with in their socio economic practice. The RFs attitude was not clear about this technology. This is mainly because of lack of knowledge about the technology. In the existing cropping pattern, only 37 percent of the RFs practices inter cropping. It may happen that there were some traditional cultivation practices where the farmers' practices as inter cropping such as mustard and wheat, mustard and lentil, mustard and chickpea, turmeric and chili.

Recommendation: In the study area, vigorous intervention should be launched to facilitate farmers practice of inter cropping. Accordingly, training for farmers on inter-cropping technology and its benefit should be organized. Demonstration may be organized in the farmers' field and motivation can be done through group meeting.

4.2.11. Relay Cropping

Relay cropping-to some extent-has found as a traditional practice technology in the study area. About 64 percent of the RFs had knowledge about relay cropping.

In the existing cropping pattern, only 30 percent of the RFs practices relay cropping. It may happen that there were some traditional cultivation practices where the farmers practice relay cropping.

Recommendation: Different programme may be taken for the farmers to promote relay cropping to increase cropping intensity. Farmers training should be conducted on relay cropping technology and its benefit. Appropriately designed demonstration may be established in the farmers field and motivation can be done through group meeting.

4.2.12. Compost

Compost is one of the major sources of organic matter in soil. About 83 percent of the RFs had the knowledge about compost as a organic manure. This means majority of the farmers know the uses of compost in the soil. It is observed that cow dung is one of the major sources of compost.

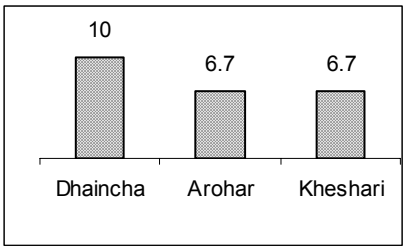
The RFs in the study area were found to be positively conceived about compost. Among the RFs, 73 percent of them thought that it help improving soil health, 33 percent conceived that compost increases water holding capacity, 43 percent understand that it helps uptake plant nutrient, and 47 percent thought it increases organic matter in soil.

Use of compost is highly prevalent in the study area. About 87 percent of the RFs themself produce compost. About 90 percent use compost in their own land and 73 percent told others to use compost as organic fertilizer.

Recommendation: Use of compost is very essential to increase organic matter in the soil. The farmers' knowledge is limited to only cow dung as a source of compost. But other sources possibly were not familiar to them. Interventions should be designed to increase farmers knowledge about the modern methods of preparing compost and best utilizations of other material as a source of compost.

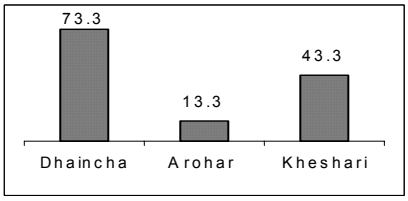
4.2.13. Green Manure

Figure 4.35: % distribution of respondents by complete (full) knowledge, practice and dissemination - green manure



Farmers knowledge was assessed on their understanding about green manure with some of the selective green manuring crops. 73 percent of the RFs reported to have knowledge about Dhaincha as green manure crop, 13 percent know about Arohor and 43 percent know about Khesari (as green manure crop). Only 10 percent of the RFs know about all the three crops as green manure.

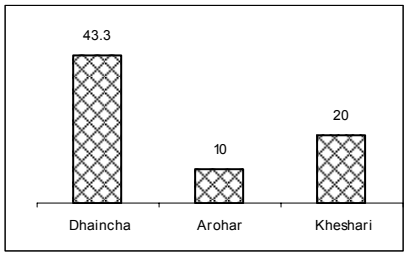
Figure 4.36: Status of knowledge about green manure by components



Farmers attitude was assessed against their idea about green manure. Among the RFs 57 percent thought that it help improving soil health, 30 percent conceived that green manure increases water holding capacity and helps uptake plant nutrient, and 28 percent thought it increases organic matter in soil.

In the study area, green manure is more or less practiced by the farmers. Among the RFs, 43 percent cultivate Dhaincha as green manure, 10 percent of them practice Arohor, and 20 percent cultivate Khesari as green manure. Only 7 percent of the RFs used all these three crops as green manure.

Figure 4.37: Status of practices about green manure by components

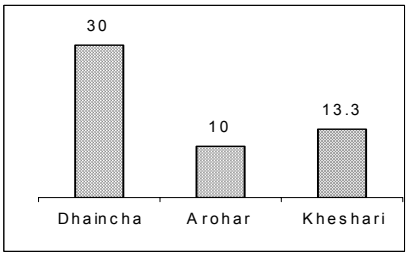


Recommendation: Green manure can be popularize among the farmers by taking motivational and awareness raising programmes. Different programmes like training, demonstration, field day etc. should be undertaken to develop farmers' awareness and skill.

4.2.14. Homestead Gardening

The RFs produce different type of vegetables in their homestead. But it is not in an organized manner. They do it mainly for their own consumption and partially for extra income.

Figure 4.38: Status of dissemination of knowledge about green manure by components



Farmers response towards homestead garden was positive and more or less 100 percent of them have homestead garden particulary for home consumption.

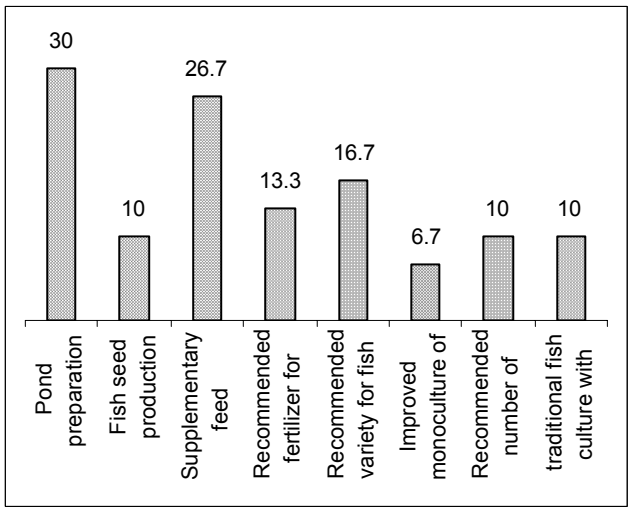
The RFs practice homestead garden in an unplanned manner. About 98 percent of the RFs practices homestead garden for home consumption and extra income. But due to inadequate knowledge of modern concept of home gardening and lack of improved seed, homestead gardening is not a profitable production for them.

Recommendation: Farmers should be imparted with adequate training, and modern variety of seeds should be available to them. In every house of the RFs, there might be a demonstration of home gardening where it would be an integrated production system.

4.2.15. Fish Farming

The RFs knowledge on fish farming was assessed on the modern techniques. About one-third of the RFs reported to have knowledge about pond preparation technique, 10 percent about fish seed production, 27 percent about supplementary feed management, 13 percent about recommended fertilizer for fish, 17 percent about recommended variety of fish, 7 percent know about improved mono culture of fish, 10 percent about recommended number of fish fries and traditional fish culture with carp. This pattern of knowledge about fish farming indicates a distinct lack of knowledge about the modern fish farming technology.

Figure 4.39: Status of knowledge about fish farming by components



It is primarily due to the lack of knowledge about fish farming that the RFs could not state their attitude clearly towards fish farming. Though RFs disseminate their idea to other farmers. About 20 percent of the RFs disseminate about pond preparation, 10 percent about fish seed production, 17 percent about supplementary feed management, 3 percent about recommended fertilizer for fish, 7 percent about recommended variety for fish, 3 percent about improved mono culture of fish and traditional fish culture with carp.

Figure 4.40: Status of practices about fish farming by Components

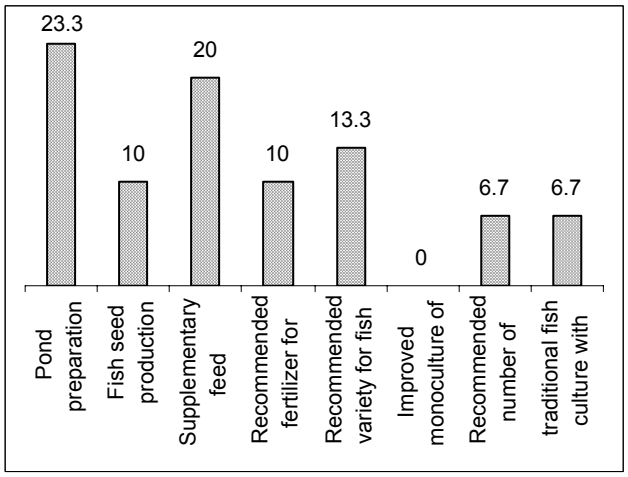
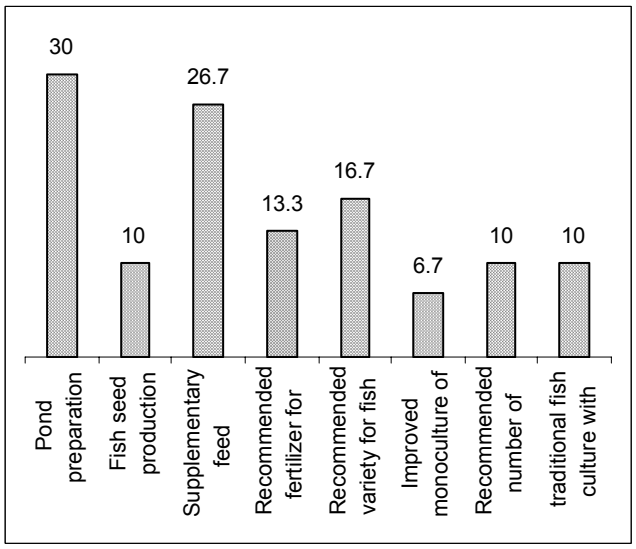


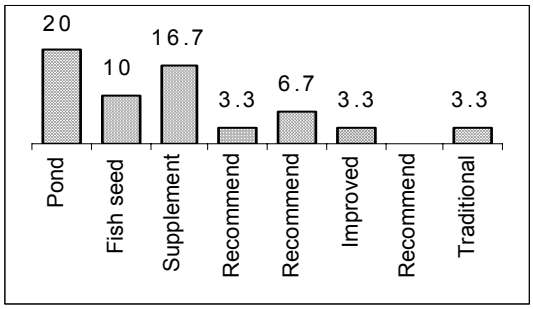
Figure 4.41 Status of knowledge about fish farming by components

Fish farming was not a major enterprise of the RFs. Among the RFs, 23 percent practice pond preparation, 10 percent engaged in fish seed production, 20 percent practiced supplementary feed management, 10 percent used recommended fertilizer for fish, 13 percent use recommended variety of fish, 7 percent practice recommended number of fries for fish and traditional fish culture with carp.



Recommendation: Fish farming may be encouraged among the farmers by forming group with those who have the resources and interest for fish farming. Adequate technological support need to be provided to them and linkage should be made with the Department of Fisheries (DoF).

Figure 4.42: Status of dissemination of knowledge on fish farming by components



4.2.16. Livestock Farming

The RFs knowledge about livestock farming was assessed on the basis of some technologies and activities of livestock farming. About two-third of the RFs had the knowledge about dewarming, 71 percent had the knowledge about vaccination, 33 percent each had the knowledge about fattening, improved breeding and improved shelter, and 27 percent had the knowledge about processing and preservation of fodder. Considering all the activities altogether, only about 7 percent had the knowledge about livestock farming. So, overall knowledge of the RFs about livestock farming is poor.

The RFs attitude was assessed against the technologies and activities-how much they conceived and disseminate to other community farmers. In the study area, 35 percent of the RFs disseminate about de-warming to their neighbouring farmers, 29 percent disseminate about vaccination, 17 percent about fattening, 13 percent about improved breeding, 23 percent about improved shelter, and 13 percent about processing and preservation of fodder. For overall technologies, only 7 percent of the RFs disseminate the technologies to other farmers.

The RFs practice was different to different technologies. The component-rise differences reported were as follows: 55 percent practice de-warming, 61 percent practice vaccination, 23 percent practice fattening, 20 percent practice improved breeding, 30 percent use improved shelter, 27 percent practice processing and preservation of fodder, and 7 percent practice all the components. Among all the technologies, they had better exposure to de-warming and vaccination.

Recommendation: The RFs should be made more knowledgeable about the different technologies of livestock farming. They should be given intensive training about different technologies of livestock farming particularly fattening, improved breeding, improved shelter, processing and preservation of fodder. This will facilitate higher production of livestock and strengthening of household economy.

Figure 4.43: Status of knowledge about livestock farming by components

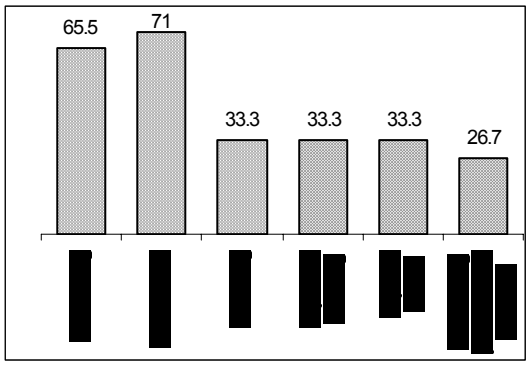


Figure 4.44: Status of practice about livestock farming by components

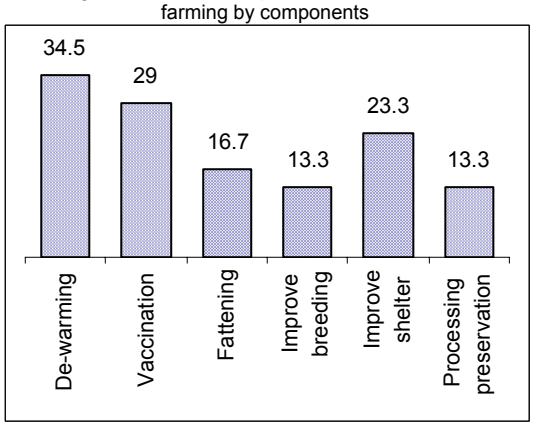


Figure 4.45: Status of dissemination of knowledge about livestock farming by components

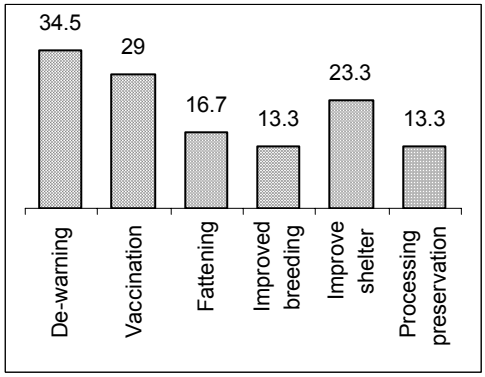
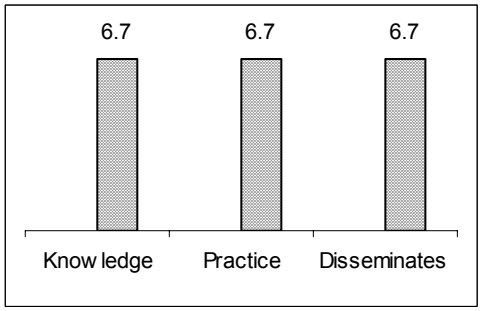


Figure 4.46: % distribution of respondents by complete (full) knowledge, practice and dissemination- livestock farming



4.2.17. Poultry Farming

The RFs knowledge about poultry farming was assessed on the basis of some technologies and activities of poultry farming. About 77 percent of the RFs had the knowledge about vaccination, 60 percent had on balanced feeding and 53 percent had knowledge on improved shelter. About 43 percent of the RFs had the knowledge about all the technologies. The RFs were found more concerned about vaccination of their poultry than balanced feeding and improved shelter.

The RFs attitude was expressed against the technologies and activities-how much they conceived and disseminate to other community farmers. Majority (47%) of the RFs disseminate their knowledge about vaccination of poultry to their neighours. It is followed by balanced feeding (33%) and improved shelter (27%). 23 percent of the RFs disseminate all the technologies to other farmers.

Majority (63%) of the RFs reported to practice vaccination of poultry, 53 percent practice balanced feeding and 47 percent practice improved shelter for poultry. Among the RFs, 37 percent practiced all the techniques for poultry farming.

Recommendation: The RFs should be given adequate training on various technologies of poultry farming. Special emphasis should be given to those farmers who are engaged in poultry farming. At the same time, this could a better source of extra income.

Figure 4.47: Status of practice about livestock Farming by components

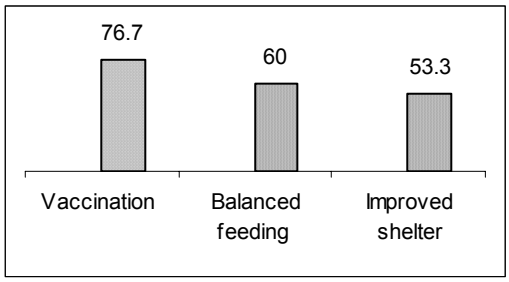


Figure 4.48: % distribution of respondents by complete (full) knowledge, practice & dissemination- poultry farming

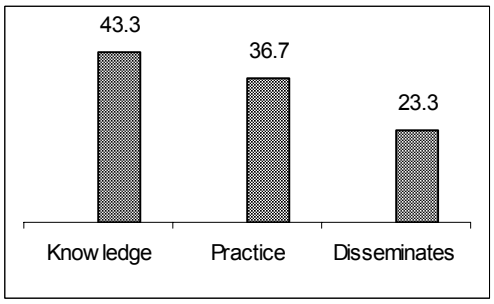


Figure 4.49: Status of practice about poultry farming by components

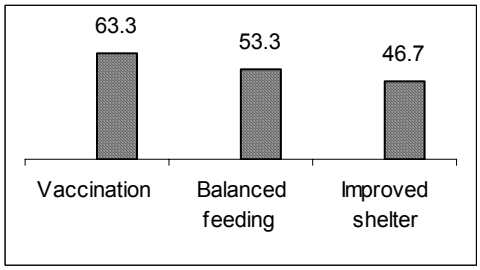
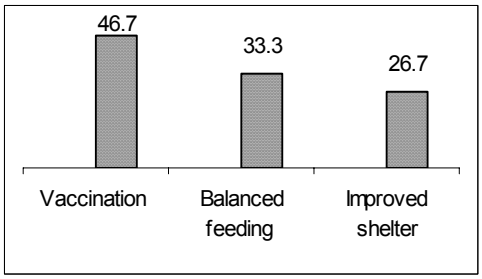


Figure 4.50: Status of dissemination of knowledge about poultry farming by components



4.3. Processes of Human and Social Capital Formation

Human and social capital is the set of skills which a farmer acquires through learning and experience that could be amplified farmer's competency in the work place. Social capital means the collective value of all social networks and the learning that arise from those networks to do matters for each other. Farmers can be intensified their knowledge and practice through learning by doing. Resource farmer is the advance farmer among a farmer's group at village level. The community farmer has the scope to learn mutually from service delivery institutions, NGOs, farmers to farmers communication, exposure visits to best practices and learn from media campaign.

4.3.1. Knowledge about and Linkages with Service Providers

The RFs knowledge about different service providers at GOs and NGOs is very poor. Due to lack of knowledge about different service providers, they could not get required support from those organizations. The highest proportion of RFs (30%) knows about NGO and all of them seek support from NGOs. Only 27 percent of the RFs had the knowledge about DAE out of which only 23 percent seek support from this organization. Only 13 percent of the RFs had the knowledge about DoL and BADC and all of them seek support from the DoL but only 10 percent of them seek support from BADC. About 7 percent of the RFs were concerned about fertilizer and seed dealer and they seek support from them. The RFs had the least (3.3%) knowledge about DoF, Veterinary and BRRI. As being the project beneficiaries, in the process of successful completion of the project task, a strong linkage should be established between the RFs and the above institutions. The RFs organize the community farmers through group meeting and 47 percent of the RFs conduct weekly group meeting to organize group members for technology dissemination. They share their skill and knowledge with the group members and 90 percent of the RFs share their skill verbally and 7 percent in both verbally and through demonstration. Two-third of the RFs do not have enough technical skill to share with the community farmers.

Community members' dependency on the RFs is still at its embroyonic stage. Majority (47%) of the RFs felt that the community members are not at all depended upon them for technology while 33 percent termed such dependency as low. It might be due to the reason that the RFs are still not that resourceful and still not enough competent to help community farmers with knowledge and skill on modern technology. The RFs need to develop their capacity to facilitate dissemination of technology and develop strong linkage with their community farmers.

4.3.2. Benefits of Technical Knowledge

The resource farmers must be adequately trained in the technical aspects of his/her work and have a good working knowledge of the main element of agriculture system in which he/ she is working. The majority (47%) of the RFs was very much benefited through technology dissemination by themselves and by their group members. About 40 percent of them received medium type benefit and only 13 percent of them received little benefit by this way of technology dissemination either by the RFs or their group members.

4.3.3. Meeting with Group Members

The majority (50%) of the RFs did not meet at all formally in-group meeting with the community members for technology dissemination. About 27 percent of the RFs met fortnightly, 16 percent once in a week and 7 percent monthly. Due to lack of organized group meeting the community farmers still could not depend on the RFs for technology and other information on agricultural activities.

4.3.4. Meeting with SAAO

The RFs had a very weak interaction with the Department of Agricultural Extension (DAE) and its field workers i.e. the Sub-Assistant Agriculture Officers (SAAO). The SAAOs are the grass root level extension workers for dissemination of agricultural technology and information at the farmers doorstep. Sixty percent of the RFs did not meet the SAAOs at all while 17 percent met monthly, 13 percent met once in a week, and 10 percent met fortnightly. The weak linkage with the field extension worker should be strengthened for effective technology transfer among the RFs and the community members.

Some SAAOs opined that Department of Agriculture Extension is providing support for the farmers particularly on improved technology, modern variety, provide support for input availability, provide training for improved cultivation practices, soil testing for fertilizer recommendation by soil mini kit, and communicate with local farmers through the resource center at union level. At the same time they set demonstrations on different technologies among the farmers level for rapid dissemination of the technologies. They also informed that they provide advisory support for the farmers through the resource center at union level.

4.3.5. Visit to RFs

The community members' personal interaction with the RFs for information seeking or to solve problems about agricultural activities was weak. About 63 percent of the RFs told that the community members did not pay any visit to them, 27 percent informed that the community farmers met them monthly, 7 percent informed that the visit was once in a week, and 3 percent informed the visit was fortnightly. About 33 percent of the RFs interact with community farmers about new technology and 17 percent faced various problems in interacting with the community farmers. The weak interaction led to the weak information flow about agricultural technology and other information. The linkage of RFs with the community members should be strengthened.

4.3.6. Organize Community Farmers

The RFs organize the community farmers through group meeting and 47 percent of the RFs conduct weekly group meeting to organize group members for technology dissemination. They share their skill and knowledge with the group members and 90 percent of the RFs share their skill verbally and 7 percent in both verbally and through demonstration. Two-third of the RFs did not possess enough technical knowledge and skill to share with the community farmers.

4.3.7. Transferring Learning

Transferring learning can create a culture of continuous improvement. The methods of such transfer are personal transformative learning, structured media campaign, and cross visit. The community members' personal interaction with the RFs for information seeking or to solve problems about agricultural activities is still weak. About 63 percent of the RFs told that the community members did not pay any visit to them, 27 percent informed that the community farmers met them monthly, 7 percent informed that the visit was once in a week, and 3 percent informed the visit was fortnightly. About 33 percent of the RFs interact with community farmers with new technology and 17 percent of the RFs felt different types of problem in interacting with the community farmers.

The Resource Farmers (RFs) are intended to disseminate new technology to his community farmers. They are the secondary source of new information and new technologies to his group farmers. The RFs received new information and new technology from the extension service providers and disseminate those to his group members. The group members were supposed to meet the RFs in the group meeting in a certain interval. From the study, it was found that 43 percent of the RFs met his group members fortnightly for technology dissemination while 30 percent of them met monthly and 27 percent met group members once in a week for technology dissemination. It appeared that there is a provision of group meeting and the group members may use this meeting-platform to seek information about technology and new information from the RFs. The group meeting should be scheduled within a fixed time so that the benefits from RFs presence maximizes.

4.3.8. Organizing and planning

Designing work plan by the resource farmers is one of the key tools. 43.3 percent of RF are able to design his work plan. The RFs organize the community farmers through group meeting and 47 percent of the RFs conduct weekly group meeting to organize group members for technology dissemination. They share their skill and knowledge with the group members and 90 percent of the RFs share their skill verbally and 7 percent in both verbally and through demonstration.

4.3.9. Communication Information Need, Linkages

The RFs must be a communicator-be able to communicate both verbally, and non verbally, and skill should be the basis of resource farmers activity. These areas skill should be the include modern technology for agriculture production, information collection and dissemination, information and knowledge about updated knowledge, rights of farmers, social and organizational issues, gender and development. The RFs indicate the need for different type of information with 100 percent of expressed the need for technical information. That means they wanted updated information about new technology and related information on agriculture. Their second expressed need was organizational information, 97 percent of the RFs wanted to know about different service providers and their modus operandi of delivering appropriate services. About 93 percent of the RFs indicated that they need social and right-based information and their access to the organizations. They were interested to know about new information from different organization and 90 percent wanted to know about the information that different organizations deliver. All these unmet need can be met by establishing strong linkages with different service providers.

The RFs knowledge about different service providers was very poor-both for GOs and NGOs. Due to lack of knowledge about different service providers, they could not get support from those organizations. Their highest (30%) knowledge was about NGO and all of them seek support from NGOs. Only 27 percent of the RFs had the knowledge about DAE out of which only 23 percent seek support from this organization. Only 13 percent had the knowledge about DoL and BADC and all of them seek support from the DoL but 10 percent of them seek support from BADC. About 7 percent of the RFs were concerned about fertilizer and seed dealer and they seek support from them. They had least (3.3%) knowledge about DoF, Veterinary and BRRI. Establishing strong linkages between RFs and all relevant service provisioning institutions will be absolutely necessary to enhance knowledge-base of the RFs and to ensure the success of the project including sustainability of the intervention.

4.3.10. Sources of Information

The main source of information to the RFs was ‘care’ and 80 percent of the RFs used ‘care’ as their primary source. This was possibly due to the group member of this project to get the benefit to get help from care. Their information source should be broaden by including other organization like DAE, DoF, DLS, BMDA, and NGOs in the process.

4.3.11. Policy

The RF should be familiar with relevant main legislation of the government. All types of policies related to agriculture, agriculture extension, fisheries, livestock and poultry farming, fertilizer and seed distribution should be disseminated among the resource farmers to equip them as true extension worker.

CHAPTER V
CONCLUSION AND RECOMMENDATIONS

This study provides information about the Resource Farmers current status of knowledge, attitude and practice with regard to crop farming, animal husbandry, fish culture, poultry farming, and linkages with the agencies of innovation technologies, farmers participation in different platforms at local and Upazilla level, and the resource farmer's ability to take initiative and responsibilities independently and confidently in introducing technologies and ideas to community farmers.

The current status of knowledge, attitude and practice was assessed based on discussion with resource farmers, meeting with key government and non-government officials and literature review of FoSHoL project. Extent of technical knowledge on different dimensions of rice production was measured using appropriate tools and yardsticks. It emerged that the concept of balanced fertilizer is somewhat known to the folks but balancing as such is being neither practiced nor being found practicable. Quality of seed use is one of the basic requirements for potential increase in the production of rice. Another area of environmental degradation linked with crop production is the toxicity impacts resulting from improper pesticides and fertilizer use. Crop diversification has been pursued largely on a commodity – by commodity basis rather than pursued on a multi cropping system basis, eg pulse in combination with crops, which might improve soil fertility. Livestock rearing serves as a critical counterpart to crop production, keeping farms ecologically balanced. Livestock rearing is the integral part of the farming system in Bangladesh. It is essential counterpart of crop farming. Poultry includes chicken (fowl) and ducks, which are very important to rural household and the economy of Bangladesh.

Crop production is not the only answer for food security. Therefore, homestead gardening, fish farming, livestock farming and poultry farming were investigated. These are being carried out quite professionally though diseases of different kinds are a constant threat and complain, so is the absence of required services and facilities.

Advanced farmers poised to be resource farmers are well linked with other farmers of the community, DAE workers and NGOs. They do command a respect in the farming community. Most impressive and encouraging is the urge for information among these farmers. They are wide open to new and newer ideas and amenable to logic and reason. While they do appreciate information, it is equally true that they hardly can make themselves available for that information. Therefore, there remains a need to 'get and remain' connected with them. It is to be noted that these farmers are literate to certain extent therefore audio-visual ways could be useful to them. Radio as a vehicle to disseminate information was enquired with them but they did not find the idea quite practical. CARE is carrying out workshops and seminars for them which is praiseworthy but should be extra careful in finding out the lowest common denominator of knowledge of the participants and design the interventions accordingly. PNGOs can be a great help to CARE in carrying out the specific analysis of the farmers of different districts. There was a similar initiative to RFs by DAE.CARE can very well making itself available to DAE for 'lessons learned' and thereby building upon the experiences.

The recommendations are based on the information and observation of the study that emphasize to FoSHoL project management to immediately address important issues that contribute to improvements in the livelihoods by increasing the availability, access and utilization of food by targeted households at High Barind Tract areas covering parts of the districts of Chapainawabganj, Rajshahi and Naogaon.

RECOMMENDATIONS

- The community farmers should adopt the overall strategy of minimum land for maximum food production. Therefore appropriate technological training on diversified agriculture production should be imparted to the resource farmers (RFs). At the same time CARE should arrange different workshops for the RFs and community farmers on the specific issues at local level.

- The agricultural extension system of Bangladesh is composed of both governmental and non governmental orginizations. Agriculture extension plays a vital role of transferring knowledge and promoting the new techniques among the farmers. Department of fisheries and livestock have a role in promoting new technologoes. Resource farmers need to communicate with DAE, DoL, DoF, and with other NGOs to enhance their knowledge and updated information about extension activities and innovative ideas.

- The Project Management along with partners should take steps towards training, workshop and exposure visits for the RF on:

    1. Leadership and management training to build capacity on problem identification, diagnosis, and analysis the present situation.
    2. Train the resource farmers in the aspects of extension activities with which they are unfamiliar: new practice, how to run demonstration or how to hold a farmer's meeting.
    3. Provide training on right-based approach, good governance and capacity building to RFs.
    4. Identify and select best practices and arrange for exposure visit for gathering knowledge, attitude and practice.

- Project shall make plan for media campaign using radio, TV, newspaper, booklets, leaflets and meeting and group discussion. These will be effective media for dissemination of information among the general farmers. The farmers should be made adequately aware of their responsibilities about: outbreak of contagious diseases and its preventive measures, improved methods of crop, poultry, and livestock and fish production.

- Agriculture credit is necessary to increase crop production. Therefore it might be appropriate to think about means and ways a provisioning and/or linking farmers with micro credit institutions for increased crop production and promotion of agriculture related small and medium enterprises (SME).

- The following key gender issues need to be addressed: equal access to resources and services (land, water; credit, training and other support services); reduce the gender differences in roles and activities; agricultural extension; commercialization of agriculture; and empowerment and access to decision-making.