

Exploring Alternative Farming Practices to End Hunger in Bangladesh: Footprints from the Special Initiatives

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Forward

Exploring alternative farming practices has preoccupied farmers, agriculture scientists and others related to the field throughout human history. Efforts in this regard has intensified more in modern times as consciousness increased about the quality of food we consume. Concern about the health hazards of harmful fertilizers and pesticides are more pronounced today than ever before. Thus, efforts towards introducing agroecological principles of agriculture farming methods have gained ground. The term agroecology refers to a science that combines natural agricultural practices in relation to the organisms and the social environment and is believed to involve principles and solutions specific to the ecosystem.

To test its hypothesis of implementing agroecology in the context of agricultural practices in Bangladesh, Research Initiatives, Bangladesh (RIB) undertook a project entitled: Exploring Alternative Farming Practices to end Hunger with funding from BMZ and the Rosa-Luxemburg-Stiftung (RLS), a German political foundation with its office in New Delhi. The report under consideration seeks to disseminate the findings of the exercise to the wider public.

More specifically, the objective of the short-term project was to implement agroecological practices as alternatives to chemical modern day farming in 4 villages of 2 Upazilas (Sub-Districts) of Chittagong District. An effort was made to expose farmers into producing indigenous and modern varieties of crops with nontoxic ingredients available and managed by farmers themselves.

A cursory reading of the report shows the following:

1. Awareness was created about the toxic effect of indiscriminate use of fertilizer, pesticide and hormones among not only the direct beneficiaries, i. e. small and marginal farmers but also in the community, local leaders and political actors.
2. Training, advocacy and dissemination of agroecological principles applied through the Participatory Research (PAR) approach had a positive influence on shifting to alternative and organic farming practices in the 17-month project period. It highlighted the need to reach out to farmers who lack knowledge or are under the intensive guidance of corporate markets.
3. The project helped to build consciousness of farmers that food production also meant nutritional and health security of the family and enrichment of the environment.
4. However, it was evident that the short time-frame of the project was not conducive to creating sustenance of the lessons learnt. There is a need to repeat and expand the exercise to larger areas for the establishment of a natural ecosystem countrywide.

It is hoped that the footprints left by the project would lead to further follow-up and nurturing by GO and NGO programmes and policies throughout the country.

I would like to congratulate all those involved in the project and thank the RLS most sincerely for their support to our efforts.

Dr. Shamsul Bari
Chairman, RIB

CHAPTER 1

Exploring Alternative Farming Practices to End Hunger in Bangladesh: Footprints from the Special Initiatives

1.0 Introduction

The mission “Exploring Alternative Farming Practices to End Hunger in Bangladesh” has been a challenge considering the present application of agricultural practices. The project supported by Rosa Luxemburg Stiftung (RLS) and executed by Research Initiatives, Bangladesh (RIB) could only place a footprint on what can be a beginning of the introduction of agroecological principles of agricultural farming methods. Bangladesh is a country of 160 million people having 147,570 sq. km of land. As it is a deltaic floodplain the country is agri-based with 9.5 million hectares of land under cultivation and home of a wide range of food crops, fodder, medicinal and forest trees. With cropping intensity of 191, Bangladesh has attained self-sufficiency in food due largely to the high input application promoted by corporates. Extensive marketing and distribution have led to indiscriminate use of fertilizers, pesticides, and hormones that have trickled down to the smallest of villages in Bangladesh. Small and marginal farmers of Bangladesh constituting 84% of food producers and supplying 75% of the food are faced with the challenges of the negative impact of chemical farming with no alternatives available. The consequences are seen in the damage of soil texture, loss of water holding capacity, low microbial activity with the additional effect of climate change. The inherent agroecosystem of the environment has declined to the extent that every succeeding crop can only be grown with heavy doses of chemical inputs. Besides, mono cropping culture has undoubtedly led to self-sufficiency in cereal production with inadequate availability of nutrition rich immunity strengthening food in a majority of the population. An imbalance of nutrition is therefore seen to be reflected in high child mortality, physical and mental disability and low resistance to communicable and non-communicable diseases in the population.

2.0 Concerns

The ill effects attributed to manmade agricultural methods on health and the environment in producing food have led to worldwide concerns on reverting to agroecological practices by a number of agencies to step forward. Agroecology a science that combines natural agricultural practices in relation to the organisms and the social environment, is believed to evolve principles and solutions specific to the ecosystem. In 2014 The German Development Ministry took up a 'Special Initiative' to fight against hunger and malnutrition, known as the “One World – No Hunger” commissioned by Stefan Schmitz in support of the Sustainable Development Goals (SDGs) and proposed by the intergovernmental Open Working Group (OWG). The two major goals of the initiatives are:

1. To eradicate hunger and malnutrition: those hungry and malnourished today must gain access to adequate, affordable and healthy food as soon as possible. Here, the Initiative focuses on the most vulnerable groups: pregnant women, nursing mothers, and young children.
2. To create and maintain the conditions that enable future generations, in a growing world population, to access adequate, affordable and healthy food. Agriculture everywhere must involve sustainable production, based on ecologically sound and socially equitable investment.

With this special initiative BMZ, Germany is making an important contribution to eradicating hunger and malnutrition by the year 2030. With funding from BMZ the Rosa-Luxemburg-Stiftung (RLS), a German political foundation with its office in New Delhi organizes and coordinates the foundation's activities in South Asia. The main areas of our work are Social Transformation, Labour, and Agriculture. Rosa Luxemburg Stiftung (RLS) in cooperation with Research Initiatives, Bangladesh (RIB) launched the Special initiatives Exploring Alternative Farming Practices to End Hunger to test its hypothesis of implementing agroecology and shift its dependence from corporate based agro-industry.

The RIB-RLS coordinated project sites in Bangladesh were taken in two locations in Chittagong with a Head office in Dhaka. The project covered a period of 17 months beginning August 2015 to December 2016. The hopes lied is combining of the dynamics of human and earthly elements to build a productive, resilient and sustainable agroecosystem with the anticipation that agroecology can bring about a second “green revolution” through the 'On World-No Hunger' initiative.

3.0 Objective

The objective of the short-term project was to implement agroecological practices as alternatives to chemical modern day farming in 4 villages of 2 Upazilas of Chittagong District. An effort was made to expose farmers into producing indigenous varieties of crops with nontoxic ingredients available and managed by farmers themselves. The ultimate goal is to create a food production and distribution method to ensure food and nutritional security of the small and marginal farmers. The long-term benefit would be to serve as a model for replicating in new areas through the Special Initiative on 'One World-No Hunger'.

4.0 Geographical Location of Selected Sites

Anwara and Banskali, the two Upazilas with an area of 164.13 km² and 376.9 km², respectively, in the Southeast of Chittagong District, were chosen for the research study (Annex I, Figure 1) Two villages were selected through a scoping exercise from each Upazila. Anwara and Banskali are located 19 and 47.2 km, respectively, from the Chittagong City (Annex I, Figure 2)

4.1 Income and Livelihood

Agriculture is the mainstay of both in Anwara and Banskali providing 41 and 59% of the source of income, respectively (Annex III, Table 1). The overall land ownership and landless percentage are similar in both the Upazilas. The main crops are paddy, vegetable, potato, and betel leaf, jute and tea estates only in Banskali. Fruits and other forest trees are small in number. Fisheries are quite common in the villages among the large holdings.

5.0 Methodology

The method of organizing farmers into groups was through “cooperatives” formed of marginal and small farmers to identify problems, find solutions and implement appropriate tools in their own eco-

environment. The method is known as “Participatory Action Research” (PAR) (Rahman, A, 1997) or 'gonogobeshona' that creates thinking ability and establishes the democratic right of PAR members to choose their traditionally believed practices. A built-in approach is the custom of activating the PAR members by trained 'facilitators' or 'animators' and project staff to assist in blending the ancient practices and introducing the proven safe method of alternative agricultural practices, in this case being agroecological principles to bring back the natural ecosystem. The selected participatory farmers were of small and marginal classes. The unions and villages and the target group of 44 direct beneficiaries are shown in Annex III: Table 2.

5.1 The Process

The PAR method helped progressive approach to enlighten the farmers and the community on alternative farming practices vis-a-vis organic farming, to begin with, and do away with chemicals. The PAR principle consisting of (i) discussing and identifying problems (ii) finding out the path of solving (iii) planning of action on the basis of priority and resource availability (iv) implementation of the plan (v) evaluation of successes and failures and (vi) renewed discussion and implementation, was applied (Annex II Picture 1 and 2, PAR groups)

The farmers of the PAR group met 3 times a month in 4 locations at the selected sites and at convenient times. During the project period of 17 months beginning from August 2015 to Dec 2016 (except Nov and Dec 2016) a total of 180 meetings and 48 in each quarter (3 months) was held at Anwara and Banskali combined. The meetings were conducted by trained 'facilitators' or 'animators', one in each Upazila and in two locations. A Senior Research Officer was responsible for the management, monitoring, and reporting. The PAR meetings were also occasionally attended by the Coordinator and staff of the Head Office, Dhaka as well as the Project Manager of Rosa Luxemburg Stiftung (RLS), New Delhi. The meetings were many times followed by a visit to the farmers' field to encourage the activities of the participating farming households.

The project objectives were implemented through a number of activities, some repeated to reinforce the learning process and implementation of the principles of agroecology.

6.0 Principles of Agroecology

Agroecology is now believed to be a discipline that integrates social, biological, economic and agricultural sciences and combine traditional farmers' knowledge to justify encountering the modern day challenges of producing food which poses a threat to human health and the environment. It is considered as a 'science, a movement or a practice' not only of a typical ecosystem (a community of living organisms in conjunction with the nonliving components of their environment) but of coining one that suits to any particular environment and human habitation. It is expected to provide the basis of “food sovereignty framework” and help establish the right of ensuring resources and economic stability within the community (Reference: Agroecology: Key Concepts, Principles, and Practices SOCLA 2015) (Annex I, Figure 3). Our effort to build an understanding of the desired agroecosystem has been rightly done through Participatory Action Research (PAR) and to some extent to instill in the community the human and the social rights. The concept was introduced step by step through discussion, skilled training, communication and dissemination of the components of the agroecosystem that is the heart of agroecology. The sustenance of the components of the ecosystem along with a socioeconomic balance is expected to bring food and nutritional security.

6.1 The Components of the Agroecosystem

In simple words the ecosystem consists of the biological community (functional groups) in a locality combined with the physical and chemical factors that make up the biotic (living: microbes, herbivores, carnivores, omnivores, decomposers, etc.) and abiotic (non-living: sunlight, temperature, precipitation, water, NPK and carbon cycles, etc.) environment. Many smaller cycles or ecosystems make up the complex ecosystem for a holistic supply of all the components of life.

Our focus on creating a self-sustainable eco-environment was first to draw attention to the disastrous effect of heavy input use in agriculture to health and environment, and secondly to create awareness on how alternative methods of farming can transform for the better. The key component of agroecology pertinent to the agroecosystem of the region came up in “gonogobesona”. These components were researched as they interacted with the society, the environment and the economic feasibility for ultimate sustenance. As the “gonogobesona” group comprised of a wide age group both traditional and modern practices of agriculture evolved around discussions. Therefore our focus was to introduce those practical components in PAR discussions with the trained experts for a wider introduction. As the agroecosystem can be manipulated to improve production and ultimate sustainability, each productive system was considered as an intervening entity in the discussion and training programmes.

There were at least 19 different technical units researched by the farmers as shown in Annex I: Figure 4. The diagrammatic vision has hopefully given insight into the need not only for food security but also nutritional security. Not all were feasible as many were beyond the reach of resource available by small and marginal farmers. Each component served multiple objectives as in agriculture the components are interdependent and linked to each other. For example, when we talked about multiple cropping or multi storied cropping, we introduced species of plants that produced food, fodder, nutrition, medicine, etc. Similarly when livestock was emphasized, the importance of milk and milk products for home consumption was given importance. However in such a short time span of the project, it was not possible to consider in-depth implementation process of each of the sub components. The impact of the component introduction, however, gave the farmers the choice to research on the knowledge generated and introduction of what was appropriate and feasible. The impact analysis will show how each of the components played a role in the social and economic changes leading to a sustainable system.

6.2 Activities

The project comprised of 7 programme activities consisting of an actionable component, a knowledge or learning component, and an advocacy and campaign component.

1. Actionable component

Small and marginal farmers participated in a cooperative inquiry through 'gonogobeshona' (participatory action research - PAR) (Anisur Rahman, 2004) identified and prioritized their problems and challenges and took action according to their learning and own traditional experiences. It combined traditional practices with modern principles of agroecology to blend to their ecosystem depending on resource availability.

2. Learning or knowledge component

Small and marginal farmers in the selected areas learned alternative farming practices beginning from principles of agroecology and the ecosystem, each of the components that are suitable to their environment. The knowledge component was supported by expert residential training and expert training programmes with specialists from home and abroad.

3. Advocacy and Campaign

Dialogues between small and marginal farmers and local left-leaning and progressive parties took place in order to develop a program of advocacy for pushing viable alternatives by the farmers themselves for the advancement and focus of marginal farmers in party agenda and parliamentary forums.

Rallies, roadshows, field days provided dissemination of technologies adopted by farmers based on their 'gonogobesona' and actions taken. Advocacy and campaign component were reinforced with posters and leaflets where messages were given on the prospects and results of alternative farming methods.

6.3 Implementation of the activities

1. **Participatory Action Research (PAR)** or “gonobeshona” as a method for application to enable the needs of the farmers for a change towards alternative farming was done through prior training of project staff, animators, and representative farmers. The PAR meetings were held in Gundip and Juiry village of Anwara and Pariang (Joldi) and Sorol of Banskali. The fundamental lesson given to the facilitators is to enhance the self-esteem of the farmers of their right to know with inquisitive questioning and challenging, and the right to speak out and stimulate their best thinking and actions. In a group situation, PAR helps collective enhancement of their ability as psychological strength and confidence are built when people have a common goal. Through weekly sessions, the groups were activated in using examples and know-how from hindsight and apply in a new dimension in their farming system.

Thus in each Upazila 84 and a total of 168 PAR meetings were held in Anwara and Banskali combined. Although there were 10 members to begin with in each of the 4 Unions/villages, the membership increased to 13 and 14. As Chittagong is a conservative area of Bangladesh almost all members were males. Some females joined only during training and activities such as rallies and dialogues. However, the animators and project staff often made visits to households and observed their participation in organic farming. Typical PAR groups are shown in Picture 1 and 2 (Annex II).

2. Learning or knowledge component

Training

The training consisted of both residential and day long. During the project period 3 training programmes were undertaken, namely residential training, an expert training programme with national trainers and a second expert training programme with a trainer from abroad. The training was spread over the project period.

a. Residential Training.

In the Residential training programme farmers from the project sites, Anwara and Banskali traveled to Syedpur and Nilphamari, North of Bangladesh where organic farming had been initiated by a previous project of RLS. This training held at RIB office of Syedpur with the selected farmers, consisting of 11 participants. This constituted 8 farmers (male + female) animators and staff of RIB who are to be involved in the project. The residential training was extensive on PAR and organic methods of farming (Annex II: Picture 3). The training gave the participants preliminary lessons of composting, the basics of organic farming, folk rice cultivation, and organic pesticides. The participants had the opportunity to observe the fields which were carrying out alternative methods and who had progressed in folk or traditional rice production. An example of self-sustenance of the North Bangladesh farmers was the establishment of the Rice Bank by the Adibashis. Through PAR the farmers also learned to apply Right to Information (RTI) in achieving some of

their dire needs in the Adibashi society of Nilphamari. The training with field visit of the areas where organic farming is practiced is shown in Annex II: Picture 4.

b. Training Programme by National Experts

The Expert training programme by national experts was held at the Anwara Project office at Chittagong. The first training was held in 2 batches of 24 and 16 participants, respectively. The farmers of the PAR group of Anwara and Banskali were the main stakeholders of the training programme. The training was given by project coordinator, national level experts on organic or alternative methods of farming and honey bee producer (Annex II: Picture 5). The subjects of the training were the concept of agroecology, understanding of the ecosystem, composting (a refresher after residential training) organic pesticide, honey bee production, folk rice varieties, multiple or multi-storied cropping, etc. Issues on nutrition and health and the importance of planting herbal plants were discussed. The concerns that came up from PAR meetings were also discussed. The questions of the farmers were answered. The classroom training was complemented with field visits (Annex II: Picture 6) A session on office management was for the regional staff on communication given by Sharmin Akter at the training programme (Annex II: Picture 7).

c. Training Programme by Foreign Expert

The second expert training was held on 10-12 April 2016. The number of trainees was 21 with 15, farmers joining from Anwara and Banskali PAR groups. This was an international level training on Agroecological Principles given by Dr. Debal Deb an Eco scientist of India. The 3-day programme included all aspects of agroecology aimed at shifting the present degraded environment to a natural ecosystem. Dr. Deb took theoretical and practical lessons to explain the various cycles of nature such as carbon, nitrogen, phosphorus, potassium that are sources of the natural fertility of the soil. Both the plant and animal world were extensively explained. The predators and preys present in any ecosystem were explained as a natural method of keeping a balance of environment through their eating habits (Annex II: Picture 8 and 9).

d. Baseline and end line survey

The baseline survey was done through a direct questionnaire on a household basis. The essential findings were the present state of the population to identify the households appropriate for the study. It also gathered information on the type of crops and agricultural practices in the study area. The end line survey was done to observe change as a result of intervention and study of the impact (Annex II Picture 10 and 11).

3. Advocacy and Campaign

Two advocacy programmes with political actors of the Upazila and Unions were held in the first year one in Anwara and another in Banskali. Three other political dialogues were held in Anwara, Banskali and Chittagong City in the second year, 2016. The objectives of the political dialogues were to promote alternative methods of farming through the voice of the political leaders and activists. Those parties and activists who believe in alternative methods and who work for the well-being of humanity need to be sensitized to bring a change in the policy of adopting methods other than the conventional. Our aim of implementing the policies that would help small and marginal farmers from being exploited by Corporates in marketing their health and environment hazardous products by activating the political actors who play a strong role in bringing changes in the government. That the farmers are concerned about the effect of heavy doses of chemicals in crop production and that alternative method exists had to be conveyed to political leaders through the bilateral exchange of farmers of PAR group and local political actors.

a. Political Dialogues 1 and 2: 19 December 2015

The first year's political dialogues were held on Dec 15, 2015, at Anwara in the morning and on the same day in Banskali. Local party leaders and important personnel and media were present. A total of 50 participants attended (Annex II: Picture 12).

b. Political Dialogues 3, 4, 5: 17-19 June 2016

The 3 other dialogues to sensitize the political leaders were held on 17, 18 and 19 June in Banskali, Chittagong City and Anwara, respectively. The occasions were attended by Political Actors of Wards and Union, Upazila, and District Farmers of Anwara, Banskali and Patia and Project Staff. A total of 64 participants attended in the 3 dialogues (Annex II: Picture 13)

c. Rally of the Project (1): 18 Dec 2015

To promote and campaign alternative farming methods a Local Rally was held at Banskali, on the 18th of December 2015. The PAR and other farmers of Anwara and Banskali jointly attended the rally. Important political and public personnel of agri sector were invited. Besides the direct beneficiaries of the project, a total of 130 people attended the rally (Annex II: Picture 14).

At the rally, project activities were introduced by power point presentation by the Project Coordinator, RIB. The staff at Chittagong also made encouraging remarks. Respected guest speakers gave their views on organic and alternative farming and how bad practices in agriculture are harmful to health and environment. A few proposed the use of organic pesticide and spoke about the use of the natural pesticide. Seedlings of bio-diverse plants with labels were distributed to encourage the planting of fruit and beneficial plant species. These activities reflected the implementation of biodiversity as an agroecological principle and a basic objective of the project.

c. Roadshow (1): 1 Sept 2016

The roadshow was held on 1 September 2016 from 9:00 am to 4:30 pm. The route of the truck ride was from Anwara to Banskali to Anwara covering the two Upazilas of the project Annex II: Picture 15). The objective of the Roadshow was to convey the activities of small and marginal farmers of Anwara and Banskali who have been using PAR as a tool in adopting organic and alternative method of farming. The truck was decorated with banners, posters, and leaflets to illustrate the lessons learned and practiced as a result of the activity of the project since August 2015. The Roadshow also consisted of addresses of the project team to the audience around the truck in between Anwara and Banskali. Local leaders, farmers, project coordinator, staff also spoke to the gathering. Leaflets were distributed among the standing crowds. Songs composed by farmers on alternative methods of farming was sung as the truck rode the highway in a rainy weather.

d. Field Days (2): 19 and 20 November 2016

Two field days were held, one in Juiry, Anwara and the other in Sorol, Banskali to cover the four villages of the two Upazilas. Besides a number of outsiders, 40 and 41 PAR participants in Anwara and Banskali, respectively, attended.

The objective of the field days was to display the products the farmers produced during the season. Prior to the field days, the Project Coordinator and Project Staff visited the locations of the PAR group farms where the crops were ready to harvest. On the day of the event, the crops were harvested and brought to the selected site of the exhibition. In both locations, tents were made and decorated with posters, festoons to

depict the various lessons learned by the farmers during the project period. It was a grand exhibit as 22 products in Anwara and 27 in Banskali, respectively were displayed with names of product and farmers in bamboo made containers. The display contained vermicompost, seeds of vegetables, leafy and green vegetables, fruits and organic pesticides (Annex II Picture 16 and 17).

The programmes were attended by important political persons, Union level agricultural officers, responsible citizens and the project staff. A big crowd gathered and enjoyed the show of farmer grown products especially as they were free of chemicals and pesticides. With bright sunshine and complimented with folk songs it was a lovely occasion for the farmers and the project. The vegetables, vermicompost, organic pesticides and other products were on sale at the end of the show (Annex II: Picture 16 and 17).

e. Coordination Meetings

Four coordination meetings were held during the project period, one in 2015 and 3 in 2016. The objectives of the coordination meetings were to synchronize, integrate and ensure responsibilities of the staff at the different tiers. To keep track, monitor and timely execution of head office and field work 3 and 1 coordination meetings were held in Dhaka head office, and Anwara respectively (Annex II: Picture 18).

In one of the meetings Mr Tauqueer Ali Sabri, Project Manager from India joined the Bangladesh RIB-EWOH team during his visit from 7-12 July 2016. He met the project staff, the PAR and other farmers of the project (Annex II Picture 19). It was a great occasion for the farmers to show the changes in the farming practices that had taken place in Anwara and Banskali (Annex II: Picture 20).

Dr Meghna Guhathakurta, Executive Director RIB visited the regional office at Anwara, Chittagong on the 19th August 2016 to give preparatory advice on holding the roadshow campaign with the right perception and grandeur. An elaborate plan was taken to advocate to the community on the alternative agricultural practices that the farmers were following in Anwara and Banskali Upazilas. She later visited the field to observe the progress of organic farming and Gol rice (folk rice) production (Picture 21).

f. Participation of women

Women are the beginners of agriculture. Yet their role still remains invisible in our society. Chittagong being a conservative area, women remain secluded inside the homes although many activities of production, maintenance and management of food are done by women. Although efforts were made to include them as PAR members, a few joined at the lag phase of the project from the two locations. They seemed to be unwilling or were not appreciated by menfolk to join the meetings in their own community. Our effort however was to some extent successful in bringing women to the training programs outside the village and also in Dhaka (Annex II: Picture 22). It is notable that when they joined it was apparent that they found freedom and spoke, asked questions spontaneously.

g. Publication of posters and leaflets

Fifteen knowledge and information rich posters (Annex II: Figure 23) were prepared on alternative farming. These were displayed during training, events and national seminar. Leaflets and festoons of 16 strategies gave innumerable messages of alternative farming practices and the close tie of food security to nutritional security. These also included the farmers' field activities during the project period (Annex II: Picture 24).

h. Baseline and end line survey

The baseline survey was done at the outset of the project to find out the present demographic profile of Anwara and Banskali, method of farming practices and any introduction of alternative or organic farming

by the small and marginal farmers. Similarly an end line survey was also done to observe adoption of alternative methods of farming due to the intervention of the project (Picture 10 and 11). The reports of the baseline and end line survey are available (Chapter 3 and 4).

i. AGROECOLOGY website

A section of the RIB website has been allocated for AGROECOLOGY. The website is being uploaded with the articles on agroecology, organic agriculture, events, and activities. The website address is www.rib-bangladesh.org AGROECOLOGY.

7.0 Outcome of the Project RIB-EWOH

The impact of the project as a result of the various activities is discussed under relevant heads. A reflection and information that supports the achievements of the projects are shown with analysis of data collected during the project period and photographs (Annex II) of exhibits of organic farming inputs and products. The impacts are discussed under different heads.

a. Outcome of the Methodology PAR

The Participatory Action Research (PAR) has been rightly applied to stimulate the marginal and small farmers to speak out their mind. The farmers participated and discussed on individual, group and community needs and problems. The meetings guided by animators were free and frank and as they were within the community, no pressure was felt by the farmers. The setup of the PAR approach gave them the knowledge of their rights to know (a preliminary training on RTI was given at the residential training programme) to establish and implement what was thought beneficial to them and not imposed upon.

Discussions and eventual acceptance dwelt on age-old practices on agriculture which are a core part of agroecology came up as a renewed effort to change their existing damaged ecosystem. However, many issues needed more than one sitting allowing the farmers' time to think and evaluate the present within their context and accepting new methods depending on their resources, technical know-how, and capability. Issues needed action and reflection, a method known as 'praxis'. The farmers were able to ask for training needs, place issues to political leaders and communicate with the project personnel. The enthusiasm of the community and the members were visible by their 80-95% attendance in the PAR meetings and more farmers willingly joining the group the second year. The significant discussions and introductions of agricultural practices may be summarized as a result of Participatory Action Research as follows:

- Ill effects of indiscriminate use of fertilizer and pesticides to health and environment. Dependence of crop production on corporate markets of highly expensive and hazardous chemicals.
- Initiation of composting, vermicomposting, increased folk rice production, organic vegetable production, the importance of multiple and multi-storied cropping, awareness of livestock, poultry, pigeon and fish production, the addition of medicinal and flowering plants in their gardens.
- PAR activities led to realization and understanding of the nutritional requirements for healthy family life and that which can be sourced from their own farm.
- Self-production and application of organic home-made pesticides and methods that was friendly to the health and environment.
- PAR discussions aided in finding out the cost benefit of any farming practice.

- Discussions led to the inclusion of women in expert training programmes even in a conservative area like the two Upazilas under study.
- The mouth to mouth message of the project activity and the enriched knowledge of farmers motivated willingness of other farmers to join the PAR group.

b. Outcome of Training

The training programmes were the desired activity of the farmers. All 3 training and follow-up activities were a boost in the learning process. As the training were aimed at both imparting theoretical knowledge and laying practical hands on the holistic system of farming and the components of agroecology for a sustainable ecosystem, farmers were enthusiastic in implementing techniques that would be profitable and improve the quality of their produce.

The training classes took into consideration of creating an environment for living and non-living –animal and plant species that would provide soil health, on cycles of the ecosystem, cropping system, control and preservation of pests, fruits and medicinal plants and food for nutrition depending on the baseline information and PAR of the farmers.

Thus to include all aspects of the ecosystem and to implement agroecological principles, the subjects covered were broadly on soil health and nutrient cycling (carbon, nitrogen, phosphorus, potassium, water), pests and predators (food web and beneficial organisms), importance of medicinal and flowering crops, seed preservation, organic pesticides, folk varieties and nutritious food. Based on the baseline information and on the PAR by the farmers, the following training programmes were designed and implemented.

i. Soil health

Although many of the techniques were new to the farmers it was the need of the day for implementing alternative methods. Most farms to the tiniest of holdings had been practicing modern methods as far as chemicals are concerned. Farmers were using fertilizer and pesticide indiscriminately with advice and promotion of corporate-backed dealers and agencies. The soil turned dry having little moisture as not much organic composts were added that would retain proper soil texture and nutrient availability. Every crop had to be supplied with heavy doses of fertilizer to get the desired production. Most of the water management depended on the natural streams of the mountains which did not have an outlet or flow to the downstream lands.

Soil health is proven to improve with compost application. The method of making simple composts and vermi composts were lessons repeatedly given. Farmers also learned to make and use organic pesticides. In addition, the use of pheromone trap was initiated by farmers which were absent in the area. Success has been achieved with the introduction of the techniques by around 50% of the PAR and some non-PAR members (Annex II: Picture25 and 26). More concrete findings are discussed in the impact analysis.

ii. The Natural Cycles of the Ecosystem

The understanding of the various cycles of the ecosystem was an important aspect of the agroecological concept. The explanations cleared up the fact that all elements of the earth and atmosphere are recycled and available for the healthy life of humans, animals, plants from microbes and from higher species. The natural state of the climate and physiography allow the water, carbon, nitrogen, phosphorus and potassium cycles to supply the natural nutrients required for any specific ecosystem. The inherent micronutrient and mineral composition of the earth's crust add to replenish the necessary ingredients for life to exist. Knowing the cycles meant that all nutrients are available from our surroundings and if the cycles are not disturbed a

balance will exist requiring no addition of external inputs. These characteristics apply to natural ecosystems, and, in a much-changed form, to manmade or agricultural ecosystems. The scale of the differences between natural and agricultural ecosystems depends mainly on the human manipulations, generally characterized by the intensity of management or intervention, and the level of disturbance vis-à-vis of the (natural) balance. The intensity of management would depend on the application of appropriate innovation due to social and economic pressures to make the agricultural system more efficient. The significance of shifting would require uniformity in crops and soil management so that the agroecosystem does not move away further from the natural system. Therefore, both agroecology and the farming systems concepts were explained as holistic approaches to the functioning of farms.

iii. Natural Sources of Nutrients

In the study of the natural cycles, the natural sources of nutrients from the soil and plants were identified. The farmers were trained to identify the natural sources of nutrients such as nitrogen, phosphorus, potassium, micronutrients (Annex I Figures 5 and 6). These sources and many others available are also sources of micronutrients essential for plant growth and reproduction. Field visits with the farmers helped to identify the plants and method of using the sources to build up the nutrient building population of the soil.

iv. Multiple/Multistoried cropping and Biodiversity

Although the baseline study showed that farmers were practicing single, double and multiple cropping in both Upazilas (Figure 7 and Picture 9) they had little knowledge of biodiversity i.e. the healthy habitat of a variety of bio diverse plant and animal life in a particular habitat, a level of which is usually considered to be important and desirable. Having a combination of the right kind of species in the same time or relayed (two or more crops on the same field but planting of the second crop after the first one has completed its life cycle) or multiple crops that would replenish nutrients to the soil, increase the productive capacity and year-round bio diverse food availability was little understood. Names of companion crops and plants were cited which the farmers also knew by their local names. A calculative understanding was also given on the higher return and eco-friendliness of multiple crops growing in a same unit of land.

Examples of the farmers' existing multi-cropping and multi-storied cropping practiced by farmer Mustafizur Rahman in Banshkali was seen during field visits. Biodiversity is an essential component of a flourishing ecosystem, allowing both nutrient enrichment and varied types of crop and plant production (Annex II: Picture 9).

v. Population dynamics of Species and the Food web

The habitats of animal species were also important for a sustainable ecosystem. In modern agriculture, all animal and plants are considered as enemies and weeds, respectively. As a result, all organisms that are beneficial and live on harmful pests are destroyed by the indiscriminate use of pesticides. Agroecologists have opposed such method and propose the identification and preservation of beneficial organisms and plants that can live together in any particular ecosystem without substantial loss of production. The studies are based on eating habit of species and mapped in an ecosystem as the food web. Food webs differ depending on the species of plants grown and the eating habit of the organisms. In natural habitats, if animal species are allowed to survive naturally they find their food and harbor in their appropriate environment, Thus herbivore, carnivore, detritivores, etc. can be allowed to live together in their favourable ecosystem (Annex I Figure 8) to the benefit of controlling the harmful pests.

Our farmers were exposed to the carnivores and herbivores of the environment that enabled them to identify the beneficial species. Exercises were done during and after the training that led to the identification of as many as 8 species farmers already knew but were not aware of the benefits (Annex I: Figure 10). Studies showed that the population of the species from different classes were way below the optimum required to maintain and sustain an ecosystem (Annex I: Figure 8). But the knowledge will hopefully go further into the restricted application of pesticides and herbicides for pest control or of the introduction of the beneficial species suited for the crop concerned (Annex I: Figure 9 and 10) to control harmful insects naturally.

vi. Fruits and Medicinal Plant

Many herbaceous and woody plant species are sources of medicine. The PAR activity also revealed the knowledge of farmers on many plant species they knew that has been used as herbal medicine from olden days. The objective of our project was to reintroduce these known plants that are around them for use in curing simple day to day ailments and maintaining health. The baseline study showed that the population sampled in both Anwara and Banshkali were suffering from communicable and non-communicable diseases. With the use of herbal medicine such as the neem, tulsi, simple ailments can be cured.

Fruits and vegetables are known to be nutraceuticals. Fruits and vegetables also supply vitamins and minerals to the diet and are important sources of phytochemicals. The ingredients in fruits play an important role as antioxidants, phytoestrogens and anti-inflammatory agents that protect from many diseases and strengthen the digestive and the immune system.

Our baseline study show, scanty plantation of common fruits of Bangladesh such as mango, jackfruit, banana, litchi, berries, guava, olives, etc. Being small farmers, not much land was available and so homesteads also do not produce enough vegetables that could be consumed for the family. Awareness was therefore needed on the importance of plantation of fruit trees and equally increasing the consumption. During PAR meetings and the training programmes the participatory farmers were exposed to the various foods to attain a balanced diet. During the rally, farmers, political leaders, and local participants were given saplings of plants of fruits and herbal species for acquaintance and introduction in their homestead (Annex II: Picture14) in whatever space is available.

Our training programme included the culture of honey bees that are 'organic farmers'. Honey bees not only provide honey but increase pollination and crop productivity by more than 20% percent. We also wanted to find ways on how farmers could earn extra income with their own labour. The hands-on training created enthusiasm not only on honey production but also floriculture not much of which is considered by rural people (Annex II, Picture 5 B Honey Bee training).

c. Nutritional Status

Food grain predominate the food consumption basket constituting 77% of the food intake. Diets are largely imbalanced in the population of Bangladesh. According to FAO and Hies report the average calorie requirement of an individual is 2439 Kcal per day. The estimated average present intake is 2318 Kcal per day. It is even less in rural Bangladesh. Food security in terms of food grain sufficiency only cannot, therefore, be a criterion of nutritional security and a healthy population.

Our training also dealt in length including both animal and plant sources of food. Although statistics showed rearing of cow, goat, and poultry; the numbers are far below the required for an average family size which is 6-8 in 34-42% of the population in the project area (Baseline survey 2015). Chicken and ducks could be

accommodated in larger numbers. Further, bird, like pigeon was reared by a few. Small fish ponds were plenty in number in the villages which were probably a means of livelihood plus a small home consumption.

Discussions in PAR meetings were an attempt to increase the number of farmers raising cows, goat, and poultry in initiating animal products that would provide protein. Food and nutrition were focused on creating awareness on health and nutrition as an integral part of food security. The list of food and the necessity of a balanced uptake of nutrients was explained diagrammatically during the training classes. Emphasis was given on planting local fruit trees and home gardening of vegetable and addition in their daily diet. (Annex I: Figure 11).

8.0 Impact Analysis

The impact of the activities of the project was analyzed at intervals of the project period. Although, a substantial change in livelihood pattern is unexpected in a span of only 17 months, small changes in farming practices were accounted for and quantitative data were taken.

8.1 Shifting to Agroecology as an Alternative Practice of farming

As our objective was to change the corporate-backed high chemical input culture to agroecosystem based farming, the project considered implementing the organic components for a holistic change. This was a remarkable way of succeeding as the ill effects of high dosages of fertilizer, pesticides, and hormones has already started to cause a visible ill effect on the health and environment. Based on the PAR research outcome, the project took into consideration the implementation of organic components of an ecosystem.

a. Impact of Training

Training has been essential for the farmers. This was reflected from the baseline survey results. Very few farmers got training in agriculture. No training has been received by the farmers of Anwara and Banskali either by the DAE, GOB or any NGO. The impact of the training is briefly stated.

i. Training on PAR

The training on Participatory Action Research was like an 'icebreaker' for the farmers who found an avenue to speak out their problems. Furthermore, the very nature of PAR or 'gonogobesona' opened up issues of ancient agricultural technologies and allowed blending with new and alternative farming methods, a basis of the agroecological concept. PAR helped farmers to identify their problems, find convincing solutions and implement the designed programmes. PAR also allowed review of issues over repeated discussions which build the confidence in accordance with Dr. Anisur Rahman that "all problems have solutions". For our farmers, PAR was the opener of the investigative mind of farmers.

ii. Training on Alternative Method of farming

Knowing and understanding the present trend of farming was important in visualizing the state of health and the environment due to indiscriminate application of chemicals supported by corporates. Although, the farmers were facing health hazards and higher cost of farming, a way out was not known. Immediate adoption of using technologies available from their homestead such as vermicomposting appeared to be a relief. As many as 20 technologies pertinent to organic farming and that covered both food and nutritional security formed the modules of the training programmes. Emphasis on implementation was also given to existing ones such as animal rearing as the numbers were shown in the baseline survey. An explanation of the economics of holistic approach helped the farmers to choose his farming practice.

The training programmes were given by experts of both Bangladesh and abroad. So, attendance was up to the capacity. Chittagong being a conservative area, women were not seen to join the village level PAR meetings. But all training programmes outside the village were attended by women of the farming households. This helped us extend our concept of agroecology to women, who really are teachers and who began agriculture. As is evidenced from the technology intake in the next section the training programmes were very fruitful that being a persistent demand of the farmers (Annex II, Picture 22).

iii. The Food Web of Species

One of the major learning of the training programme was the (i) agroecological aspect of blending old technology with new, (ii) the biological and nutrient cycles, (iii) identification of plants that are natural sources of nutrients, (iv) importance of multiple and multistoried cropping for maintenance of biodiversity and most importantly (v) the preservation of animal and plant species that are eco- friendly. Further exercise carried out after the training allowed them to map the existing habitation of animal species i.e. the beneficial species present in that particular ecosystem. In this study, the species found in rice and vegetable based ecosystem was mapped (Annex I Figure 10). This particular aspect was important as a balance of ecosystem can occur if the desired species are present in adequate numbers.

The lesson learned from the study is the knowledge of beneficial species by farmers to preserve the eco-friendly herbivores and carnivores. It can lead to motivate the farmers introduce beneficial species and increase their population. This is a very important aspect of agroecology.

iv. Introduction of safe technologies

The technologies that were considered safe for the agroecosystem and that which would help food and nutritional security were encouraged in PAR discussion. Thus 20 such components (Annex I: Figure 12) that also has many invisible benefits were encouraged for farmers' adoption irrespective of the practices done by farmers. Data on the adoption was collected at intervals from the beginning of the project (Figure 13) so, a total count of multiple adoptions could be determined. Although the sample size was 44 (PAR members) there were 228 adoptions from the 20 technologies extended (Annex I: Figure 13).

As a result of 20 components extended to the PAR groups 14 were adopted over time during the project period. Data shows a positive response and gradual adoption especially those that were repeatedly discussed as desired by the farmers. Farmers also were calculative on the short and long term returns in case of adoption.

Of the 20 technologies that would ensure food and nutritional security, 8 were in use by 30 households in the 4 project sites at the onset of the project. Fourteen of the techniques were picked up at different numbers till November 2016. The remarkable introductions were the vermicompost and different kinds of organic pesticides, pheromone trap, nursery, etc (Annex I: Figure 12) that were not existing in the areas. The high level of introduction of fish and livestock also indicated that although investment had to be made, returns were higher. The number of farmers introducing folk rice increased when their knowledge of the low cost of input and the nutritive value of brown rice was enriched by the project.

Six technologies namely honey production, rearing of Quail, N fixation, use of water weeds for K, dry ash for P and rice bank were not initiated by any farmer. The reasons were mainly due to the high cost of investment and lack of confidence in getting a return on the investment. The availability of source and ultimately finding a market was also a reason for not introducing some products. The specific reasons given by farmers are explained below.

Sl. No.	Technologies	Reasons for not introducing in farms
1	Honey Bee	Cost of startup is around Taka 4000-8000, farmers could not afford; also not sure of getting return
2	Rearing of Quail bird	Not habituated to having quail bird and egg; startup investment was as high as Taka 3000
3	Nitrogen fixation	Unavailability of quality seeds of N fixing crops; could not spare land for non-rice crop; however farmers learned that beans, and other crop roots could be incorporated in the soil for increasing nitrogen
4	Dry ash for P	Could not afford to burn wood to make the P fertilizer; perhaps training needed repetition
5	Water weed for K	Not abundant in the existing fish ponds
6	Rice Bank	Farmers did not think it necessary as they could manage rice from year round production or by buying after sale of other products

It is notable that although the number of PAR members was 22 in each Upazila, all technologies combined were adopted by 96 and 132 in Anwara and Banskali, respectively. With the total number of PAR being 44, a total of 228 households were using some kind of alternative farming practices that would reduce the use of chemical inputs. This shows that the farming practices has extended beyond the PAR member holding household in both the locations (Figure 13) Further each household had adopted more than one technology. The rising trend of adoption over time shows that a larger coverage of area on alternative farming is expected over time (Annex I: Figure 14). However, low cost, easy resource availability, use of own manpower and need for home consumption were points considered when shifting to organic methods. Most farmers also used part of their land for alternative farming; afraid to take the risk of the unknown and try out first as farming is their sole or major means of livelihood.

b. The impact of Advocacy and campaign

i. The Political Dialogues

The political dialogues (5 in number) at the local Upazila level and the City, exposed the project to the people who take part in changing policies and implementing new strategies that will bring benefit to the people. As organic farming is low cost and safe for health the statement were strongly placed to the political parties. The consciousness of the general public and the policy makers needs to be raised looking at the development of agriculture and rural lives as a whole. The attention of the party leaders and policy makers has become essential on focusing the existing environmental hazards and the need for a shift to the natural system without losing the production necessary to feed the family and the population. The dialogues played a central point of connection between the farmers and the promoters of policies and programmes of the country.

a. Farmers' connection

Due to the dialogues, the farmers of PAR and the village realized the importance of communicating their issues to people who take part in decision making and who can contribute to the agriculture sector that would ensure safe food and nutritional security. The dialogues also created ties with the Union level government officials with the farmers. The PAR groups came up with a number of points and presented

them to the political actors. The farmers raised the following points as a result of their connection with political leaders..

1. More training is required for organic and alternative methods of farming.
2. Arrangement of compensation to farmers for loss due to natural disasters
3. Closure of unauthorized, harmful pesticide and restricted sale of chemical and organic pesticides.
4. Good seed supply by the GO, NGO and Private companies
5. Krishi market for the farmers only.
6. Interest-free easy installment loan is essential
8. Permission to use government unused land for agriculture
9. Yearly special budget and fund for farmers' only
10. Cooperatives in the use of inputs required for farming.
11. Need all kinds of agricultural services required for farming.
12. Exemption of proposed tax on farmers
13. Ensure that pheromone traps given by UN office are free
14. Cooperation and frequent visit and monitoring of the agricultural officers

b. Feedback of Political Actors

The dialogues were welcomed by all the party leaders present in the two Upazilas and the Chittagong city. The political actors and root level workers of various parties of Gundip and Jhuiry- PAR activity sites attended the meeting. A newly elected Lady member, Parvin Akter attended the dialogue in Anwara. The party leaders and members present actively participated in the dialogue. They were happy to know of such farming group in Anwara and Banskali and would want an expansion of the programme in other Upazilas of Chittagong. They expressed that more public lessons be given on alternative farming.

The political dialogue in the city was led by Mr. Shah Alam, president of Communist Party. The parties they represented had most of the agenda raised by the farmers. So, they were their priorities too. Most of the members agreed that the points risen by the farmers for carrying out alternative farming and safe food production was logical and need of the day. All the members appreciated the fact that this Special Initiative project was an appropriate plan to call local and regional political parties for discussion on such an important issue. Our country is agri-based, but our traditional agriculture is losing ground, so it is a welcome call for them to work with RIB for safe agri product production and ensure food and nutritional security.

The group felt increased awareness of PAR activities and committed to speaking about the problems to the upper levels of the party. All members agreed to take these on the agenda of their party and convey the messages of the needs of the farmers at the Union and Upazilla level. They expect that more on alternative farming will spread with their conversation with other members of the political group they are associated with. Some of the leaders who came from Patia, another Upazilla suggested that RIB forms PAR groups in Patia where farmers needed to know the technologies stated in the presentation. Other such areas are not technology driven on alternative methods that RIB project was assisting on, so the expansion of sites would be very useful for Chittagong. Mr. Amrita Barua suggested that we develop a manual on organic farming components and methods.

c. Impact of Rally, Roadshow and Field Day

Public functions always attract a lot of crowds who are sometimes not direct stakeholders. A rally, a roadshow and 2 field days were colourful events that acted as a campaign for organic and alternative farming practices.

The attraction of the rally was a gathering of farmers of Anwara and Banskali. Posters were made to depict activities the farmers had done. A large number of people including the public attended the function. The introduction of medicinal, fruit and herbal plants created enthusiasm among the participants. The picture and name tag on plants helped identification of the species (Annex II: Picture 14). The Project staff and important guests spoke of the ill effects of chemical fertilizer and pesticides to create awareness. A positive response could be seen on the eagerness of the community to know the activities that would improve their farming system and livelihood.

The roadshow was equally a funfair occasion- a ride on a decorated truck. Crowds gathered along the highway while the participating farmers and project personnel sang folk songs to give messages on organic and alternative farming. Leaflets with messages were picked up by spectators and school children (Annex II: Picture 15).

The field days were held at Anwara and Banskali at locations where the farmers of respective villages of Anwara and Banskali attended. The tents in each location were decorated with festoons having an innumerable number of messages. Posters of 15 kinds (Annex II Figure 16 and 17) pictured activities of farming the farmers took part in. The main attraction was the display of organic inputs and products the farmers grew in their farms. It was a joyous moment as alternative farming practices were visually seen as a success.

d. Impact of Posters, Festoons, and leaflets

Written messages have no time limit of impact. These will hopefully motivate farmers even long after the project. (Annex II: Picture 23 and 24).

e. Impact on nutritional aspects

Although precise data could not be taken in such a short time of the project period, it is expected that consumption of milk, egg, meat, fish, and vegetables increased due to the production of safe products on their own farms. Our training programmes gave the farmers widespread knowledge of the importance of balanced food for a healthy life (Annex I: Figure 11).To avoid the risk of using alternative methods at the beginning, the farmers introduced in small pieces of their whole land. They opined that they consumed organic products as they did not spray chemicals. Otherwise very little market purchased products were consumed as awareness has grown on the residual effects of chemicals on food bought from the market.

9.0 Cost Benefit of Alternative farming

The project studied the cost-benefit of organic or alternative farming of the farmers practicing from the beginning of the project. The income from investment has provided small returns. Almost all had consumed some of the organic products as safe food. A survey was done on the investments made, amount consumed and savings made in terms of monetary value (Annex III: Tables 3 and 4) over a 14 months period excluding the startup time and ending the survey in October 2016. The crops and technology for cultivation were according to the alternative methods of farming in small portions of their cultivated area (Shown in Tables 3 and 4). It is notable that farmers who introduced livestock invested more, returns of which were not

available during the project period. However, the losses seen in Table 5 and 6 are expected to be recovered through sale of milk, cattle and rice in future.

In another survey carried out by our project staff (animators) among the PAR members, the area, production and monetary gains were recorded from 17 and 15 PAR and non-PAR members of Anwara and Banskali, respectively (Annex III: Tables 7 and 8). These were mostly seasonal crops of vegetable and folk rice in small portions of the land. It is remarkable to notice that so many have started alternative or organic farming in Anwara and Banskali, indicating the positive response of the activities of the project in a new untouched area of Bangladesh. According to the end line survey, the investment and income statement is also remarkable. Out of 44 PAR members, 20 (12 in Anwara and 8 in Banskali) had taken up the technologies introduced or re-enforced by the project as a business (Annex III: Tables 5 and 6) in the two Upazilas. They were also using substantial quantities in their own farm.

The summary of the data indicate interesting consumption and sales figures. The investment when converted to monetary figures was an average of only 8.7% of the produce. They earned 91.3% from the products indicating kind of farming they adopted; their way of livelihood to some extent was agriculture (others beyond the scope of the study). Table 9 also shows that the profitability was 7.6 % apparently not expecting a high return at the startup of the learning process and slow introduction of agroecological principles.

10.0 The National Seminar

The national seminar of the project on Exploring Alternative Practices to End Hunger in Bangladesh was held on Saturday the 10th December 2016. The seminar was graced by Dr Rafikul Islam Mondol, Director General, Bangladesh Rice Research Institute (BARI) as the Chief Guest. Dr Shamsul Bari, Chairman, RIB chaired the function. Distinguished guests from GO, NGO, development agencies, farmers, content writers, media and RIB personnel attended the function. The summarized version of the comments, questions and photographs are included in Chapter 2.

11.0 Sustainability of the Project

The 17-month-old project showed a substantial progress that was visible. The farmers became aware, learned new techniques, and blended the old with the new. Two leading people one Md Shahed a PAR member and Mr. Ibrahim a local Village doctor have agreed to take the project activities forward. They committed on calling the PAR members and meet and discuss in the same way to continue the agroecological concepts of the EWOH project.

12.0 Recommendations

1. PAR has helped motivating farmers and could be successfully used for expansion of alternative farming. In this case where farmers have not been exposed to group discussions, 'gonobesona' helped them to open up the needs of technical knowledge and inputs that would reduce their cost of farming. At the end of the project, noticeable partnership and sharing had developed among the farmers.
2. The study showed that introduction of organic fertilizer has been beneficial and did not cause any great loss in income (however it was done on a small scale). This indicates that more studies should be done by GO and NGO to develop a self-sustainable system through using the principles of agroecology.

3. Agroecology should be introduced in the agricultural curriculum to allow extension of all methods the farmers can choose from.
4. Knowledge of the disease resistance, low cost of production and grain quality revealed the importance of folk varieties and seed preservation and storage as a whole. Farmers expressed need assistance in seed preservation and storage of the endemic varieties. GO and NGO should develop strong policy on seed bank at the grassroots level.
5. Farmers have no savings or fund for increasing or intensifying production through higher investment. The government should take up projects and programmes to give soft loans. The present credit system of the private sector has high interest rates and is not actually helping the farmers.
6. The short period of this initiative will not likely to be sustainable. It is too short a time to see continued practices of the lessons taken up or of any sustained impact on the food and nutritional security. Trust and confidence in agroecological concept can grow only with continuity of such activities over a longer period of time.
7. The local political parties became aware of the alternative farming methods. But the spontaneous initiative of all the parties whose attention was drawn may not occur in one or two encounters with the farmers. Continuity of such activity of farmers is essential to enable incorporation of their demand on their proven desired farming practices.

13.0 Conclusions

Anwara and Banskali can be considered as the beginners of alternative farming in Chittagong. Although they were small and marginal farmers, intensive PAR activity, training and follow-up, enthused the farmers and created enthusiasm among the neighbouring households. At the end of the project an adoption of 228 members is observed among 44 members. Although several non-PAR members have taken up alternative farming our data show multiple adoptions by each member and adoptions that suited their need and resource availability. Out of 20 introductions, organic compost, organic pesticides, and multiple farming---3 major components of agroecology were practiced by farmers visibly accepting the shift towards agroecology.

Six technologies were not adopted by farmers mainly due to lack of resources and financial investment not within the means of small and marginal farmers. However, farmers expressed their gratitude for the training received and planned to start more income generating endeavours.

PAR, training and advocacy and campaign were equally important in driving the project activities towards creating awareness and self-motivated shift. Group formation and participatory action research (PAR) can be attributed to being a peaceful process for breaking the mindset and bringing about a change, in this case, the agricultural system. Most importantly, farmers developed confidence in speaking out and the will power to implement new ventures.

The political dialogues created a bridge between the project and farmers with the policy makers, although at a level where any immediate influence cannot be expected. However, future sustenance of their activity would largely depend on the continued leadership of the farmers who want to continue the new initiatives.

The accomplishment of complete food security from a nutritional point of view cannot be concluded from this small study, but consciousness among the stakeholders or participating farmers has grown on safe and balanced food intake by the alternative farming practicing families.

The end line survey and the studies done by the project personnel show no loss but rather a gain in alternative farming. The data and statistics show that farmers had divided their land for organic farming. They had consumed part of the products and sold some to allow reinvestment and sustenance of livelihood. Income from alternative farming plus the safe food supply is a positive sign that the project has succeeded.

Most importantly farmers could see the products of alternative farming in such a short period. The project has created quite a few happy farmers and success stories. Hopefully, the achievements will have a trickle-down effect beyond the direct beneficiaries.

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Figure 1: Geographical Location of Project sites

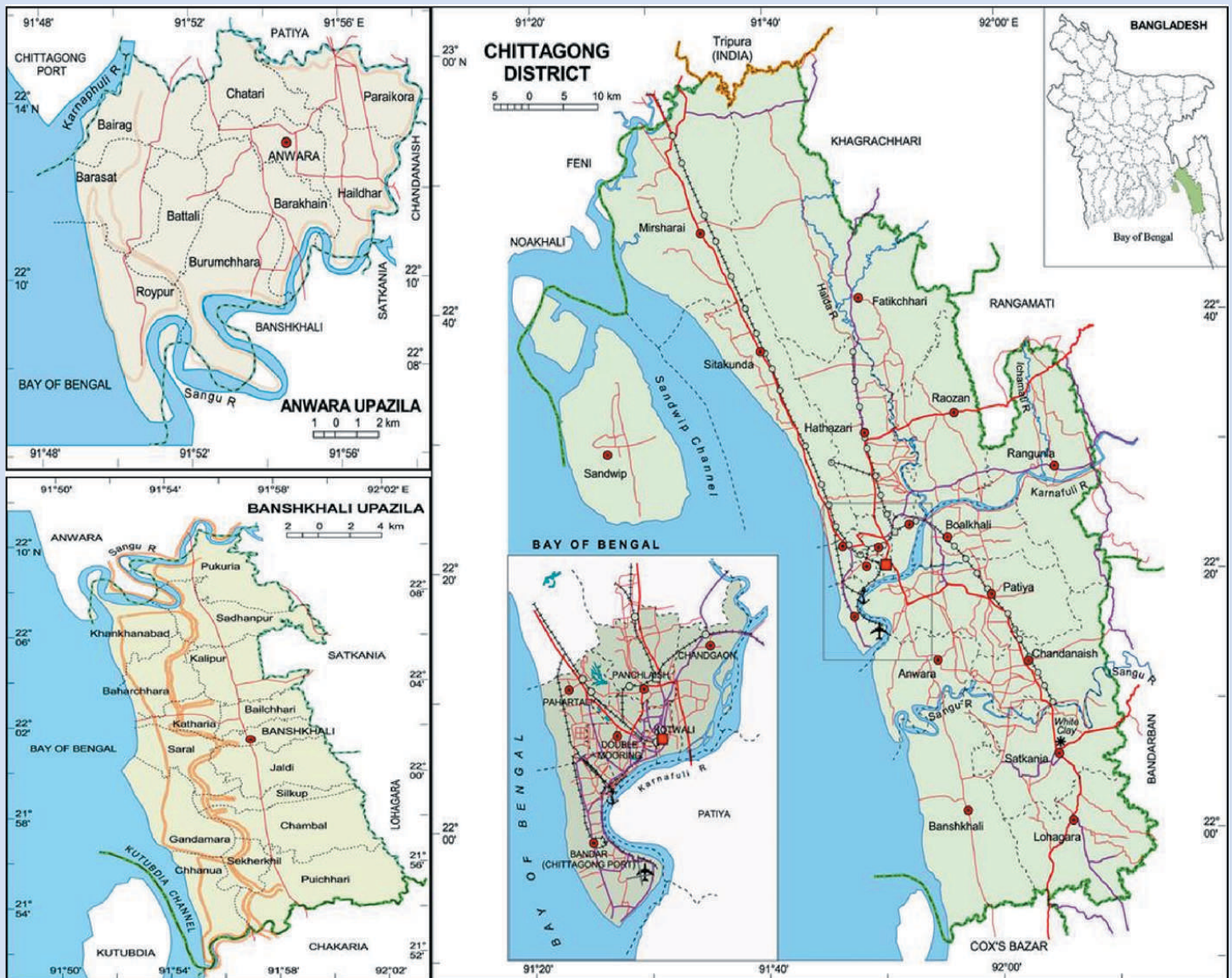


Figure 2: District Locations and Basic Statistics of the Project Sites



Upazila	union (project site)	Area (Km ²)	Population (1991)	Population Density (km ²)	Km from Chittagong City
Anwara	Gundip	164.1	219,446	1,265	19
	Jhuiry				
Banshkhali	Sorol	376.9	320,339	850	47.2
	Joldi				

Figure 3: (Reference: Agroecology: Key Concepts, Principles, and Practices SOCLA 2015 (Modified))

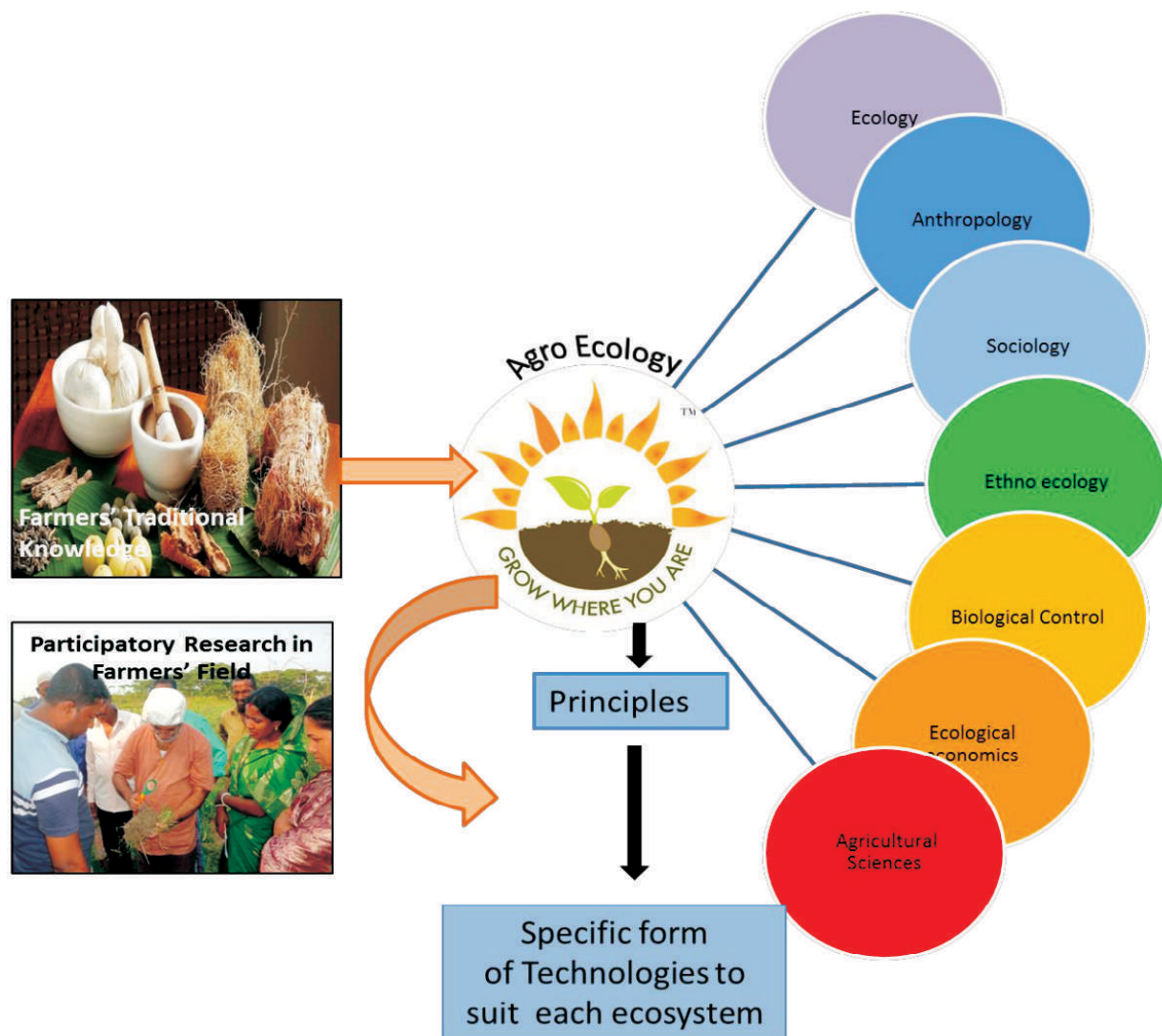
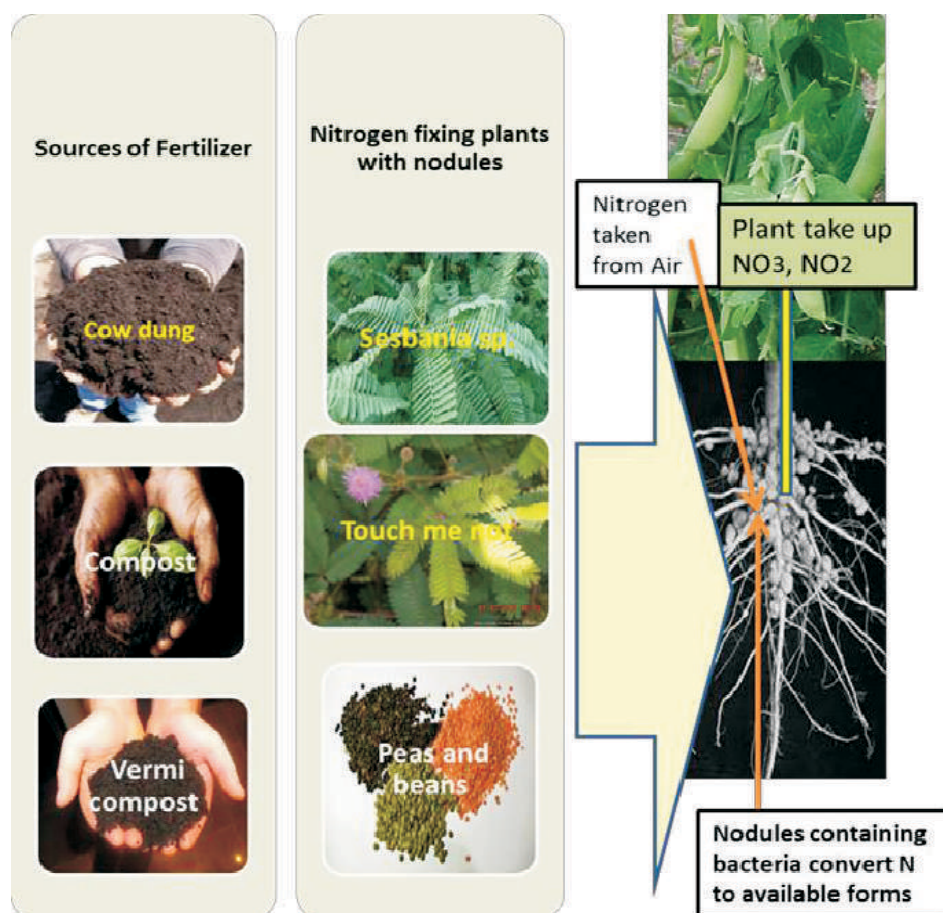


Figure 4: Adoptable Technical Units of the Agro ecosystem



Figure 5: Nitrogen fixing plants and mechanism of fixation



The natural sources of Nitrogen	Crops that incorporate Nitrogen
<p>Cow dung</p> <p>Compost</p> <p>Vermi compost</p>	<p>Sesbania (dhancia)</p> <p>Touch-me knot (Lajjaboti)</p> <p>Peas and beans</p> <p>Alfalafa</p> <p>Soyabeans</p> <p>Peanut</p>

Figure 6: Natural Phosphorus and Potassium Enriching Sources

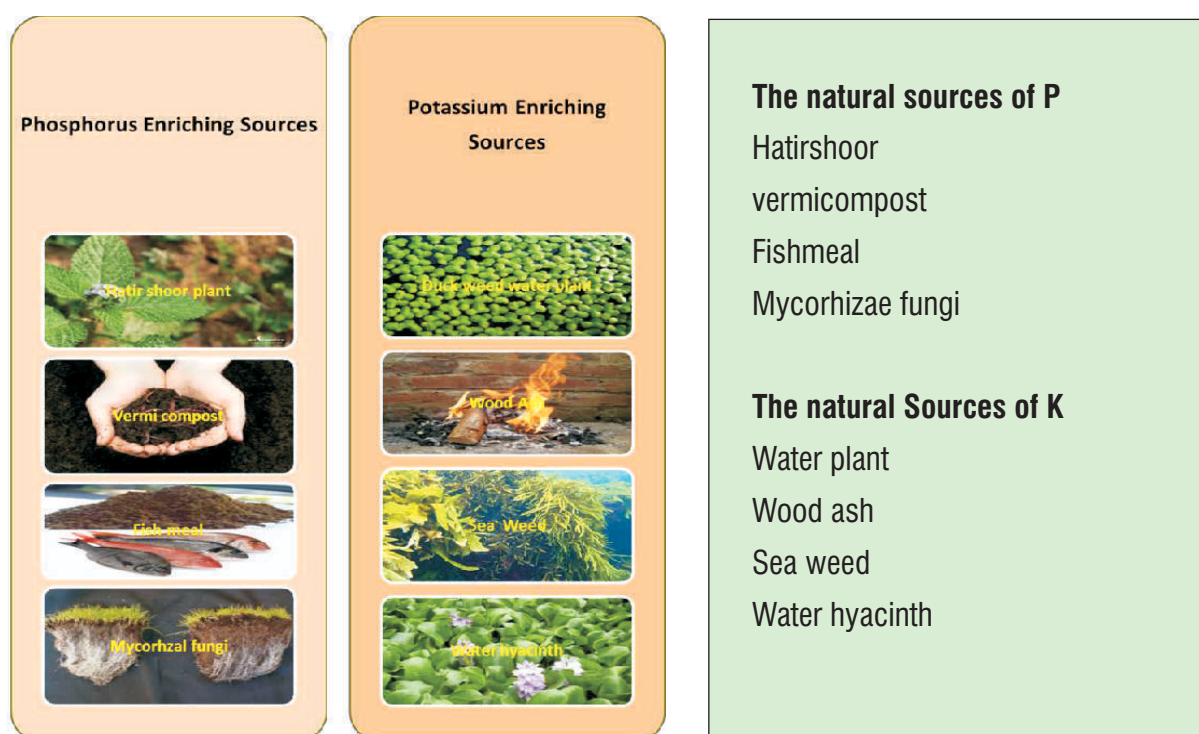


Figure 7: Baseline information on Intensity of cropping in two locations

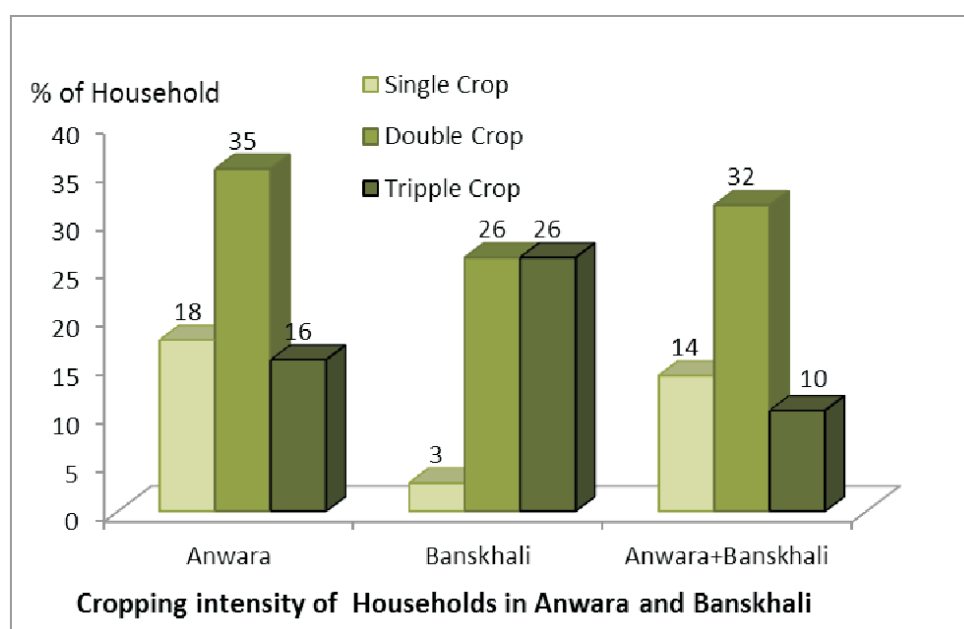


Figure 8: A typical Rice Food Web of Species

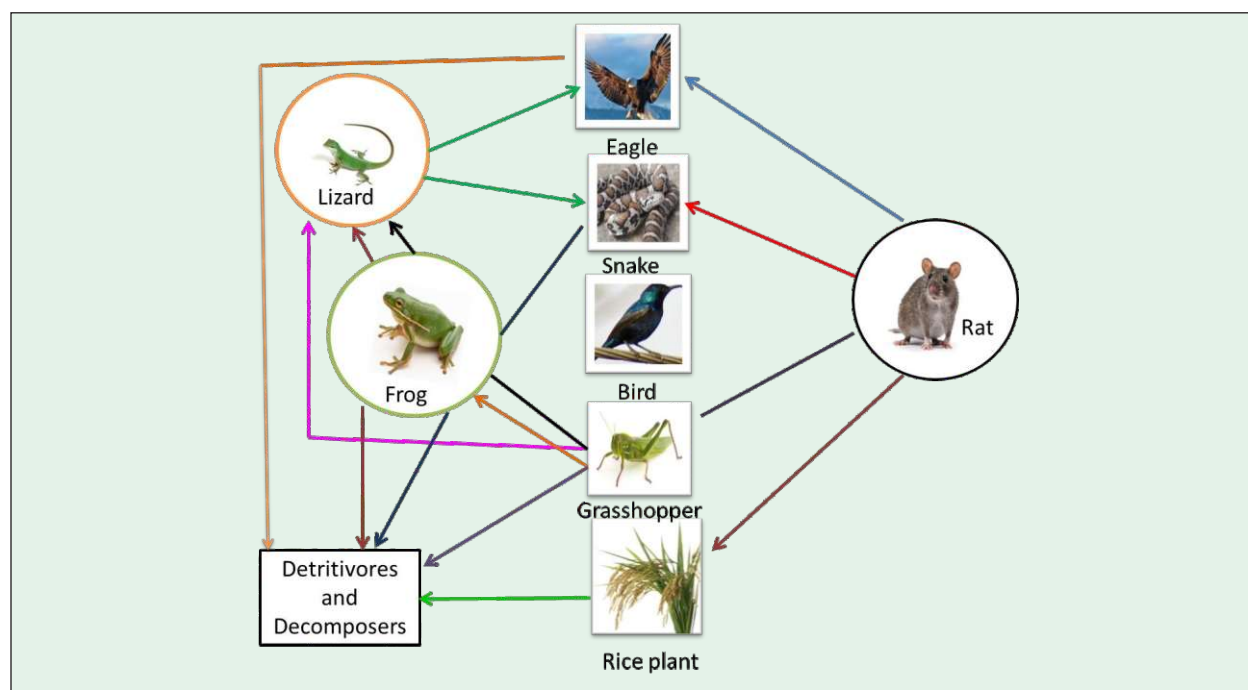


Figure 9: Population of 8 Beneficial Species counted by Farmers in the 4 locations

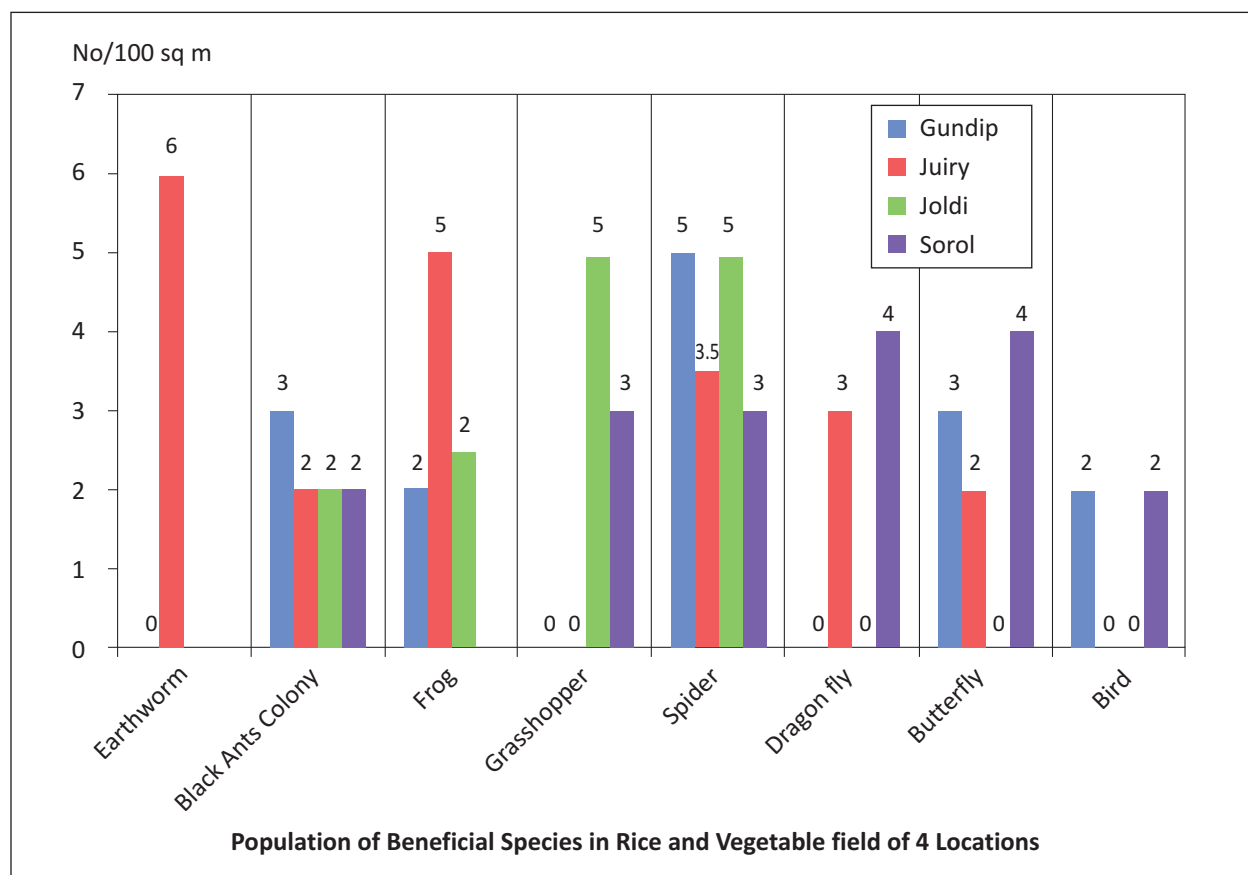


Figure 10: Beneficial Organisms of the Food web observed in Rice and Vegetable Ecosystem Observed by farmers











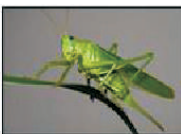






Predator II Feed on Others	3 types observed				
Predator I Feed on Others	3 types observed				
Herbivore Feed on Plant	Pests 3 types observed				
Basal Species Plants	Crop Plants				
Detritivore Feed on decomposing animal or Plant	Earthworm 1 type observed				

Figure 11: Representative Food for a Healthy diet

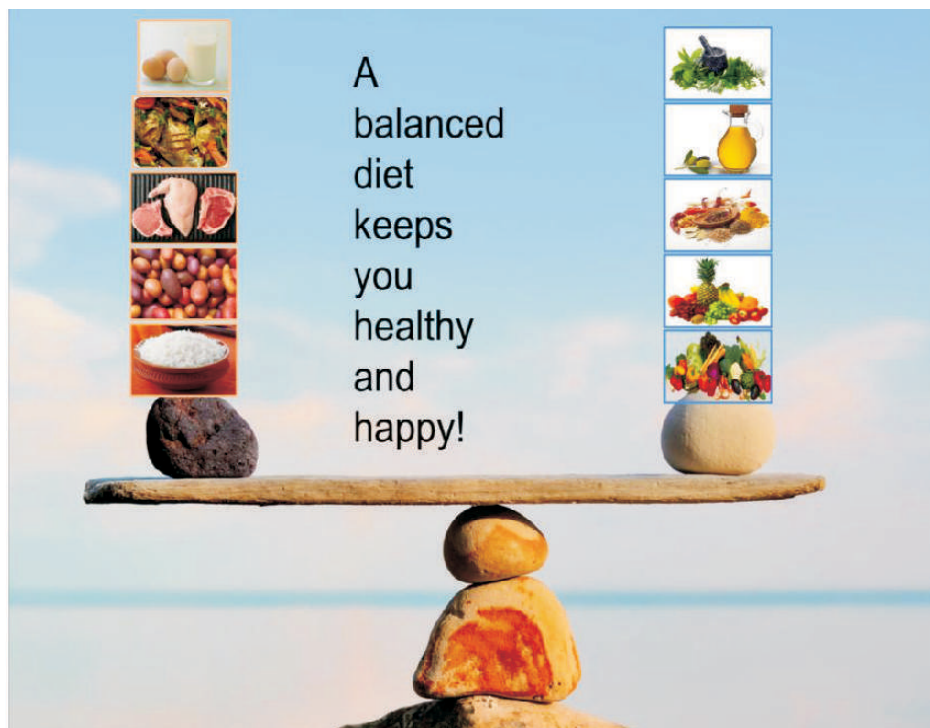


Figure 12: Technology uptake by PAR and non-PAR households at the end of the Project (Oct 2016)

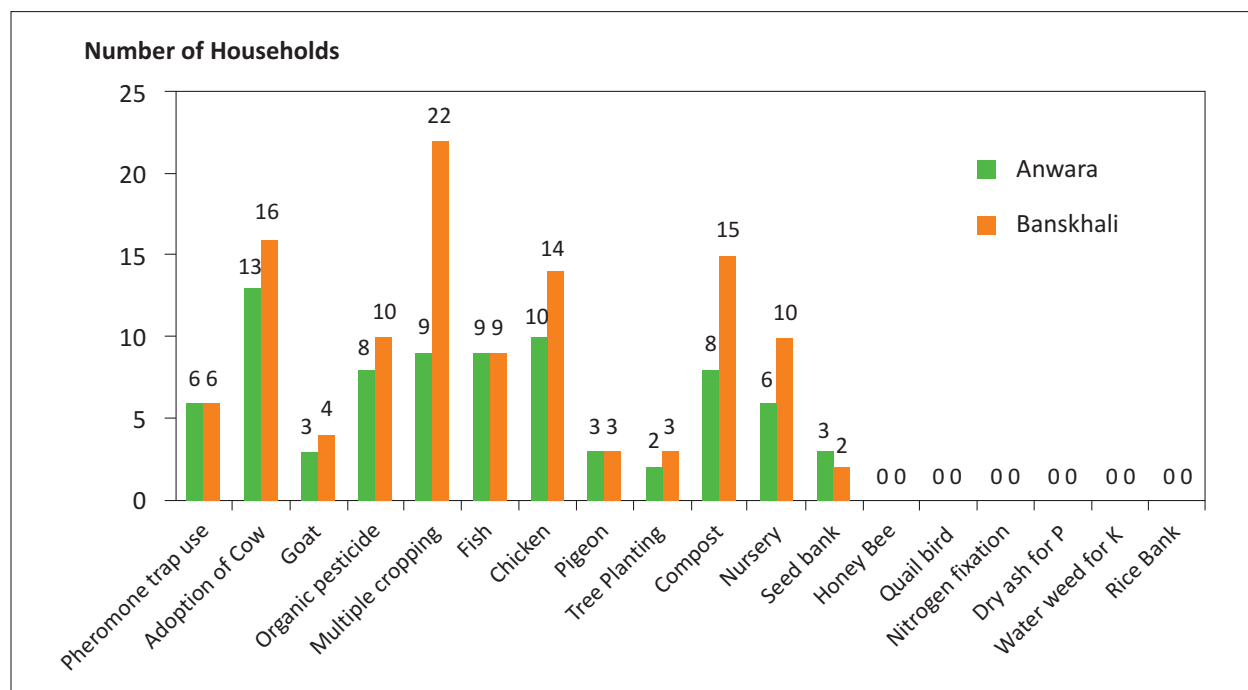


Figure 13: Summary of PAR and non-PAR Households Adopting Alternative Farming at end of Project

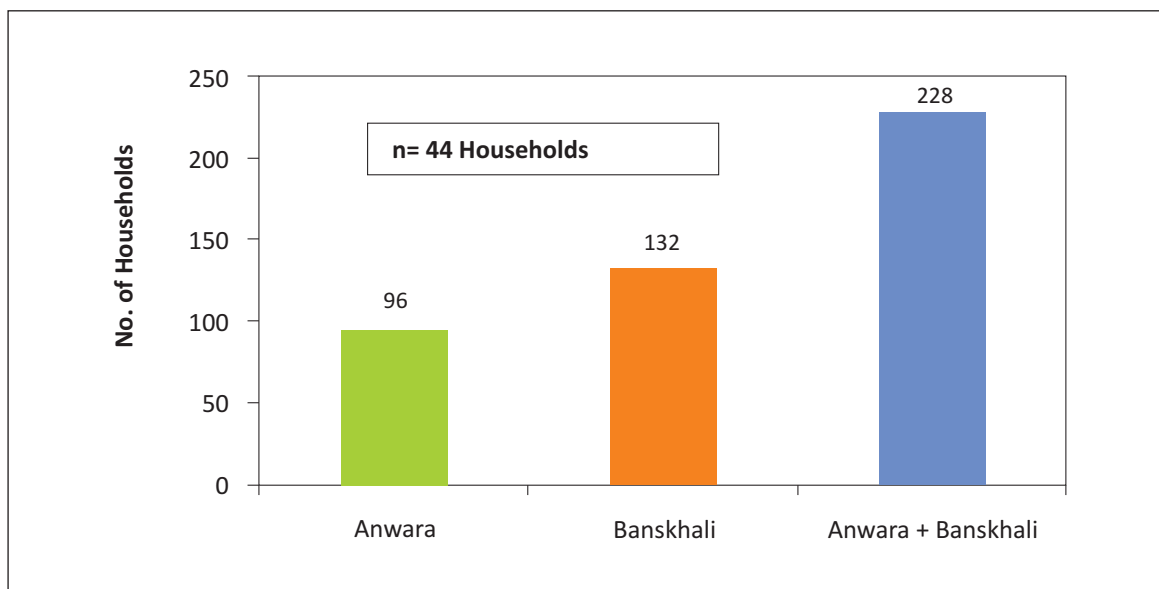
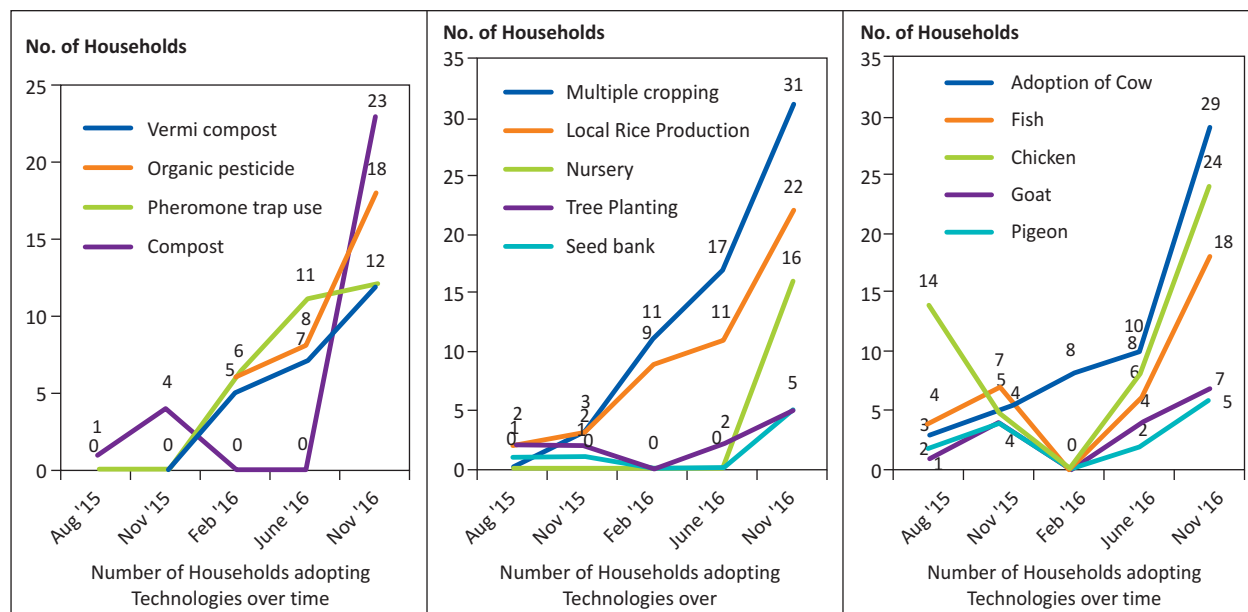


Figure 14: Increasing trend of Adoption of Technology by Farming Households in 2 Upazilas



Annex



Picture 1:
Experience sharing of
PAR group members

Picture 2: PAR group members after and during meeting



Picture 3:
Residential Training at
Nilphamari, Syedpur



Picture 4: Field Visit at Nilphamari.



Picture 5: First Expert Training at Anwara, Chittagong



A. Class on Organic fertilizer



B. Class on Honey Culture

Picture 6: Field Visit after expert Training 1: Vermicompost production had begun



Picture 7: Communication Training of Office Staff, Anwara, Chittagong



Picture 8: Classroom Training of Dr Debal Deb, eco Scientist, India



Extensive Lessons in the Classroom

Picture 9: Field Training by Dr Debal Deb, Eco Scientist, India



Field Visit to Study Ecosystem of Project Site



Field Assessment of Biodiversity

Picture10: Baseline Survey at Anwara and Banskali



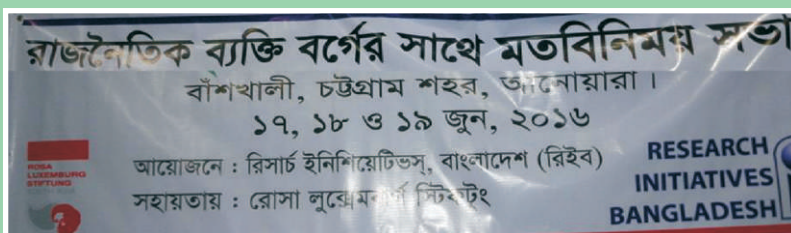
Picture 11: End line Survey of Anwara and Banskali



Picture 12: Political Dialogues at Anwara and Banskhalī in Year 1



Picture 13: Political Dialogue at Anwara, Banskhalī and Chittagong City in the 2nd year



Picture 14: Rally of the project jointly held by Anwara and Banskali farmers on 18 December 2015



Picture 15: The Roadshow of the project held on 1 September 2016



Picture 16: Field day at Anwara



Picture 17: Field Day at Banskhal



Picture 18: Coordination Meeting of the team



Picture 19: PAR Meeting during Project Manager's visit in Chittagong



PAR Group Banskhal



PAR Group meeting



PAR meeting with Tauqueer, Project Manager, RLS, Delhi

Picture 20: Time spent by the Project Manager in the office and field



At Anwara, Chittagong 22 Feb 2016



Exercise by Researchers at Anwara office by Tauqueer



Field visit of Project Manager



Picture 21: Visit of Dr Meghna Guhathakurta, ED, RIB to Anwara office and field

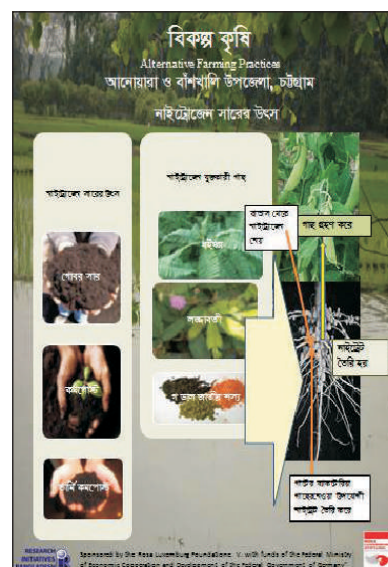
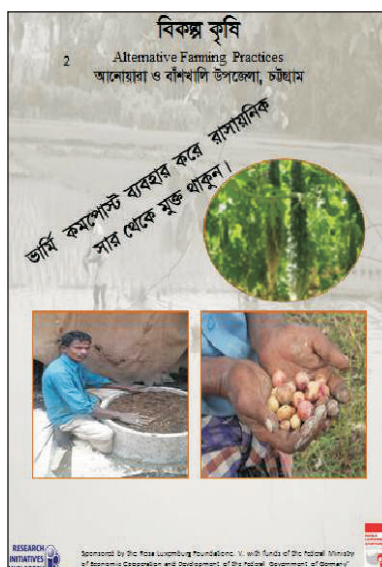


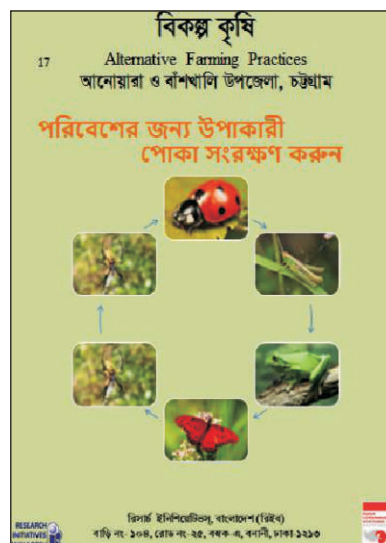
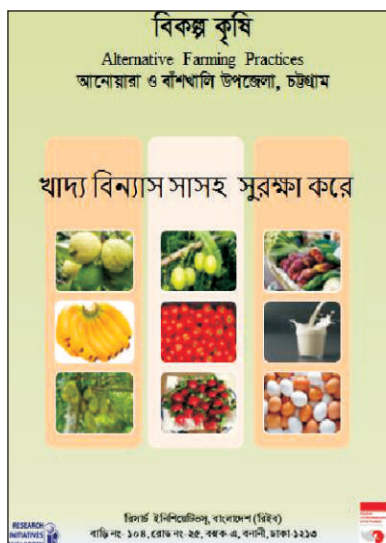
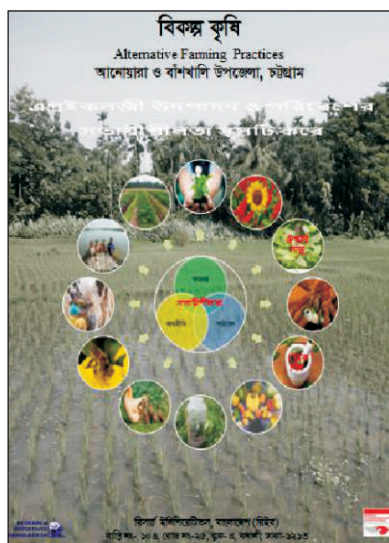
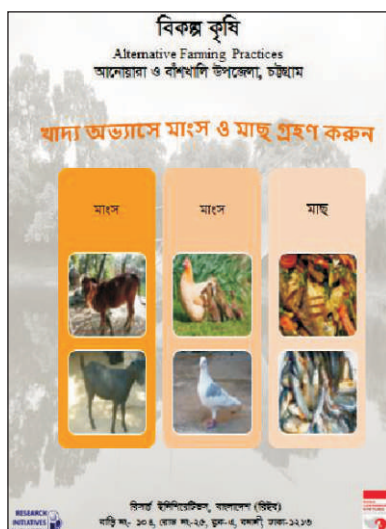
Picture 22: Women's Participation in the Various Programmes of the Project

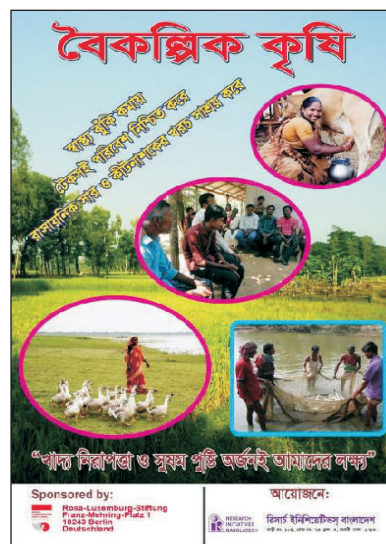




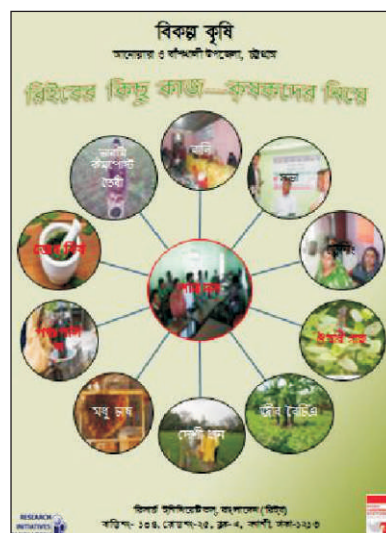
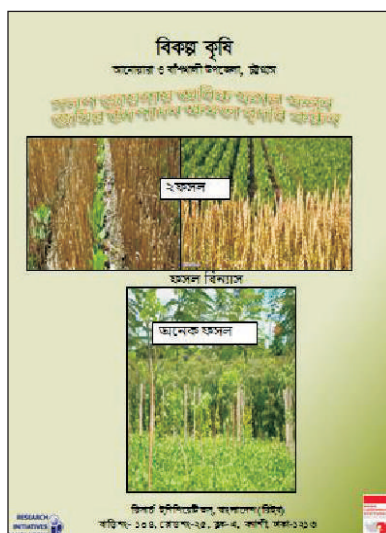
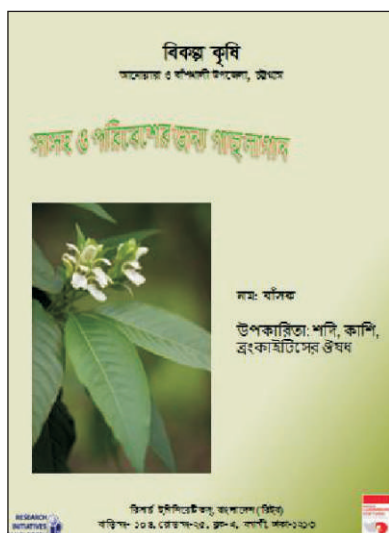
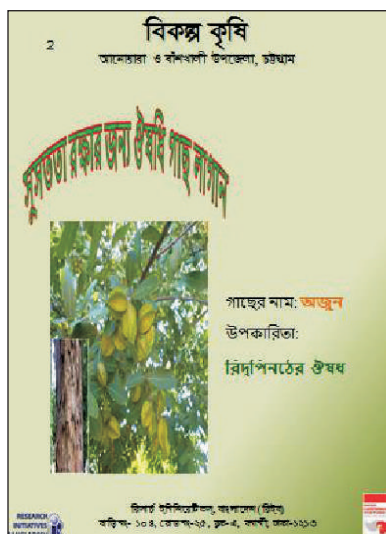
Picture 23: Posters for Disseminating messages







Picture 24: Leaflets and Festoons for Communicating messages on alternative farming



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গণগবেষণা দল



- আলোচনা
- সমস্যা চিহ্নিতকরণ
- কর্ম পরিকল্পনা
- বাস্তবায়ন
- পর্যালোচনা (সফলতা ও ব্যর্থতা)
- পুনরাবৃত্তি আলোচনা

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মধু চাষ **মৌমাছি**



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নাইট্রোজেনের জৈব সূত্র

নাইট্রোজেন কৈরী করে


নাইট্রোজেন যুক্ত
পোবর সার
কমপোস্ট
জৈবিক কমপোস্ট

নাইট্রোজেন কৈরী করে
বাক্স থেকে
নাইট্রোজেন
পানি
লাজলার
জৈব জাত

পানির
খাদ্য
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সার: ভারি কমপোস্ট
উপকারিতা: ভিটামিন, আইরন, প্রসবী ফল

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ভারমি কমপোস্টের উপকারিতা


- মাটির উৎপাদন ক্ষমতায় ঘাটতি
- ভারসাম্য পরিবেশ
- বিষ মুক্ত শাগসবজি, ফল উৎপাদন
- দুধ, মাছ, মাংস অনিয়মে বিক্রয়
- আবহাওয়া দূষিত
- ফরমালিনমুক্ত খাবার
- নিজের তৈরী সার
- খরচ কম



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ঔষধী গাছ ও ফল



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নাম: পেঁয়াজ
উপকারিতা: ভিটামিন সি, আইরন, ফাবার যুক্ত ফল

কিসের উপদেষ্টা: ড. বালেশ্বর (বিইও)
কৃষি: ১০৪, রোড-২২, গ্রাম-৪, কলী, জল-১১১০

বিকল্প কৃষি
অনোদ্যত ও বর্ষাকালী উপজেলা, ঈশ্বরদী


**সলপ জায়গায় বই তলা ফসল
দেখে আবেগ ফলন**



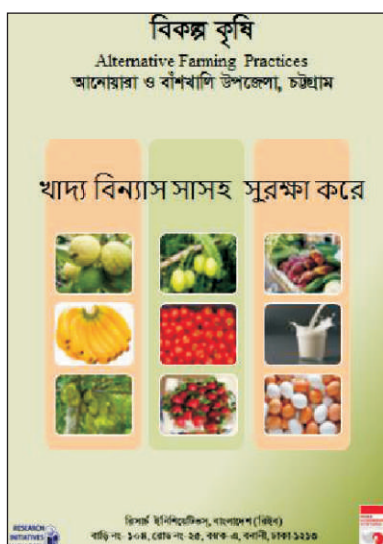
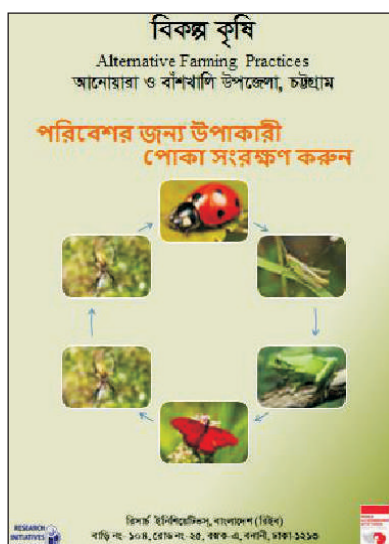
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খাদ্য অভ্যাসে মাংস ও মাছ গ্রহণ করুন



কিসের উপদেষ্টা: ড. বালেশ্বর (বিইও)
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Picture 25: Vermicompost made by Nusha Mia and Mustafa of Anwara and Banskhal, respectively



Annex



Table 1: Sources of Income, land ownership and agricultural resources in Anwara and Banskali

Anwara	Banskali
<ul style="list-style-type: none"> • Main sources of income: Agriculture 41.25%, non-agricultural labourer 3.38%, commerce 15.38%, transport and communication 3.26%, service 16.46%, industry 0.46%, construction 1.42%, religious service 0.60%, rent and remittance 3.60% and others 14.19%. • Ownership of agricultural land Landowner 48.78%, landless 51.22%; agricultural landowner: urban 45.05% and rural 48.86%. • Main crops: Paddy, potato, brinjal, vegetables. • Extinct or nearly extinct crops Mukh pulse. • Main fruits Mango, jackfruit, guava. • Fisheries, dairies and poultries: This upazila has a number of fisheries, dairies, poultries and hatchery (chicken). • Main exports: Fertilizer, fish. 	<ul style="list-style-type: none"> • Main sources of income: Agriculture 58.73%, non-agricultural labourer 6.68%, commerce 11.42%, transport and communication 1.70%, industry 0.50%, service 6.78%, construction 0.58%, religious service 0.43%, rent and remittance 1.51% and others 11.67%. • Ownership of agricultural land Landowner 47.16%, landless 52.84%; agricultural landowner: urban 40.34% and rural 47.53%. • Main crops: Paddy, jute, tea, potato, ginger, betel leaf, vegetables. • Extinct or nearly extinct crops Sesame, mustard seeds. • Main fruits Mango, jackfruit, litchi, banana, papaya, watermelon, lemon, guava. • Fisheries, dairies and poultries Fisheries 34, poultry 86, hatchery 25. • Main exports Betel leaf, litchi, tea, ginger, salt, shrimp, sea fish.

Reference: Banglapedia, 2009

Table 2: Union and Upazila of the Direct Beneficiaries of the Project

Upazila	Union	Name of Village	No. of PAR members
Anwara	No. 2 Barsat	Gundip	10
	Barkhain	Juiry	10
Banskali	Banskali Sadar	Joldi	12
	Sorol	Paraing	12
Total Members at initiation			44

Table 3: Income from Alternative Farming at Anwara over 14 months

Upazila	Union	Sl. No.	Name of Farmer	Area of Land (dc)	Product	BDT Spent	Consumed (Equivalent BDT)	Sold (BDT)	Total Earning from sales (BDT)	Monthly (BDT)
Anwara	Juiry	1	Md Ilias	20	Vermi compost, garden bean cow/milk	8,200	4,500	10,700	15,200	90
		2	Abu Taher	80	vegetable, compost, cow	9,500	2,700	52,500	55,200	4,600
		3	Khokon Datto	50	Cow milk, vegetable, compost	22,000	201	60,540	60,741	5,062
		4	Md. Dider	90	Vegetable, cow milk, paddy	63,000	40,280	3,300	43,580	3,632
		5	Uthfol Dotto	80	Paddy, cow, milk	35,000	21,780	2,810	24,590	2,049
		6	Ranjeet Dotto	10	vegetable	4,000	10,000	1,000	11,000	917
		7	Kalo Dotto	100	Paddy, vegetable, milk	19,000	39,840	2,840	42,680	3,557
		8	Nilo Shil	0	Duck, hen egg	32,000	288	16	304	25
		9	Lucky Shill	0	Hen	4,000	372	72	444	37
		Monthly Average (14 months)			14,050	8,569	9,556	18,124	1,426	

Table 4: Income from Alternative Farming at Banskali over 14 months

Upazilla	Union	Sl. No.	Name of Farmer	Area of Land (dc)	Product	BDT Spent	Consumed (Equivalent BDT)	Sold (BDT)	Total Earning BDT	Monthly BDT
Banskhalı	Joldı	1	Mostofızur Rahman	68	Papaya, lemon,other veg. fish, ox	242,000	23,500	158,000	181,500	15,125
		2	Mostofa Kamal	8	Vegetable, bought ox, compost	101,000	20,800	38,000	58,800	4,900
		3	Md. Kaiser	30	Vegetale, fish, lemon, vermi compost	62,000	20,800	86,300	100,000	8,333
		4	Md.Halal	12	Paddy, vegetable, bought ox	190,000	15,000	72,000	87,000	7,250
		5	Md. Bosir	7	Vegetable, fish	42,000	5,000	55,000	60,000	5,000
		6	Didarul Mostofa	14	Fish tree plantaion, papaya	46,800	7,000	61,000	68,000	5,667
		7	Foyjol Hoque	9	Vegetable, fish, egg, milk	76,000	11,000	102,500	113,500	9,458
		8	Nurul Kabir	22	Fish, milk, vegetable	105,000	56,000	73,900	129,900	10,825
		9	Sofikul Rahman	27	Fish, vegetable, compost	52,500	10,800	58,600	69,400	5,783
		10	Dolil Ahamed	18	Vegetable, fish, bought ox	85,000	7,000	40,000	47,000	3,917
		11	Md. Kasem	8	Vegetable, fish, egg	56,500	5,800	23,200	29,000	2,417
		12	Abdul Hoque	46	Milk, fish, egg, papaya, paddy	89,500	17,800	46,200	64,000	5,333
		Monthly Average(14 months)				82.021	14.321	58.193	72.007	6.001

Table 5: Production of Alternative Farming Inputs in Banskali Upazila (Endline Survey)

Sl. No.	Name of Farmer	Organic Technology	Location	Money spent BDT	Area of Land	Production (Value)BDT	Amount Consumed BDT	Amount Sold BDT
1	RANJIT SHIL	Compost	Juiry	2000	16	5400		5400
2	MD DIDAR	Compost	Juiry	12000	120	20000	8000	12000
3	KHOKON DAUTTA	Compost	Juiry	2000	4	5000		5000
4	NOOR MOHAMMAD	Compost	Juiry	1500	10	3000		3000
5	DIPOK DAUTTA	Compost	Juiry	1400	8	2500		2500
6	MD ABU TAHER	Compost	Juiry	2500	20	7200		7200
7	MD JABAED	Compost	Juiry	1700	10	4800	2400	2400
8	MD ELIYAS	Compost	Juiry	500	4	1440	440	1000
9	SOJIB SHIL	Compost	Juiry	3000	20	7200		7200
10	MD AKTER	Compost	Gundip	2000	320			
11	MD SHAFIQ	Vermi compost	Gundip	1000	4	2000	200	1800
12	MAMUNUR RASHID	Compost	Gundip	2000	8	3000		3000
Total				31600		61540	11040	50500

Table 6: Production of Alternative Farming Inputs in Anwara Upazila (Endline Survey)

Sl. No.	Name of Farmer	Organic Technology	Location	Money spent BDT	Area of Land	Production (Value) BDT	Amount Consumed BDT	Amount Sold BDT
1	JALAL UIDIN	Pheromone trap use	Paraing	13400	16	40000	1000	39000
2	SIDDIK AHAMMED	Local Rice Production	Paraing	3200	6	5000	3000	2000
3	DOLIL AHAMMAD	Compost	Joldi	1500	3	4000	2000	2000
4	ABDUL MOTLOB	Organic pesticide	Joldi	1500	4	4000	3000	1000
5	ABDUL HAQUE	Organic pesticide	Joldi	1200	6	1500	1500	
6	MD MOSTAFIZUR RAHMAN	Vermi compost	Joldi	800	10	6000	2000	4000
7	MOSTAFA	Vermi compost	Joldi	500	4	6000	4000	2000
8	MOSTAFA	Organic pesticide	Joldi	200	4	6000	4000	2000
	Total			22300		72500	20500	52000

Table 7: Income from Alternative Farming in Anwara

Sl No.	Name of Farmer	Name of Location	Area under corp (Decimal)	Area under organic farming (Folk rice, vegetable, others)	Monthly Income from organic farming BDT
1	Md. Shafiqul Islam	Gundip	10	Folk rice	1,800
2	Md. Shakander	Gundip	20	Vegetable /folk rice	2,200
3	Md. Salah uddin	Gundip	20	Vegetable	2,600
4	Mamunur Rashid	Gundip	10	Folk rice	1,150
5	Md. Abu Taher	Gundip	15	Folk rice	1,500
6	Md. A Rahman	Gundip	8	Folk rice	1,600
7	Jamir Hossain	Gundip	18	Vegetable	2,250
8	Md. Akter	Gundip	24	Folk rice/vegetable	3,750
16	Md. Harun	Gundip	16	Folk riece	1,500
17	Nurul Islam	Gundip	10	Vegetable/ Goat	2,500
9	Kalo Dotto	Jhiury	15	Vegetable	2,000
10	Md. Elias	Jhiury	10	Vegetable/folk rice	1,250
11	Md. Abo Taher	Jhiury	10	Folk rice	2,000
12	Md. Didar	Jhiury	15	Vegetable	3,000
13	Khokon Dotto	Jhiury	12	Vegetable	3,000
14	Uthful Dotto	Jhiury	6	Folk rice	500
15	Md. Javed	Jhiury	4	Folk rice	500
	Average Income		13		1,947

Table 8: Monthly Income from Alternative Farming from Banskhal

Sl No.	Name of Farmer	Name of Location	Area under corp (Decimal)	Area under organic farming	Monthly Income from organic farming BDT
1	Md Sahad	Sorol	20	Foll rice	1,200
2	Siddiq Ahamed	Sorol	15	Folk rice, vegetable	2,500
3	Shbab Mia	Sorol	25	Folk rice	850
4	Md. Jalal	Sorol	20	Folk rice	3,000
5	Md Forkan	Sorol	15	Folk rice, fish	1,300
6	Md Bosir	Sorol	10	Vegetable folk rice	1,450
7	Nowsa Mia	Sorol	20	Vegetable folk rice	2,100
8	Md Siddiq	Sorol	20	Vegetable folk rice	2,000
9	Md. Jamal	Sorol	15	Vegetable, fish	1,800
10	Nurul Kabir	Joldi	18	Vegetable folk rice	600
11	Md. Mostofis	Joldi	9	Vegetable, animals	4,500
12	Mostafa Kamal	Joldi	10	Vegetable folk rice	800
13	Sofic Ahmad	Joldi	20	Vegetable, adaption of animals	2,500
14	Md. Kowser	Joldi	14	Vegetable	1,000
15	Norruzzaman	Joldi	15	vegetable	800
	Average Income		16		1,760

Table 9: Summary of Cost benefit from Alternative farming in 4 locations combined (14 months)

Upazila	Union	No of Farmers	Mean Area of Land (dc)	Technology adopted and marketed	BDT Spent	Consumed (Equivalent BDT)	Sold (BDT)	Total Earning from sales (BDT)	Profitability
Anwara	Juiri	9	55	Paddy, Vegetables, vermicompost, compost, ox, goat, cow, milk, egg, hen, duck, nursery, multiple cropping	100,225	3,680	44,035	47,715	52,510
	Gundip	9	124		109,300	1,105	21,400	22,505	86,795
Banskhal	Sorol	12	21		82,763	20,850	95,625	116,475	(33,713)
	Joldi	13	18		213,175	14,900	265,250	280,150	(66,975)
Total		43*	218		505,463	40,535	426,310	466,845	38,618
Percentage						8.7	91.32	100	7.6

Comments and Questions at Seminar on Exploring Alternative Farming Practices to end Hunger in Bangladesh

10 December 2016

1.0 Introduction

The seminar began with a welcome address by the Chairman of RIB Dr. Shamsul Bari. All guests introduced themselves with their names and the organizations they came from. Eight farmers attended from the project area Anwara and Banskhalī. Three staff of RIB from Chittagong were present. In addition, one women farmer joined. Agriculturist, activists, GO and NGO representatives, economists, freelance content writers on agroecology, political actors of Krishak Sramik dal, activists, media and RIB staff filled the Azimur Rahman Hall of Daily Star Centre with full capacity on a cool Saturday morning.

A warm welcome by the Chair was followed by a presentation by Dr. Nilufer Hye Karim the Project Coordinator of this Special Initiative Exploring Alternative Farming Practices to End Hunger in Bangladesh. The project staff and animators and farmers directly involved in alternative farming were invited to share their experiences after the presentation.

2.0 Experience of Project Staff of Chittagong

The staff shared their role in assisting farmers to use of the Participatory Action Research or 'gonogobesona' in implementing the objectives of the project. Nawsher Huda, Senior Research Assistant overseeing the two Upazilas expressed that a clear change occurred in the farmers farming practices during the project period. Continuous discussions on the disastrous effect due to indiscriminate use of chemicals created realization and awareness among the farmers that alternative practices could be tried, stated by Mojjafer, Research assistant of Anwara. Badrul, Research Assistant, Banskhalī stated that trust of the farmers on the new farming system was also created with the visit of union level Krishi officers who spoke of the existence of a programme of organic methods of farming taken up by the government. He also mentioned the slow acceptance of farmers keeping in mind the availability of market.

3.0 Opinion of farmers

The farmers opined that RIB had intervened in Anwara and Banskhalī to their welfare. Alternative farming practices such as the use of vermicompost, organic pesticide, multiple cropping, etc. towards a holistic

approach were being practiced by the farmers according to their own justification and consensus arrived at the PAR meetings.

A women farmer Jahanara expressed her happiness to be a part of the participatory group and was practicing alternative methods in their farm. Two important points were made by the farmers; one, according to Mustafa compost making required no additional investment as resources were available in their farms and used only what they could afford. Two, Jalaluddin told the audience that he was avoiding the risk of cultivating his entire land to practice alternative method, to begin with as he was not sure of the production potential. Further, the product he produced was being consumed mostly by the family as he knew these were pesticide free. He partly sold his product. The products taken to the market did not get a good price as they were not as attractive.

These proved two points: (i) that the farmers were aware that use of pesticide was injurious to health and (ii) alternative farming practice could safeguard the health of the family that is important to remain healthy.

The Chair then welcomed the 2 discussants and audience for comments and questions. A wide range of discussion enriched both the executors and the audience on the subjects of agriculture and food security.

4.0 Comments of the Discussants

The keynote paper was given to discussants, Dr. Khalilur Rahman, Agriculture Scientists and Ms. Sanjida Rahman, Director, Karmajibi Nari much ahead of the seminar for their critical evaluation. The keynote paper was thought by them to be extensive and well written. But, Dr. Khalilur Rahman opined that the paper needed more discussions and references on the present state of modern agriculture in Bangladesh. Plenty of literature was available on agroclimatic conditions of Bangladesh, fertilizer recommendations, HYV seeds and modern methods of cultivation and contribution of GDP to agriculture that could be included in the introduction. If references to the agroclimatic condition and crops grown were given then the package of alternative farming practice would have been better. The report also did not list the rice or vegetable varieties grown in the location. He said that some of the practice such as pheromone trap was quite common in Bangladesh now, so it was not a necessary technology for inclusion in the introduction process. Not much importance was given to fruits and medicinal plants. On the basis of the fact that our advocacy had led to more farmers having dekhi chata or brown rice for improving intake of Vitamin B, Dr. Khalil pointed out that it could not be re-introduced as it is too labour intensive and supplying such large amounts to the population would be impossible. Besides farmers and political leaders, he emphasized the inclusion of religious groups in the advocacy programme. All of the opinions, however, ended up on a positive note that 17 months of the project period was a short time indeed.

Ms. Sanjida appreciated the findings of the project and thought it to be a good culture. But she regretted that women could not be brought to the PAR meetings although few became members towards the end of the project. It is women who introduced agriculture so it is important that more women should be involved in alternative farming practices.

Both the discussants appreciated the fact that the period of 17 months was too short a time for such an initiative.

4.1 Clarifications by the Speaker

As regards to the review of the literature on recent publications on modern agriculture, we thought it was not necessary as it was not a comparative study. It is also well known and recognized in the introductory remarks that Bangladesh and the world have reached self-sufficiency in cereal production, but a great damage has occurred to the environment and health due to a high and indiscriminate use of chemical based farming. Besides our objective was to introduce the concept of agroecological principles that in fact proposes recycling of natural resources relevant to that particular ecosystem and combining the social, economic, anthropological, ethnological and traditional and modern agroecological sciences. The project was not aimed at reporting the cropping pattern or number of varieties as mentioned by the discussant. However, in Table 1 of the keynote the overall demography and agricultural crop of the two locations have been included. Although the farmers were familiarized with fruit, medicinal and forest plants and their benefits, there was no scope of the 17-month-old project to go into depth of all the 19 components discussed nor was this an objective of the project. The inclusion of all crops was emphasized in the biodiversity issue under which farmers chose to introduce what they preferred, had land for and what they thought were cost effective in the short and long term. Nutritional aspect was indeed taken seriously with the introduction of livestock and poultry. It should be noted that the farmers were not helped with any cash or kind.

Ms. Sanjida, Director Karmajibi Nari has rightly pointed out the fact that more women should have joined the PAR groups. It was observed that women refused to come to discussions within the village in their own locality but attended training and events outside the unions. It is at least expected that the 4 women who joined the training programme of Dr. Debal Deb can share their learning with the other family members.

5.0 Comments of the Open Discussions

The participants from all sectors were very enthusiastic on commenting and asking questions having found a forum to discuss openly. Mr. Sobhan opined that the findings were groundbreaking and eye-opening. He, however, questioned why such agroecological technologies were not spreading? Why is there no marketing facility developing for safe food or that of inputs availability?

Mr. Rajikuzaman Roton expressed that he was enlightened by being present in the seminar. He stressed the importance of a balance between quantity and quality and nutrition needed more emphasis. Bangladesh population is known to get 6% of the calorie requirement from rice so increased production and uptake is needed on the other foods that supply nutrients in sufficient amounts.

Media personnel, Russel had many questions on the present state and concerning the authorities and organizations responsible for carrying out the research findings. He was happy about the joint effort of the research with local people and the farmers. Concern was raised on agricultural loan offering system and other issues regarding the future course of action.

Concerns were raised by many that the findings were not reaching the grassroots. The inclusion of more UNO and government level workers would have accelerated the process, some opined.

On a statement of the speaker that Dekhi Chata or brown rice were now becoming popular due to our intervention of the project areas, some questioned the fact that it may not be possible to reintroduce this technique, required in mass scale for the benefit of the entire population.

Ms. Ayesha Hussain a social analyst thought the initiative was a very timely one, expected to increase awareness on nutrition and food security. She was, however, concerned about the market availability of the products that the farmers will produce. A number of participants also were concerned of the unavailability of the market that would ensure the farmers that part of their products would be sold. Dr. Abdul Majid emphasized the importance of introducing varieties of biofortified crops such as zinc and iron as natural sources of supplement in addressing nutritional issues.

Mr. Shawkat expressed that there was no mention of the contribution of GDP to agriculture and that the forest sector was not emphasized. Mr. Khurshed Alam let the house know that the Government has already formulated a policy on pesticide-free food production in 2013. He had confusion whether we were focusing on alternative food besides cereal or alternative farming practices. The suggestion was also made on the application of on-line marketing method for helping the producers sell the products.

6.0 Comments of Special Guests and Chief Guest

Three special guests gave strong views on the outcome of the seminar. Professor M.M Akash, an economist of the Dhaka University, made 7 rankings of the outcome of the project. According to him the technologies suggested are safe, tasty, and remunerative, and has a long-term benefit to the environment. The study also showed that alternative farming would not however immediately supply enough and cheaper food. Additionally, the long-term sustainability of alternative farming was questionable and the work on attainment of nutritional balance is still incomplete. An empirical model would be required for full fledged application of alternative farming methods towards a change to agroecology.

Our Special Guest Advocate Shamsul Haque Reza stated that enough awareness on agricultural technology was absent in Bangladesh. The ideas were actually not reaching the farmers. He thinks that the media should be more active in taking forward safe practices to the farmers.

Mr. Sajjad Zahir of the Krishak Society also opined that the farmers also did not know much of the research findings on agriculture. He emphasized that the government should take more initiative in changing the attitude of the people on the importance of increasing more value-added food to their diet.

Dr. Anisur Rahman, Board Member RIB expressed his concern that women were playing many vital and important roles in the society and in agriculture. But the participation of women in PAR or 'gonogobesona' or in this forum is not as expected. He strongly opined that a greater focus should be given to bring women to the mainstream and ensure their participation.

6.1 Clarifications by the Speaker

The speaker thanked the audience for their active participation and generating ideas for an in-depth investigative approach towards an agro-eco environment. The objective of the study was once again clarified as an approach to alternative farming practices that would revive the fertility of the soil and create a self-sustaining ecosystem. As it was not an approach to a wide range of agricultural practices based on the present status of Bangladesh a complete review of the literature available was not necessary. Our approach was to bring the toiling farmers who actually have knowledge but lack confidence, to join together to speak, share and implement whatever was within the means and take the assistance of what the project could offer. The project provided no benefit in cash or kind but the encouragement and continuous monitoring by the project helped the PAR members to move forward.

Additionally, food security does not stand alone and the food security of a population is only secure if enough nutrition is available. For example, biodiversity was used as a component to include the introduction of species of fruits, spices, herbals, medicines, forest, flowers and their interaction with animals and microbes that directly or indirectly make up a congenial and sustainable ecosystem. The livestock poultry, birds were encouraged to improve the nutritional status. As many of the questions and comments were beyond the scope of the study and as a 17 month period was not long enough to intervene and implement every component independently, a holistic approach to food and nutritional security was diagrammatically depicted in this case.

7.0 Response of the Media

The media was invited to attend the seminar on Exploring Alternative Farming Practices to End Hunger in Bangladesh on Saturday the 10th December 2017. The Daily Star a leading English Newspaper gave their response on 11th December 2016. The response of the Daily Star is enclosed.

Daily Star, 11 December 2016

Organic farming gains foothold

Crop production through organic farming practices provides higher benefit in the long-term than producing foods by using chemical fertilisers and pesticides, found a recent study.

The study was conducted by the Research Initiatives, Bangladesh (RIB), a not-for-profit organisation that supports research that could ensure sustainable poverty alleviation in the country, in two upazilas in Chittagong district.

The cost-benefit analysis of organic farming practices yielded positive results. The gains, although little, were encouraging, the study said.

“What we or farmers have done have become fruitful,” said Nilufer-Hye-Karim, project coordinator of RIB, while presenting the outcome of the project at a seminar held at The Daily Star Centre yesterday.

The seminar was organised by RIB in association with Rosa Luxemburg Stiftung, a Berlin-based transnational alternative policy group, to share the findings of the project, 'Exploring Alternative Farming Practices to End Hunger in Bangladesh'.

The project was taken up in August 2015 with a view to popularising alternative farming practices to meet the global challenges faced in food production by small and marginal farmers, RIB said.

Adequate safe food production for the rising population has become a global challenge in the backdrop of corporate marketing and indiscriminate use of chemical fertilisers and pesticides, Karim said.

Production has increased over the years largely due to high use of chemical fertiliser and pesticide.

But the use of agrochemicals for production and storage has not only jeopardised health and environment, it has also degraded soil health and affected the natural eco environment, she said.

For the study, alternative farming techniques were deployed in four villages under Anwara and Banshkhali of Chittagong.

Some 20 technologies that include making organic pesticides, vermicompost, pheromone trap and compost for alternative farming were introduced, and 14 of them were accepted by more than 50 percent of the farmers under the study.

However, the farmers did not allocate all of their lands for organic farming as production would have been lower than with the use of chemical fertilisers, said Jalal Uddin, a farmer from Chittagong who attended the programme.

He also did not grow all the vegetables through organic farming practices because of the low demand for pesticide-free food.

Ensuring the marketing of safe food is important for sustainability of alternative cultivation practices, said Delwar Jahan, a journalist.

Organic farming practices are better than high input and chemical-based farming for long-term economic and environmental sustainability, said MM Akash, professor of economics at the University of Dhaka.

Subsequently, he called for taking the best of both the farming practices for optimum benefit.

Crop yield should be increased to feed the growing population, said Rafiqul Islam Mondal, director general of Bangladesh Agricultural Research Institute.

Not all chemicals are harmful, he said. But the government has taken steps to grow genetically modified foods to cut back on the use of chemical pesticides.

“Already the BARI has released Bt Brinjal and it will apply this month for the release of first GM potato,” he said, adding that there would be no toxicity for eating Bt Brinjal.

Chaired by RIB Chairman Shamsul Bari, the seminar was also addressed by RIB Board Member Anisur Rahman, Bangladesh Krishak League General Secretary Shamsul Haque Reza, and Bangladesh Krishak Samity General Secretary Md Sazzad Zahir Chandan.

8.0 Address of the Chief Guest

The chief guest of the seminar Dr. Rafikul Islam Mondol thanked RIB for inviting him to such an important forum. He summarized the agriculture sector in terms of contribution of the Bangladesh Agricultural Research Institute (BARI) in his concluding address. He agreed that the dependence of food production on chemicals was indeed a crisis. It is a risk of food security. However scientists have progressed in alternating the genetics of popular varieties to make them resistance to pests and as a result, pesticide application may not be necessary. Such an introduction is the bt gene in brinjal, which environmentalists are opposing and questioning on the long term health hazards of genetic manipulation. He thinks it was also essential to use hormones for regulating and the ripening process and such technologies cannot be avoided. Dr. Mondol also talked about the multiple uses of the APP introduced by BARI that is a source of information about all achievements done by scientists of BARI. The APP can be downloaded on the phone and used by the farmers as well to get answers to questions on varieties and cultivation method

9.0 Address by the Chairman

The chairman thanked the audience for their active participation. He expressed his satisfaction for the attendance of distinguished people from a wide range of disciplines that ended in fruitful findings. He thought that the organizers have done a good job. He also thanked the Chief guest Dr. Rafikul Islam Mondol to have taken the time to attend the seminar and give his valuable comments.

10.0 Vote of Thanks

Ms. Suraiya Begum, Assistant Director, RIB in her vote of thanks expressed appreciation on the presentation of the speaker, the discussants, and the special guests. Their comments and discussions have aroused a lot of food for thought for future studies of RIB on agroecology and agriculture as a whole. She thanked the audience for their presence and invited them to attend RIB's activities in the future.

Some Scenes from the Seminar

Exploring Alternative Farming Practices to End Hunger in Bangladesh

RIB EWOH 10 Dec 2016











CHAPTER 3

Baseline Survey of Anwara and Banskali, Chittagong Exploring Alternative Farming Practices to End Hunger in Bangladesh

1.0 Introduction

The baseline study is a measure to assess the present status of the area under study at the beginning of the programme. The results will allow proper methods and types of interventions to reach the objectives of project 'Exploring Alternative Farming Practices End Hunger in Bangladesh' sponsored by Rosa Luxemburg Stiftung (RLS) and implemented by Research Initiatives, Bangladesh (RIB).

1.2 Objectives

The objectives of the baseline survey were to find out the existing practices of agriculture in the selected small and marginal households of Gundip and Juiry in Anwara and Sorol and Joldi in Banskali that would serve as a comparison of the changes with the end line survey after intervention with alternative farming or agroecological practices.

1.3 Geographical Location

To give a clear understanding of the locations and the existing practices secondary information was also compiled from Bangladesh Bureau of Statistics and National and International Reports. The two Upazilas, Anwara, and Banskali are located 19 and 47.2 km, respectively, from the Chittagong City. Chittagong Division is the second most important District of Bangladesh as it graces both the South Eastern Hill tracts and the longest Coastal region of the world (shown below).





1.4 Census of the target villages

To enable identification of the target villages for cooperative group formation, a census was done to gather primary data on the percentage of the household of the target villages. As a survey is carried out of a number of a variable on a given section of a population, the results of which reflects a wider area, reasonable numbers that would give statistically significant information are used for quantitative data collection. The survey, therefore, followed a number of steps to enable accurate data collection and representation.

1.4.1 Identification of Households

A pre-survey or census of the target population of the selected villages was required to determine the sampling size. Households having less than 1 ha of land representing small and marginal farmers of Gundip. Jiuri, Joldi and Soral were identified (Table 1 shows a total of 660 households). An average of a third i.e.38 percent of the household were used to collect data for the survey.

Chittagong District of Bangladesh (red) Anwara (red star) and Banskhali (green star)



Table 1 Census to determine surveying households

Locations	District/Zilla	Upazilla	Union	Name of Village	No. of Households (Census result)	No. of Household used in Baseline survey	
						No.	%
1	Chittagong	Anwara	No. 2 Barsat	Gundip	217	83	38.2
2	Chittagong	Anwara	Barkhain	Jiury	172	64	37.2
3	Chittagong	Banskhali	Banskhali Sadar	Joldi	86	34	39.5
4	Chittagong	Banskhali	Sorol	Paraing	185	69	37.3
Total/ mean					660	250	37.8

1.4.2 Primary Survey Method

The survey was done through primary questionnaire prepared jointly by the Project team and experienced surveyors. A total of 13 questions with a number of follow-up questions were formulated to get information on demography, land and family size, profession, means of livelihood, agriculture crops, food sources, nutrition status and overall socio-economic conditions of the villages. The questionnaire was filled out through the household visit of 38% of the target area. This consisted of 140 households in Anwara and 103 in Banskhali. The questionnaire was filled out by the visit of households comprising of small and marginal households selected after the census.

2.0 Findings of Survey

Quantitative data derived from the answers of respondents of the household comprising of small and marginal farmers were tabulated and compiled to get the desired information. The information is described under 6 major sectors.

2.1. Demographic information

The demographic information consists of the structure of the society of the target population under study. They are therefore discussed under different headings.

2.1.1 Household Family Size

The largest family size was observed to be 3-5 members, the percentages being 63 and 50 in Anwara and Banskhali, respectively (Figure 1). Many families in both Upazilas combined had a higher family size (34%) of 6-8 members, although in Banskhali 42% of the families in the sampled population had families as large as 6-8 members (Table 2). This is above the average national family size of 4.35 (BBS, SID 2012) and rural of 4.36 (BBS, SID 2012) people per household in Bangladesh. Families above 9 members are in the range of 4-5 percent, the large size is due to households having undivided properties over more than one generations.

Figure 1: Family size of Household in Anwara and Banskhali Upazila, Chittagong

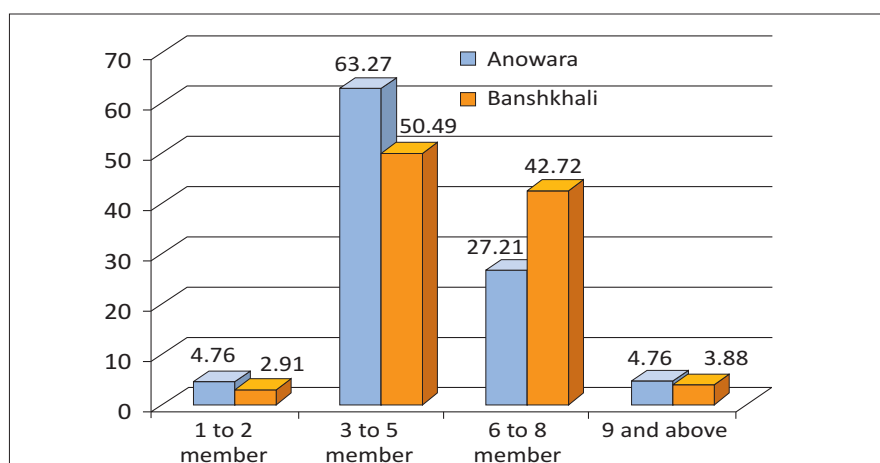


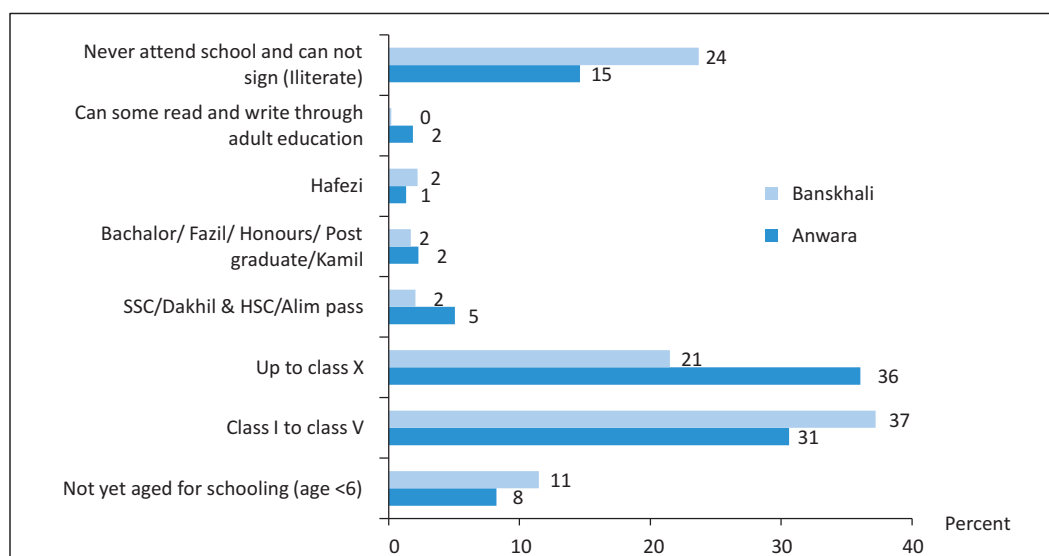
Table-2: Household Family Size by Upazila

Family Size	Upazila				Combined	
	Anwara		Banshkhali			
	No.	(%)	No.	(%)	No.	(%)
1 to 2 member	7	4.76	3	2.91	10	4.00
3 to 5 member	93	63.27	52	50.49	145	58.00
6 to 8 member	40	27.21	44	42.72	84	33.60
9 and above	7	4.76	4	3.88	11	4.40
Total	147	100.00	103	100.00	250	100.00

2.1.2 Literacy

The survey collected information on the education level of the 2 Upazilas with a sample size of 752 members in Anwara and 1292 in Banskhali. Only 2 percent are educated above graduation level. The largest number (31 % in Anwara and 37% in Banskhali) was observed to have received primary education. A percentage of 15 and 24 % in Anwara and Banskhali, respectively are illiterate (Figure 2).

Figure 2: Educational Level of Family members of Anwara (n=752) and Banskhali (n=1292) Upazila



2.1.3 Occupation

There are at least 28 different farming and non-farming occupations. The farming population ranged from 2-8% only, the highest being domestic or agriculture labourers (22 in Banskali and 23% in Anwara (Table 3A). A higher percentage of the population (7%) own land, 2.2% own and share and only 1.8% lease and share in Anwara (Figure 3). Conversely, the scenario is different in Banskali. A low percentage (2%) own, 4% own and share and 7% lease and share land in the sampled population (Figure 3). Anwara and Banskali have non-agricultural small businesses holders of 8 and 2%, respectively (Table 3). The disabled and unemployed population is around the same percentage of above 1 percent (Table 3A). The unemployment percentage of both Upazilas combined is less than 2% (Table 3A).

In the case of occupation of the head of household, there are 20 different means of income generation. Around 10 to 35% are involved in land ownership and leasing (Table 3B). Obviously, few (1-5%) of the heads are involved in domestic or other labours. A higher percentage of land ownership, land sharing and leasing occurs among the head of households in Anwara compared to Banskali (Figure 4).

Figure 3: Land ownership and sharecropping in Anwara and Banskali

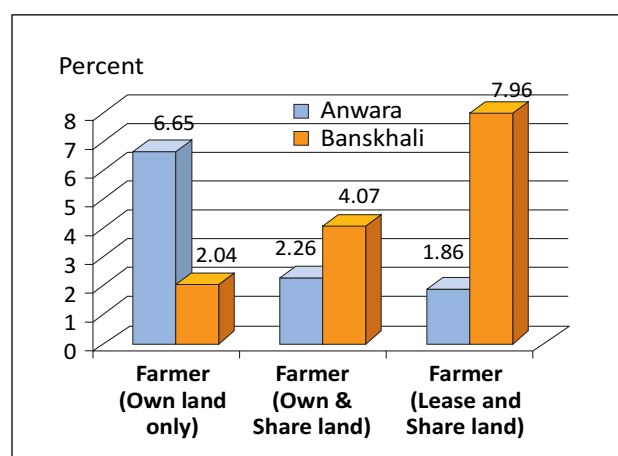


Figure 4: Land ownership and Sharecropping of Head of Households in Anwara and Banskali

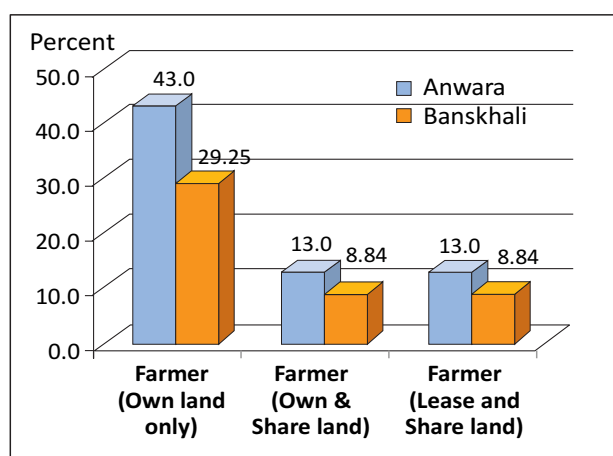


Table 3A: Main Occupation by Upazila (6)

No.	Occupation	Anwara	Banskali
		(%)	(%)
1	Farmer (Own land only)	6.65	2.04
2	Farmer (Own & share land)	2.26	4.07
3	Farmer (Lease and Share land)	1.86	7.96
4	Fish-farmer/Fish-farm		0.19
5	Poultry farm	0.27	
6	Domestic/household works	23.94	22.78
7	Farm labour	0.53	1.67
8	Non-farm labour	0.53	1.85
9	Firm/Factory/Garments worker	2.39	0.37
10	Small business	7.85	2.22

No.	Occupation	Anwara	Banskhali
		(%)	(%)
11	Big business	0.13	0.37
12	Salon/Barbar	1.86	
13	Carpenter	0.27	
14	Masson		0.56
15	Goldsmith	0.13	
16	Service (Non-government)	5.19	3.33
17	Service (Abroad)	1.73	
18	Van/Rickshaw driver (Own/hire)		0.19
19	CNG/Botboti/Nosimon/Karimon driver	0.66	0.37
20	Transport labour (Driver/ Helper/ Contactor)	0.4	1.85
21	Teacher (School/ Collage/ Madrasa)	0.13	0.56
22	Security Guard (Different establishments/ Institutions)	0.13	
23	Student (boy-girl)	32.18	34.81
24	Old age/ Unable/ Disable	1.46	1.11
25	Private tutor	0.13	
26	Unemployed/No-work	1.33	1.67
27	Child (below 16 years)	7.85	12.04
28	Painter	0.13	

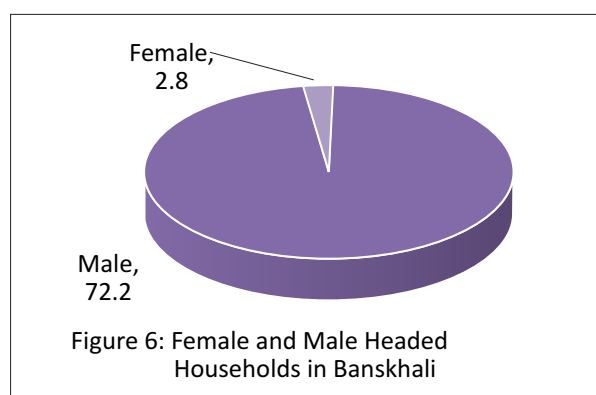
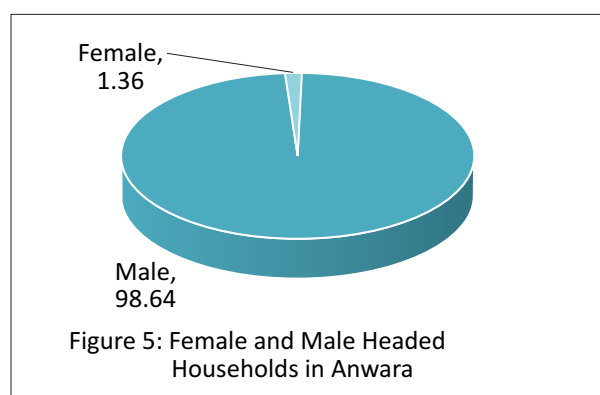
Table 3B: Main Occupation of Head of Household by Anwara and Banskhali Upazila

Sl. No.	Occupation	Anwara	Banskhali
		% Respondents	
1	Farmer (Own land only)	29.25	9.71
2	Farmer (Own & share land)	8.84	14.56
3	Farmer (Lease and Share land)	8.84	34.95
4	Poultry farm	0.68	
5	Domestic/household works	1.36	3.88
6	Farm labour	2.72	4.85
7	Non-farm labour		1.94
8	Small business	25.85	6.8
9	Big business	0.68	1.94
10	Salon/Barbar	4.76	
11	Carpenter	0.68	
12	Service (Non-government)	6.12	3.88

Sl. No.	Occupation	Anwara	Banskhali
		% Respondents	
13	Service (Abroad)	4.76	
14	Van/Rickshaw driver (Own/hire)		0.97
15	CNG/Botboti/Nosimon/Karimon driver	1.36	1.94
16	Transport labour (Driver/ Helper/ Contactor)	0.68	7.77
17	Teacher (School/ Collage/ Madrasa)		1.94
18	Security Guard (Different establishments/ Institutions)	0.68	
19	Student (boy-girl)		0.97
20	Old age/ Unable/ Disable	2.04	2.91
21	Unemployed/No-work	0.68	0.97

2.1.4 Head of Household

The household information also revealed a very low number of women headed household, 1.3% in Anwara (Figure 5) and 2.8% in Banskhali (Figure 6) based on the number of households responding under the survey. This is way below the female-headed household of Bangladesh of 12.8% in 2007 recorded by WDI (2015).



2.1.5 Drinking and cooking water source

All the households sampled had deep or shallow tube wells as drinking water source from either deep or shallow tube well (Table 4). But only 86% in Anwara and 51% in Banskhali had ownership of tube wells (Table 5) the remaining sharing water from neighbors. Although a majority (90-94%) used tube well water for cooking, a small percentage (6-10) is using pond water for cooking and cleaning (Table 6).

Table-4: Drinking water source

Drinking water source	Upazila				Anwara+Banskhali	
	Anwara		Banskhali			
	No.	(%)	No.	(%)	No.	(%)
Tube well deep/shallow	147	100.00	103	100.00	250	100.00
Total	147	100.00	103	100.00	250	100.00

Table-5: Drinking water ownership

Drinking water ownership	Upazila				Anwara+Banskhali	
	Anwara		Banskhali			
	No.	(%)	No.	(%)	No.	(%)
Own	127	86.39	53	51.46	180	72.00
Neighbour	20	13.61	50	48.54	70	28.00
Total	147	100.00	103	100.00	250	100.00

Table 6: Cooking water source of Anwara and Banskhali

Cooking water source	Anwara	Banskhali
	Percentage	
Tube well deep/ shallow	90.48	94.17
Pond	9.52	5.83

2.1.6 Sanitation

As sanitation facility is a symbol of improved livelihood and hygiene, information was taken on the type of latrine and ownership. Anwara, not yet a municipality had lesser number of permanent water-sealed latrines on household (20%) compared to Banskhali of 41% (Table 7). The number of households under the survey having ownership of latrine i.e. latrines built on their own is, however, high (95% in Anwara and 94% in Banskhali) (Table 8).

Table 7: Latrine type in Anwara and Banskhali

Type of Latrine	Anwara	Banskhali
	(%)	(%)
Pucca Latrine/ Slab (water sealed)	19.73	40.78
Pucca Latrine/ Slab (not water sealed)	71.43	35.92
Katcha Latrine	7.48	23.3
Open space / No Latrine	1.36	

Table 8: Latrine Ownership in Anwara and Banskhali

Latrine ownership	Anwara	Banskhali
	(%)	(%)
Own	95.24	94.17
Others	4.08	3.88
Share/Ajmali	0.68	1.94

The introduction of sanitation facility and tube wells within the household indicates the consciousness of the people towards health and hygiene.

2.1.7 Types of Illnesses

Data generation on the number of diseases afflicting the population and the type of illness was thought important as it would help the future formulation of health safety programmes. In response to questions on incidence of diseases in the survey, the respondents (total of 250) cited 20 different non-communicable diseases and 7 communicable diseases in Anwara and Banskali (Figure 7 and 8). In Banskali a lesser number (12 non-communicable) of the households were afflicted by both non-communicable and communicable diseases (Table 9 and 10). A combined estimated (Figure 11) analysis shows the prevalence of gastric ulcer, weakness, body pain, headache and diabetes in both locations. The prevalent communicable diseases were cold/cough, fever and diarrhea in Anwara and Banskali combined (Figure 8). These data indicate that the population of the two Upazilas had nutritional deficiency and susceptible to sicknesses related to poor sanitation and clean health practices. Banskali being a corporation probably had more access to medical facilities and so the incidence of sicknesses stated by respondents was less.

Figure 7: Non-Communicable Diseases in Anwara and Banskali Upazila

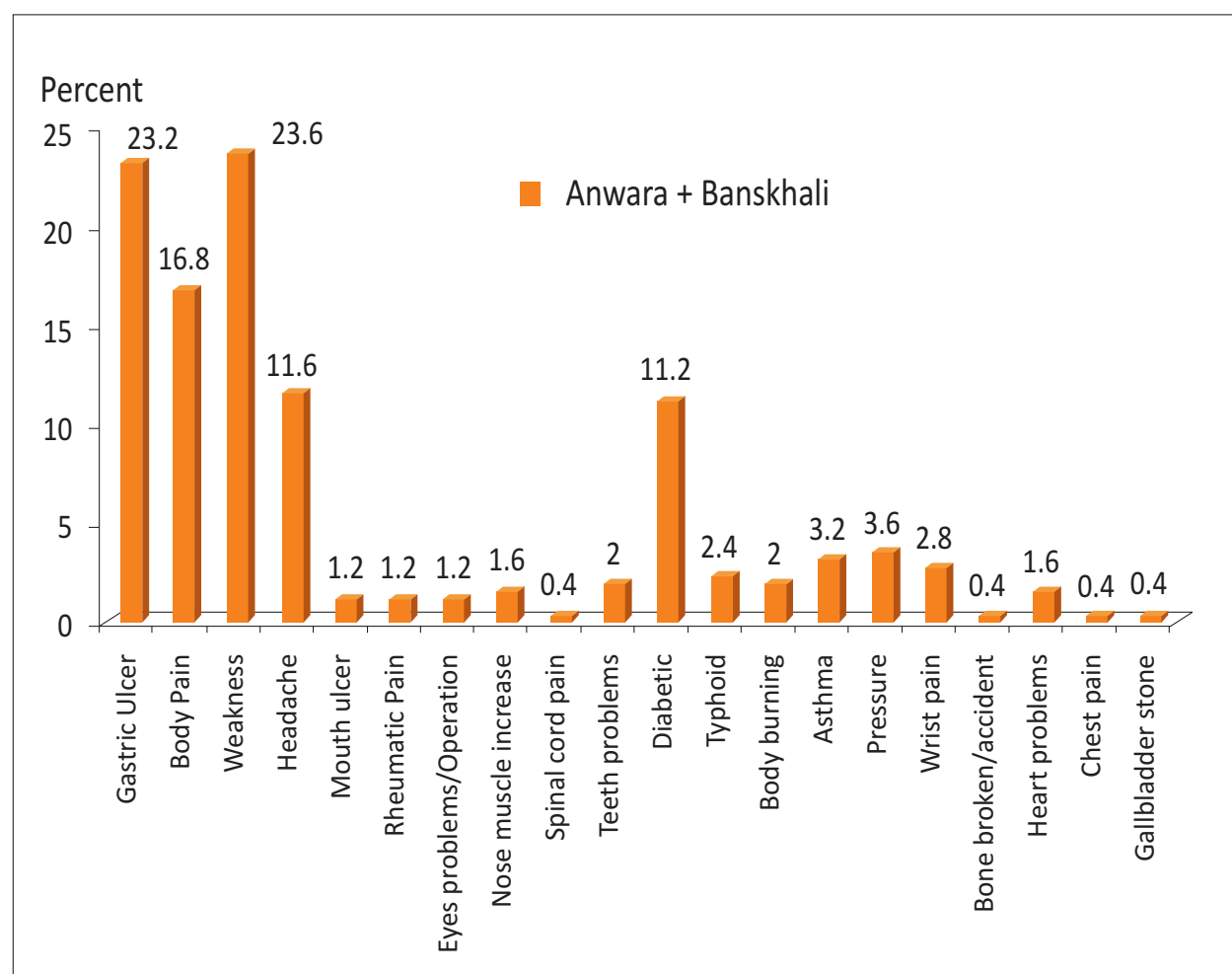


Figure 8: Communicable Diseases in Anwara and Banskali

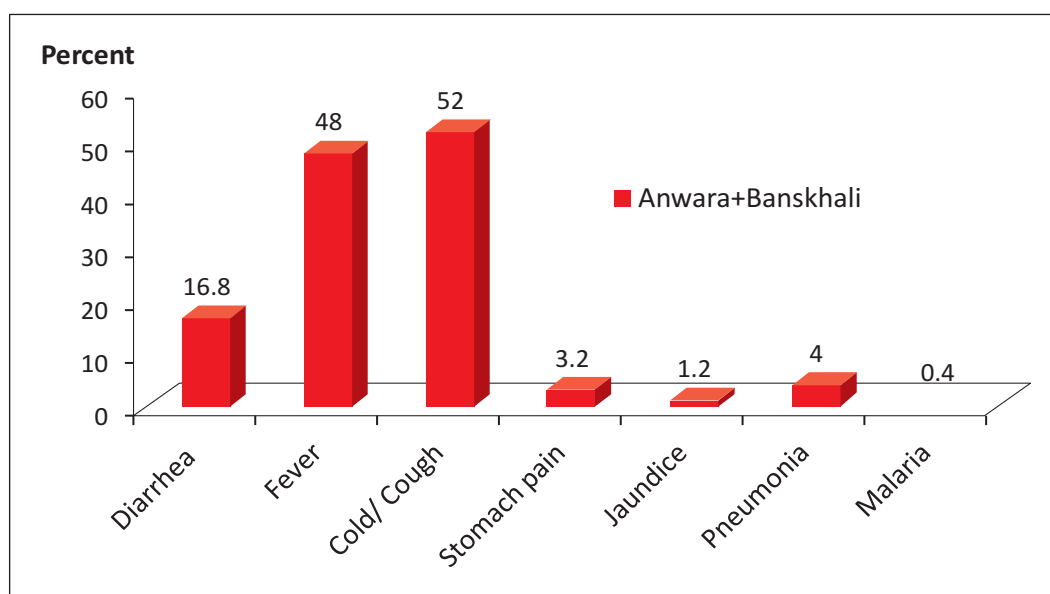


Table 9: Non-Communicable Diseases in Anwara and Banskali

No.	Diseases	% Respondents	
		Anwara	Banskali
1	Gastric ulcer	24.49	21.36
2	Body pain	15.65	18.45
3	Weakness	16.33	33.98
4	Headache	6.12	19.42
5	Mouth ulcer		2.91
6	Rheumatic pain	0.68	1.94
7	Eyes problems/Operation	2.04	
8	Nose muscle increase	1.36	1.94
9	Spinal cord pain	0.68	
10	Teeth problems	3.4	
11	Diabetic	12.93	8.74
12	Typhoid	4.08	
13	Body burning	0.68	3.88
14	Asthma	4.76	0.97
15	Pressure	4.76	1.94
16	Wrist pain	4.08	0.97
17	Bone broken/accident	0.68	
18	Heart problems	2.72	
19	Chest Pain	0.68	
20	Gallbladder Stone	0.68	

Table 10: Communicable Diseases in Anwara and Banskhalı Upazila

No.	Diseases	Anwara (n=147)	Banskhalı (n=250)
1	Diarrhea	19.05	13.59
2	Fever	32.65	69.9
3	Cold/ Cough	60.54	39.81
4	Stomach pain	4.76	0.97
5	Jaundice	2.04	
6	Pneumonia	6.8	
7	Malaria		0.97

3.0 Agriculture in Anwara and Banskhalı

The agricultural information at initiation is important in designing intervention programme on agricultural activity in a rural scenario. The basic information compiled from the baseline survey is described under pertinent headings.

3.1 Agricultural Land

The land ownership size varied from a minimum of 4 decimal to a maximum of 280 decimals in both the Upazilas which is equivalent to 0.04 to 2.8 acres. The mean land size is only 50 decimals in the sampled 250 households in Anwara and Banskhalı, combined (Table 11). Around 44% had no land ownership. The highest ownership of 1-30 and 31-60 decimal was found in 23 and 20 percent of the households, respectively (Table 11). The mean estimate shows ownership of 50 decimals only in Anwara and Banskhalı combined (Table 11). According to the respondents, the shared cultivable land sizes were smaller (Table 12).

Table 11: Land size of the Households sampled in Anwara and Banskhalı Upazila

Land Size (decimal)	Anwara	Banskhali	Anwara+Banskhali
	(%) Respondents		
No Land	27.21	67.96	44
1 - 30 dc	29.93	12.62	22.8
31 - 60 dc	27.21	8.74	19.6
61 - 100 dc	8.16	4.85	6.8
100 +	7.48	5.83	6.8
Total	100	100	100
Minimum size	4	8	4
Maximum size	280	280	280
Mean	50.71	64.73	50.01

Table 12 Shared Cultivable Land size (decimal)

Land Size (decimal-dc)	Anwara	Banskhali	Anwara+ Banskhali
	(%) Respondents		
No Land	67.35	40.78	56.4
1 - 30 dc	8.84	8.74	8.8
31 - 60 dc	14.97	23.3	18.4
61 - 100 dc	7.48	20.39	12.8
100 +	1.36	6.8	3.6
Total	100	100	100
Minimum size	10	16	10
Maximum size	240	160	240
Mean	53.79	65.34	60.26

3.2 Cropping Pattern

In Anwara and Banskhali, single, double and triple cropping was practiced. A predominance of the double crop is noticed although the households of Banskhali practiced double and triple crops in equal numbers (Figure 9). In the case of shared cropping, double cropping was more of a practice in both the Upazilas (Figure 10).

Figure 9: Cropping intensity of Households in Anwara and Banskhali

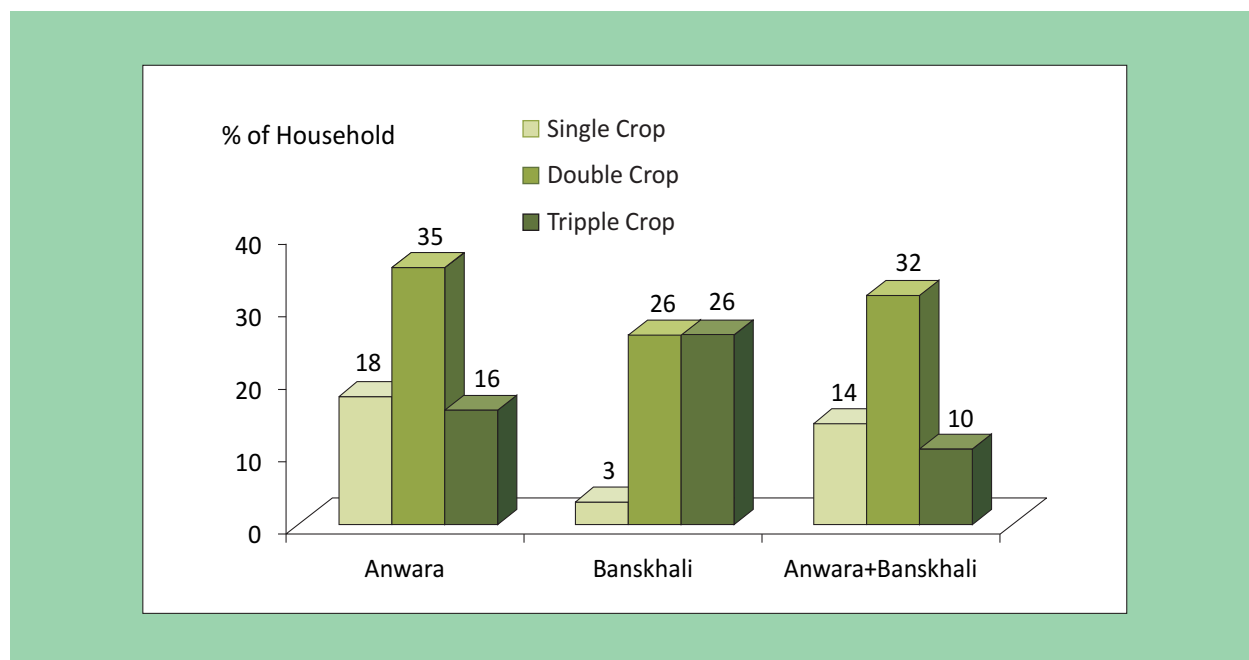
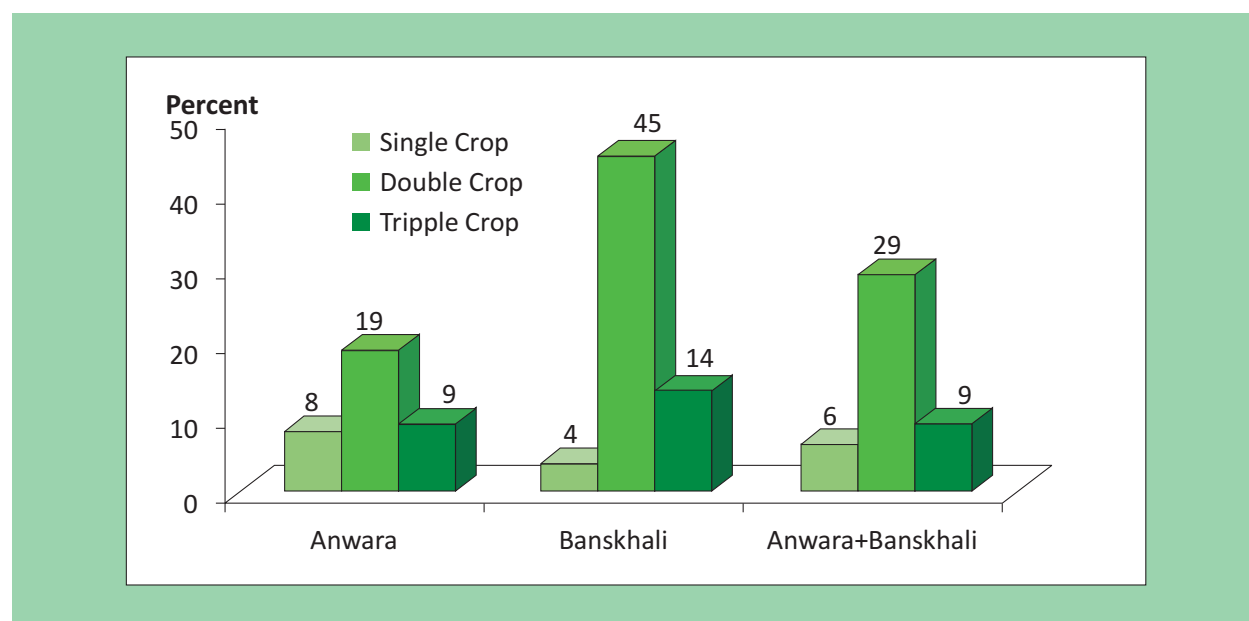


Figure 10: Percent of Households with Shared cropping in Anwara and Banskali



3.3 Crops

In Anwara Upazilla 10 different crops are cultivated as stated by 147 households sampled. In Banskali the number of crops cultivated is 14 stated by 103 households indicating a higher biodiversity in Banskali. The majority of the farmers produce rice of the 3 seasons that suits their land. Besides potato, pulses, chili, sweet potato, bean, bottle gourd and sweet gourd are grown in Anwara (Figure 11). The additional crops grown in Banskali are cucumber, eggplant, bottle gourd and teasel gourd (Figure 12). Rough estimates as stated by the farmers on the cost benefit of crop production were recorded. The benefits from rice cultivation were marginal. The highest benefits were from chili and potato in both the locations (Figure 13). The vegetables cultivated are pumpkin, eggplant, bottle gourd, teasel gourd, Indian spinach, bean, coriander, bitter gourd, radish, etc.

Figure 11: Percent of Households cultivating 10 different crops in Anwara Upazila (n = 147 Households)

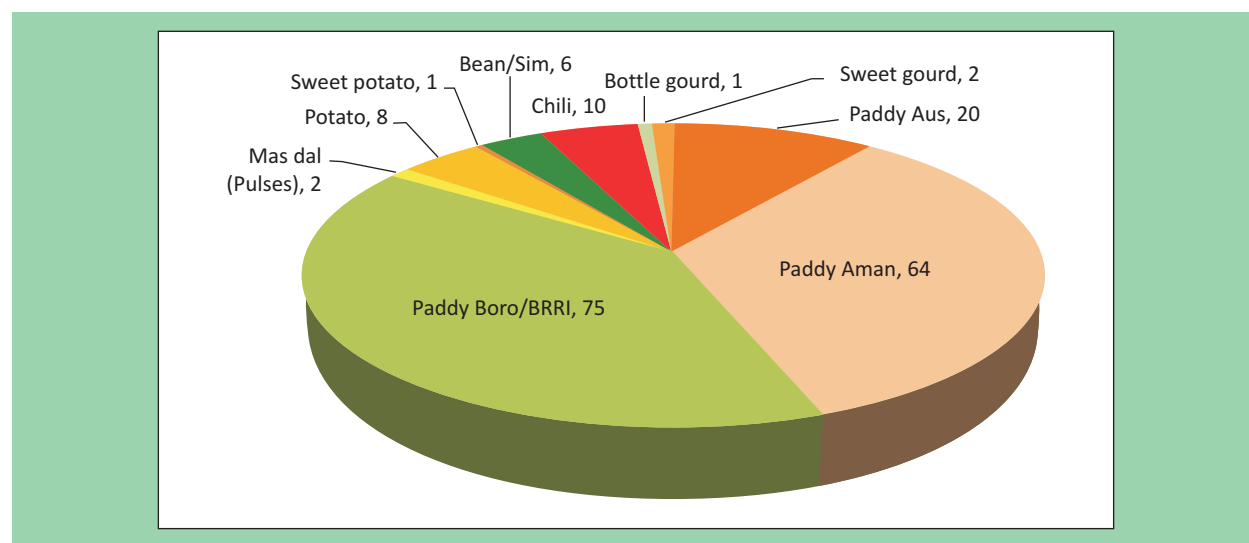


Figure 12: Percent of Households cultivating 14 different crops in Banskali Upazila (n = 103 Households)

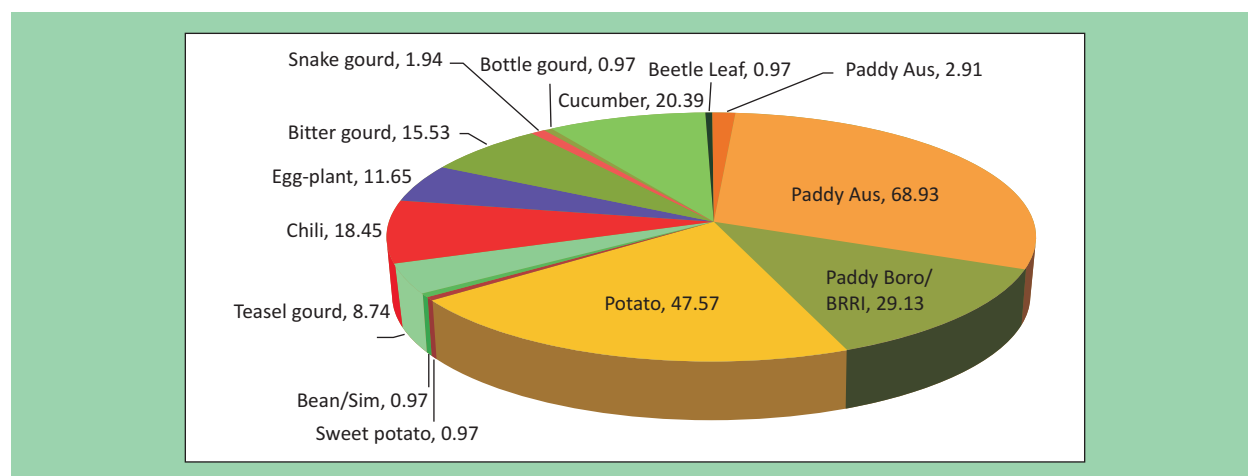
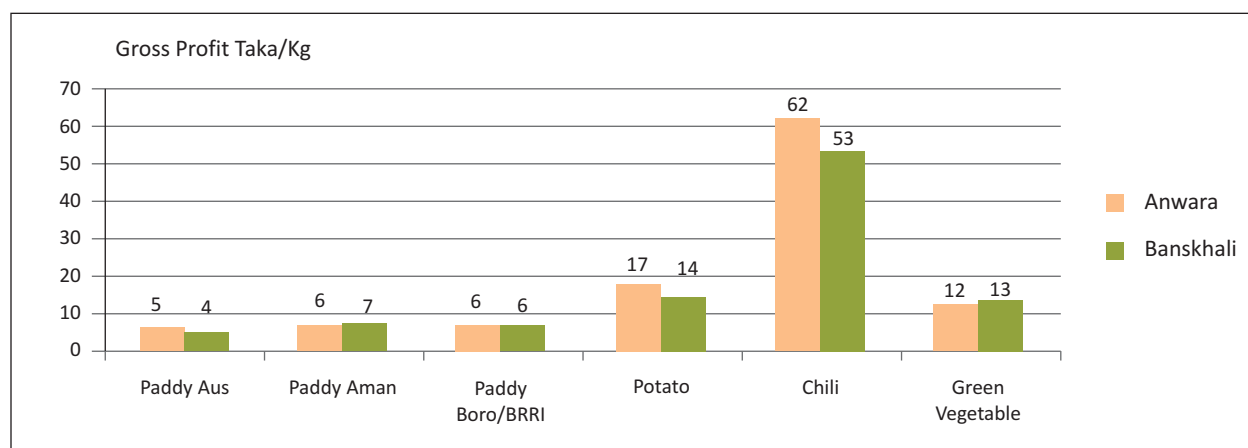


Figure 13: Gross Profit from 6 types of crops in Anwara and Banskali



3.4 Homestead Gardening

As homestead gardening was a source of supply of vegetable for home consumption, it was important to know if home gardening was practiced. Only 6.8 and 13.59 percent of Anwara and Banskali of the surveyed households had homestead gardens (Table 13A). Out of the households having homestead space 60 and 35.71 in Anwara and Banskali, respectively grew vegetables (Table 13 B). The reason for not producing crops in homestead was stated to be due not having enough space, none trained or have know-how on production and lack of manpower to nurse vegetable garden (Table 13C).

On a question of having fruit trees in the homestead, 83.67% in Anwara and 87.38% of Banskali households had fruit trees such as mango, litchi, blackberry, jackfruit, guava, pomegranate, rose apple (jamrul), wood apple (bel), grapefruit (jambura), lemon, safodilla (sofeda), olive (jolpai), etc (Table 14). These fruit trees were one or two in each household. However, this reflects that most households have their own source of some kind of fruit for home consumption.

Table 13A: Percent Owning Homestead Garden

Homestead Gardening	Percent household	
	Anwara	Banskhali
Have homestead garden	6.8	13.59
Do not have homestead	93.2	86.41

Table 13B: Percent Cultivating in Homestead

Status of Homestead garden	Percent household	
	Anwara	Banskhali
Cultivate at Homestead	60	35.71
Do not cultivate	40	64.29

Table 13C: Reasons for not Doing Homestead Gardening

Reasons	Percent household	
	Anwara	Banskhali
Not enough space	25	
Non-trained	50	11.11
No nursing persons	25	88.89

Table 14: Presence of Fruit trees in Homestead

Fruit trees in Homestead	Percent Household	
	Anwara	Banskhali
Fruit trees	83.67	87.38
No fruit trees	16.33	12.62

3.5 Fish Culture

Fisheries are a cottage industry type entrepreneurship in both Anwara and Banskhali. The farmers had home ponds where fish was produced in small scale mainly for home consumption and for sale at the local markets. A mean of only 20 households had ponds with a minimum and maximum size of 2 and 22 decimals, respectively (Table 15). Anwara cultivated Catla, Rui, Carp and Pangus while In Banskhali only Catla, Rui and Carp were cultured (Table 16). Fish was a source of protein for the farming households. Farmers who did not culture fish even if they had small ponds were due to lack of funds and training.

Table 15: Household having ponds in Anwara and Banskhali

Ponds	Percent Households		
	Anwara (n=147)	Banskhali (n= 103)	Anwara + Banskhali (n=250)
No Pond / No Land	79.59	79.61	79.6
1 - 3 decimal (dc)	9.52	6.8	8.4
4 - 6 dc	9.52	6.8	8.4
6 + dc	1.36	6.8	3.6
Total	100	100	100
Minimum size (dc)	2	1	1
Maximum size (dc)	12	22	22
Mean	3.8	7.38	5.27

Table 16: Kinds of Fish Cultivated in Ponds of Anwara and Banskhali

Fish Type	Percent Household		
	Anwara(n=20)	Banskhali (n=15)	Anwara+ Banskhali (n=35)
Catla	30	6.67	20
Rui/Rui types	30	26.67	28.57
Carp/carp types	70	73.33	71.43
Pangus	0	26.67	11.43

3.6 Poultry

Almost every home with ownership of land owns poultry. Homestead with ponds also reared duck in small numbers. Eggs and poultry meat was consumed and sold in the neighbourhood markets.

4.0 Marketing of Agricultural Products

The availability of a market for any product is a prime requirement for any society to flourish. Any intervention and increased production would need avenues and supply chain to facilitate sales. Locating existing markets will help farmers to take advantage of the best market.

4.1 Agricultural Markets in Anwara and Banskhal

Farmers were asked on the available markets for their agricultural products. They had multiple answers. Only in Banskhal, there existed a Non-government Institution for marketing agricultural products. A high percentage (97.8 in Anwara and 93.85 in Banskhal) depended on Bepari, Paiker, Faria and Middleman for sale of their produce. A mean of 22 percent farming households depended on other Consumer, Neighbours, and Retail sellers for sale of their products (Table 17).

Differential percentages (53 in Anwara and 8 in Banskhal) made sales from home to home. A high percentage (mean of 83%) sold their vegetables, fish, poultry and fruits in the nearby local market. Around 15% only send their products to far off markets (Table 18).

Table 17: Marketing Facility of Agricultural products in Anwara and Banskhal Upazila

Marketing Facility	Percent Response		
	Anwara (n=91)	Banskhali (n=65)	Anwara+ Banskhal (n=156)
Non-government processing institution	0	1.54	0.64
Bepari/ Paiker/ Faria/ Midleman	97.8	93.85	96.15
Consumer/ Neighbors/ Retail seller	20.88	24.62	22.44

Table 18: Sale Place of Agricultural Products in Anwara and Banskhal

Sale Place	Percent Response		
	Anwara (n=91)	Banskhali (n=65)	Anwara+ Banskhal (n=156)
Sale at home	52.75	7.69	33.97
Sale at nearby market	82.42	84.62	83.33
Sale at far Market/Mukam/Paikari market	15.38	15.38	15.38

5.0 Training on Agriculture

Training improves the quality and quantity of production in agriculture. An assessment of training need can be done from baseline information of the training received by the community.

5.1 Agricultural Training in Anwara and Banskhal

A very few percentage of the (mean of 4) farming households received training on agriculture, even in Banskhal which is an Upazila (Figure 14). Likewise, the trained numbers were equally low in livestock and poultry (Figure 15). No training was given by any agency of Government or NGO on organic agriculture, tree cultivation or fish nursery culture or fish production.

Figure 14: Percentage of Farmers Received Training in Agriculture in Anwara and Banskali

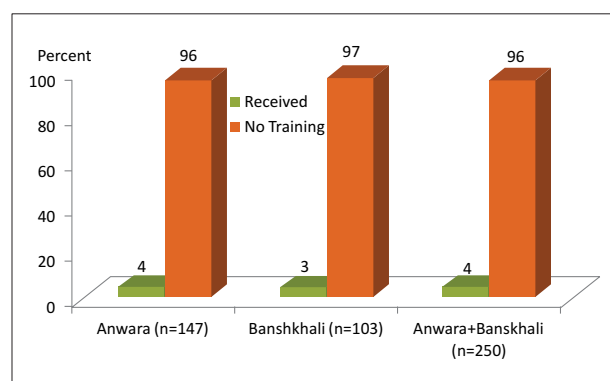
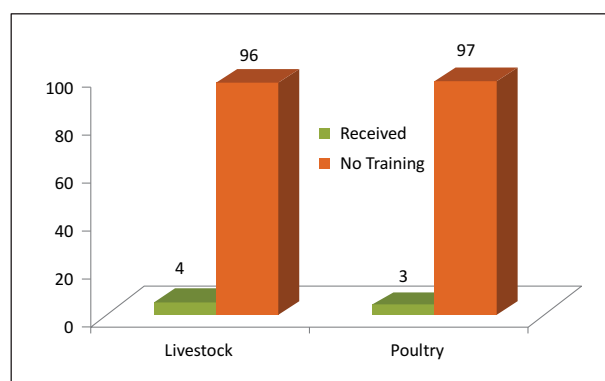


Figure 15: Training on Livestock and Poultry at Anwara and Banskali



6.0 Nutritional Security

Food security is closely tied to nutritional security. A population can be productive if they are healthy. Health is dependent on balanced food containing all the required nutrients available from agricultural produce. The right food taken is also dependent on access and availability of food. In any agroecosystem one would expect the natural growth or introduction of nutritious sources of food suitable to that environment. Information on the present sources of nutrient supplying sources of food is therefore considered.

6.1 Sources of Nutrition

The source of nutrition was made from data on the vegetable, fruit trees, poultry and milk production from the sampled respondents of Anwara and Banskali Upazilas. At least 10 different vegetables were produced in Anwara and Banskali. As is the case in villages, parts of the vegetables produced are consumed day to day. Farmers also keep their yearly need of paddy and potato, so at least the basic food and source of carbohydrate is available for small farmers (Figures 10 and 11). A count of the fruit trees shows among the respondents each household had at least one fruit tree of the 15 fruit trees growing in the area (Table 19). Some consumption of milk and egg is reported from the baseline survey (Table 20). As we do not have the exact volumes of consumption per person, it would be hard to conclude nutritional deficiency does not exist.

Table 19: Diversity and Population of Fruit Trees in Households of Anwara and Banskali

Sl	Fruit Trees	Anwara			Banskali		
		No.of Respondents	Mini. Number	Max. Number	No. of Respondents	Mini. Number	Max. Number
1	Mango	100	1	30	85	1	12
2	Berry	7	1	2	9	1	4
3	Litchi	1	1	1	12	1	6
4	Jackfruit	51	1	15	61	1	10
5	Guava	61	1	5	30	1	4
6	Jamrul	2	1	3	1	1	1
7	Wood-apple	11	1	2		-	-
8	Jambura/ Batabi-lebu	7	1	2	9	1	2
9	Lemon	11	1	1	6	1	2

Sl	Fruit Trees	Anwara			Banskhali		
		No.of Respondents	Mini. Number	Max. Number	No. of Respondents	Mini. Number	Max. Number
10	Safeda		-	-	1	2	2
11	Olive	2	1	1	6	1	2
12	Coconut	70	1	40	40	1	100
13	Nut	16	3	60	14	2	200
14	Jujube	5	1	2	5	1	4
15	Carambola	1	1	1		-	-

Table 20: Production and Consumption of Egg and Milk in Anwara and Banskhali

Livestock/ Poultry/Month	Anwara (n=147)			Banskhali (n=103)								
	% of Respondents	Average Production	Own Consum	% Consumption	Average Sale	Gift to Relative	% of Respondents	Average Production	Own Consum	% Consumption	Average Sale	Gift to Relative
Cow Milk (litre)	18.4	73.5	16.8	22.9	56.5	0.2	7.8	41.3	22.5	54.5	18.8	
Goat Milk (litre)	0.7	8.0	8.0	100.0								
Goose egg (no.)	0.7	60.0	40.0	66.7	20.0		1.0	60.0	20.0	33.3	40.0	
Duck egg (No.)	13.6	31.1	22.2	71.2	9.0		14.6	35.7	16.1	45.1	19.6	
Chicken egg (No.)	11.6	23.7	18.5	78.2	5.2		27.2	17.7	13.8	77.9	3.9	
Total	44.9						50.5					

7.0 Conclusions

The baseline survey gave an estimate of the agricultural production of Anwara and Banskhali, the selected sites of the project Exploring Alternative Farming Practices to End Hunger in Bangladesh. Our objective of introduction of the principles of agroecology will be reflected with a comparative study of the baseline with the end line survey results. This, therefore, will form the basis of impact of the activities of the one year and 5 months project funded by Rosa Luxemburg Stiftung and implemented by Research Initiatives, Bangladesh.

References

Bangladesh Bureau of Statistics 2009, 2014

Bangladesh Map

Primary Baseline survey Questionnaire

World Development Indicators (WDI), November 2015

CHAPTER 4

Report of the End line Survey on Exploring Alternative Farming Practices to End Hunger in Bangladesh

1.0 Introduction

End line survey literally is the collection of information after an intervention to see a change in a developmental process in the society. It is actually an impact assessment analysis to show short and long term effects of the intended or unintended intervention. The project Exploring Alternative Farming Practices to End Hunger in Bangladesh (EWOH) had intervened in the agricultural sector to create awareness and introduce agroecological principles towards the philosophy of BMZ to establish “No Hunger-One World” for fulfilling the Sustainable Development Goals (SDGs). The Rosa Luxemburg Stiftung (RLS) in cooperation with Research Initiatives Bangladesh (RIB) have chosen Bangladesh as a South Asian site from its office in Delhi and Berlin. The end line survey is a logical follow-up of the baseline survey held at the initiation of the project.

The impact of interventions of various components will be presented in tables and figures some of which may not parallel with the baseline survey but were logical outcomes. These results are expected to show “difference in difference” from Baseline to End line and act as directional guideline for future proposals to take agroecological principles forward.

1.1 Objectives

The objectives are to assess if, how, why and under what conditions the intended interventions or impact assessment assist the use of evidence derived to advise policy changes and practice. The objectives were fulfilled by conducting short or long term ex-ante and ex-post evaluation of the result of project activities. Both qualitative and quantitative method, authenticated by acceptable sample size, method of data collection and experimental design form the basis of the so-called baseline and end line surveys.

1.2 Specific Objectives

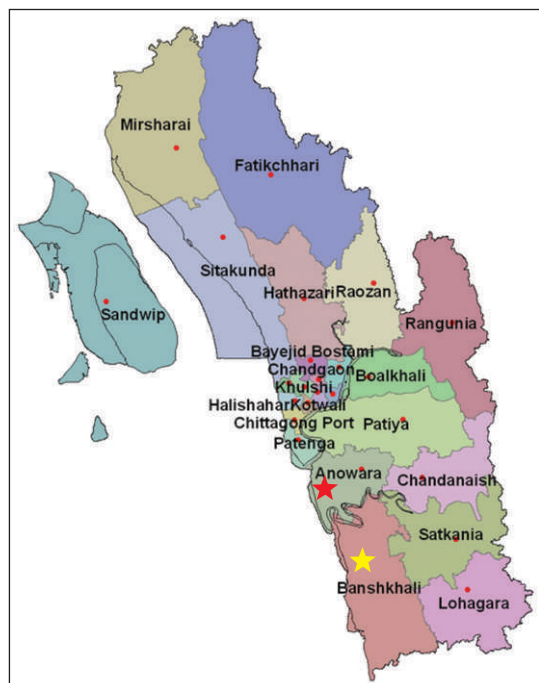
The specific objectives of the end line survey were to

- a. Assess and evaluate the acceptance and changes in agroecology due to intervention of alternative farming in Anwara and Banskhal through quantitative and qualitative analysis.
- b. To find a picture of the socio-economic changes that may occur due to intervention and adoption of alternative and organic technology.
- c. Distinctive analysis of the cost-benefit of products as a result of a changed agricultural practice that would ensure future course of implementation of the agroecological principles.

1.3 Geographical locations and Method

The geographical locations are that of the baseline survey, i.e. 2 unions each of Anwara and Banskhalī in Chittagong district (Figure 1).

Figure 1: Anwara (red star) and Banskhalī (yellow star) in Chittagong District



1.4 Identification of Households

The sample sizes were 140 and 110 from Anwara and Banskhalī respectively, totaling 250 households. (Table 1). The methodology was the same as baseline, the data generated through a primary questionnaire with additional questions to detect change. An average of 25% of households was visited to collect data for the survey. The geographical locations were taken from the website. The findings were mainly based on the changes of the PAR members or direct stakeholders of the project.

Table 1: Identification of Households for End line Survey

Sl. No.	District/Zilla	Upazila	Union	Village	No. of household used in End line	
					No.	%
1	Chittagong	Anwara	No. 2 Barsat	Gundip	71	28.4
3	Chittagong	Banskhalī	Banskhalī Sadar	Joldi	40	16
Total					250	25

2.0. Findings

The time difference between the baseline and end line survey was only 14 months and so not any statistical difference in land ownership, primary and secondary occupation were revealed from the data.

This report would therefore point out facts that had occurred due to intervention of agroecology by the EWOH project.

2.1 Demographic Information

An extensive data was collected on the structure of the society. The information relevant to the study is mostly compiled in the baseline report. The end line therefore does not have major repetition of information.

2.1.1 Women Headed Household

The households are dominated by males. Female headed households are way below the national level of 12.8% recorded by WDI in 2007. The role of women is Chittagong area as seen in the baseline is very negligible. Chittagong is a conservative area than most of Bangladesh and it is expected that the participation of women is also low (Figure 2 and 3).

Figure 2: Female and Male Headed Households in Anwara

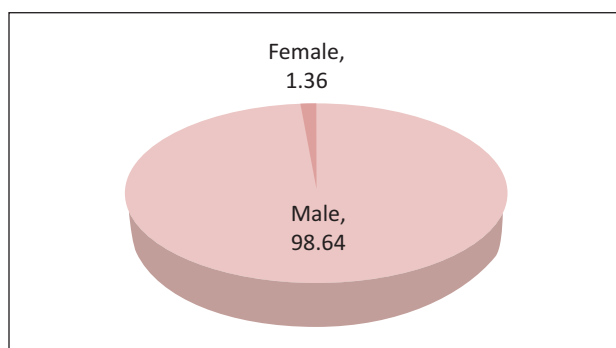
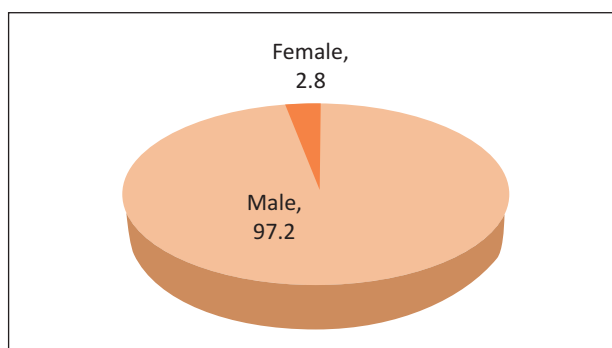


Figure 3: Female and Male Headed Households in Banskhal



2.2 Occupation of Households

The primary and secondary occupation had remained more or less the same. There are around 20 to 28 kinds of ways people of Anwara and Banskhal live their lives. The Figures 4 and 5 shows that the head of household, main occupation is farming on own or sharecropped land in both the locations, but a large percentage of the family members are domestic labourers.

Figure 4: Main Occupation of Head of Household of Anwara and Banskhal

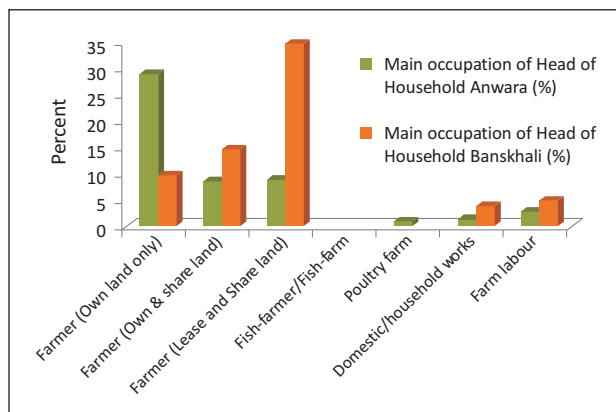
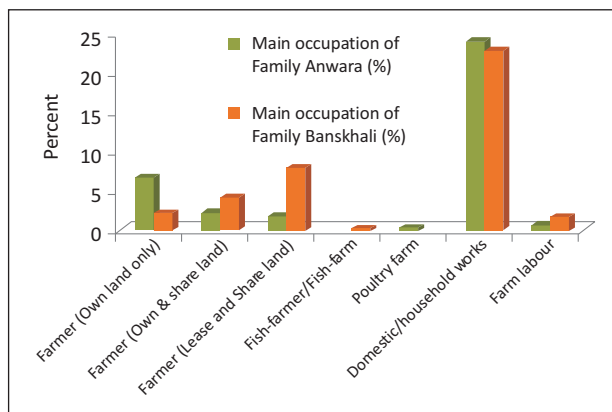


Figure 5: Main Occupation of Family Members of Anwara and Banskhal



3.0 Agriculture in Anwara and Banskali

No significant difference in the agricultural land size is observed in the 250 respondents.

Figure 6: Cropping intensity of Households in Anwara and Banskali (End line)

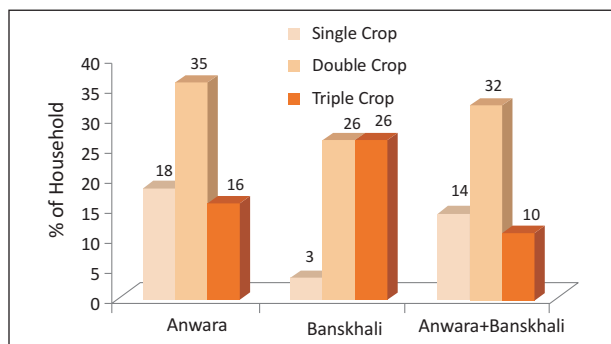
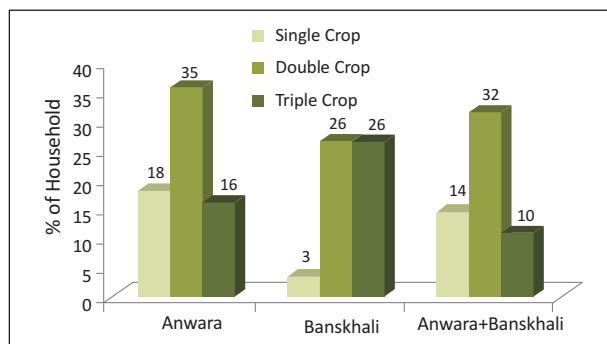


Figure 7: Cropping intensity of Households in Anwara and Banskali (Baseline)

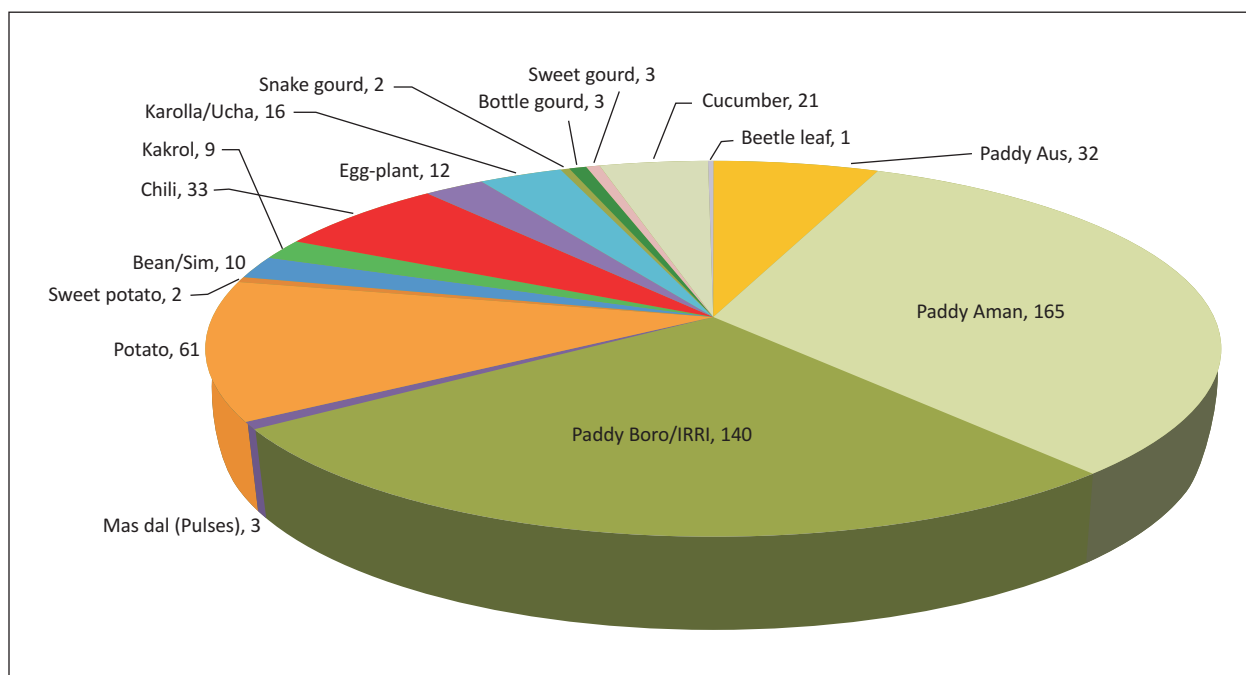


The pattern of single, double and triple cropping that had taken place within the stakeholders of PAR groups had not been reflected in the end line information with the baseline, (Figure 6 and 7). Both locations showed most households practiced mostly double cropping.

3.1 Agricultural Crops grown

The largest number of household is involved in paddy cultivation especially during Boro and Aman seasons. A total of 513 households grew 16 kinds of crops indicating each household growing more than one crop per season (Figure 8). The number is higher than seen in the baseline survey of 10-14 crops.

Figure 8: Crop Cultivation by 250 Households in Anwara and Banskali Combined (End line)



3.2 Impact of Alternative Farming

The intervention of 44 PAR families eventually ended up in 50 members at the end of 17 months. The influence of PAR as a method followed by training, advocacy, and dissemination of the techniques was evaluated through a questionnaire. However, the survey was done on the total households (Table1) selected for the survey.

The project had approached the change to alternative farming from an agroecological approach, integrating the desirable and farmer affordable components of farming that suits their ecosystem. The points of difference were emphasized on using farming techniques that would eliminate the indiscriminate use of fertilizer, pesticide, herbicide or hormones that are injurious to health and the environment. Therefore, PAR discussions were primarily on creating awareness on the deleterious effect of chemicals and then the use of safe methods that will change the ecosystem to its natural state of fertility and self- sustenance.

Intervention, therefore, depended on the PAR farmers' will and ability to accept the techniques that possibly would trickle down to the society and be accepted by other farmers. Therefore open-ended questions were placed without the mention of the techniques that came out from the PAR discussions. The tables and charts showing the results are given below:

3.2.1 Awareness of Alternative or Organic Farming

The farmers of Anwara and Banskhalī were asked on the awareness of knowledge of alternative or organic methods after the last 17 months of the project period. In Anwara and Banskhalī 24 and 34 percent respectively, were aware of organic methods (Figure 9). But only 9 and 8 percent in Anwara and Banskhalī respectively, were practicing now (Figure 10). When asked about their willingness to adopt, 36 and 40% in Anwara and Banskhalī respectively were interested in adopting (Figure 11). But out of 250 respondents in

Figure 9: Percentage of Farmers Aware of Alternative Methods of Farming (n=250)

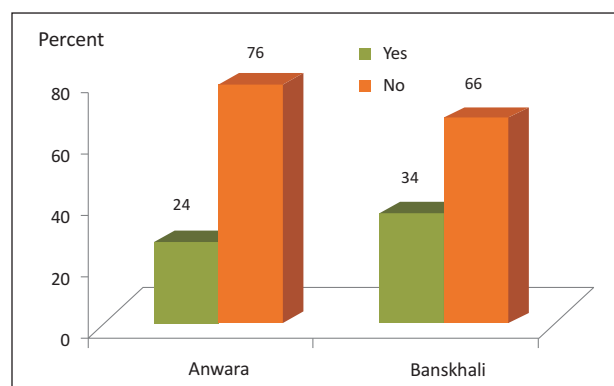
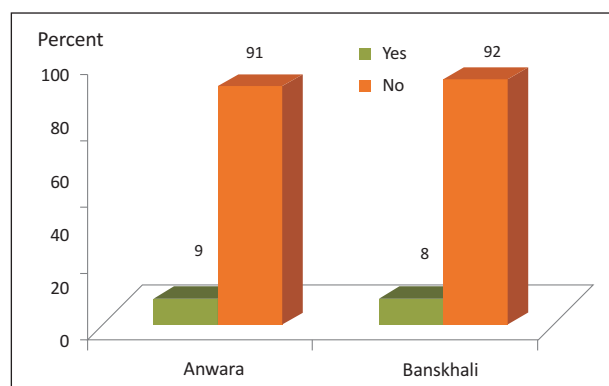


Figure 10: Percentage Adopting Alternative Farming Practices (n=250)



the two Upazilas 76% farmers, were Interested in some way to learn and adopt organic farming (Figure 11- green bars). Although only 1% wanted to adopt at the moment, they emphasized on knowing more about alternative methods and a large percentage thought training was necessary (Figure 12). It is evident that training exercise would create confidence in beginning techniques that are absolutely new.

Figure 11: Percentage of farmers willing and not willing to adopt Organic Farming in Anwara and Banskali (n=250)

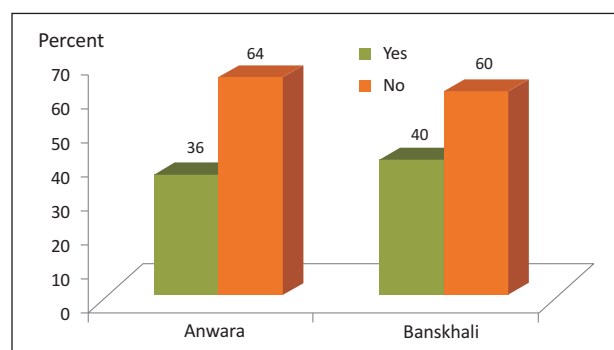
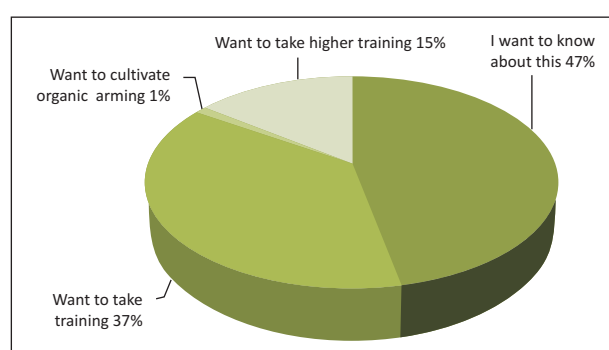


Figure 12: Response of farmers to adoption of Alternative Farming in (Anwara + Banskali)



3.2.2 Farmers using Selected Organic Technology

Of the 20 technologies introduced the survey showed adoption of only 5 by a total number of 20 farmers according to the end line survey (Figure 13). Compost was the most widely adopted probably because of it being an available and easy resource for farmers (Figure 13 and Table 2). The survey carried out by Research assistants of the project, however, showed multiple adoptions in combined Upazilas.

Figure 13: Five intervened technologies were adopted in Anwara and Banskali

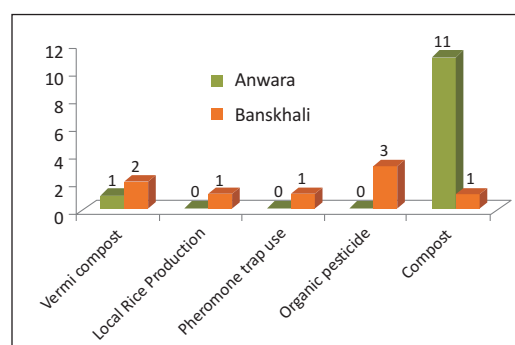


Table 2: Technology Adopted by Farmers

Technologies	Anwara	Banskali	Anwara + Banskali
Vermi compost	1	2	3
Local Rice Production	0	1	1
Pheromone trap use	0	1	1
Organic pesticide	0	3	3
Compost	11	1	12
Total	12	8	20

3.2.3 Pest Attack

The farmers were asked if their crops were attacked by pest. The result shows 79 and 100% of the farm holdings were faced with attack of pests and diseases (Figure 14). Almost all farmers faced pest infestation more than once a year (Table 3). One hundred percent of households stated the infestation of pests in Bangladeshi.

Figure 14: Pest attack in holdings of 2 locations

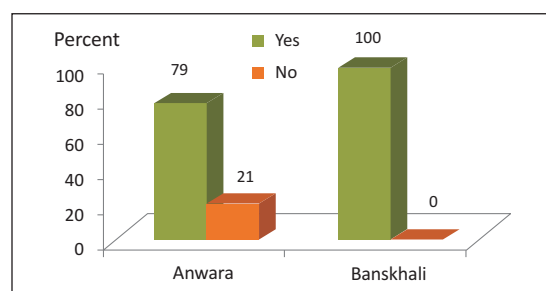
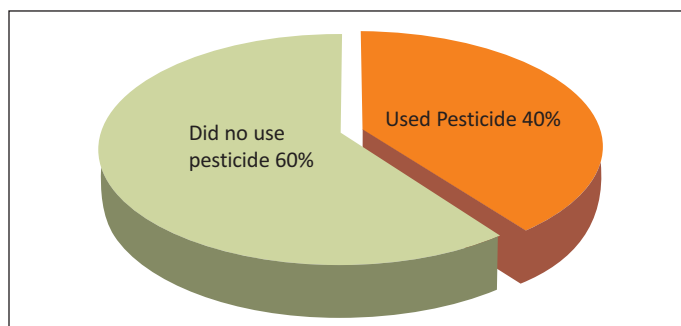


Table 3: Incidence of attack of pests in Anwara and Banskali

No. of Times Pest Attack	Response of Farmers (%)	
	Anwara	Banskali
One time	36	0
More than one time	64	100

Figure 15: Use of Pesticide by Farmers of Anwara and Banskali



On the question of the issue of pest management 40% farm holdings used pesticide in Anwara and Banskali to control pests (Figure 15). The number of times they used pesticide was 2 to 4 or more than 4 times a year. So the intensity of pesticide used can be visualized. The farmers also cleaned the seeds before planting.

3.2.4 Method of Controlling pests and diseases

All farmers used some kind of pest management to control pest and diseases. Although the number of sample size was 13 and 22 in Anwara and Banskali, respectively, some farmer used at least 4 kinds of organic pesticide to control pests. Moreover, more than one kind of technique was used to control pests in the winter season vegetables (Figure 16).

Figure 16: Organic Pest Management of Winter Season Vegetable

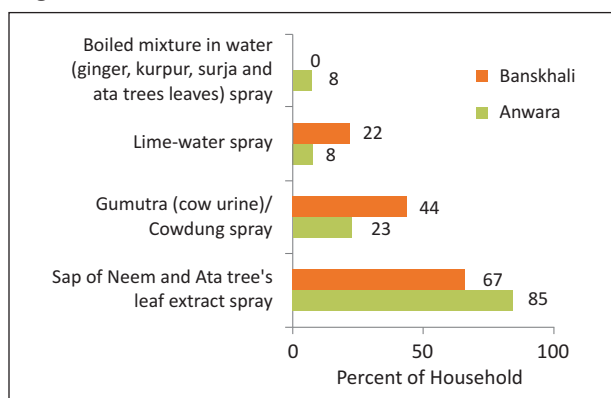
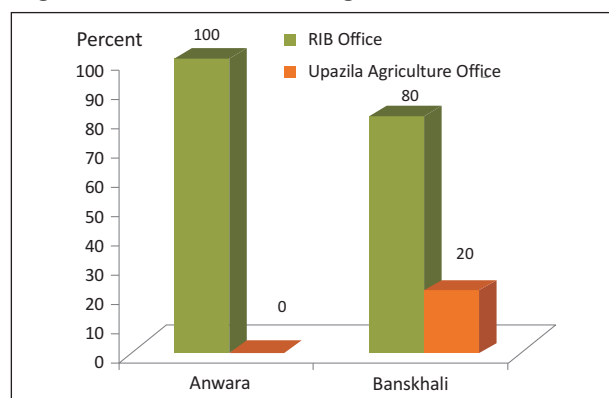


Figure 17: Percentage of Farmers' Receiving Training on Organic Method of Pests Management



3.2.5 Training on Organic Pest Management

Out of the 25 farm households questioned on the issue of receiving training on organic or alternative method of pesticide used, 56% farmers replied in the positive but 44% stated that they had not received any training. All the farmers have received training from RIB's alternative method of farming in Anwara but 20% had been trained by the Upazila Agriculture Office in Banskali (Figure 17).

Although the farmers were aware of the benefits of alternative methods of farming, the confidence of such a farming community where education is low or absent appears to be low (Figure 18 and 19). The data also reflected that there is a large portion of the farmers who are outside the PAR groups and are not aware of the alternative chemical free methods of farming practiced by the project at the 4 Unions of Anwara and Banskali.

Figure 18: Farmers' Knowledge on agri-methods to avoid safe food

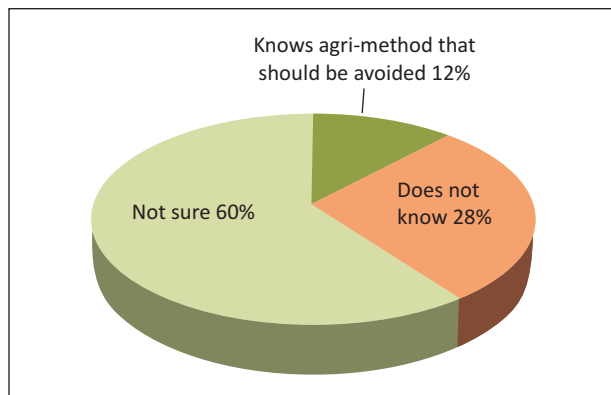
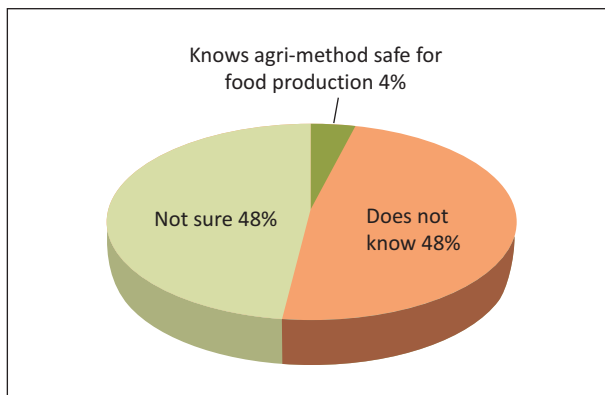


Figure 19: Farmers' Knowledge on agri-methods to adopt safe food production



The project had only 4 PAR groups with around 55 members and 80-90% attendance. As 20 technologies were introduced, it is possible that in this short period the discussions needed more repetition than was possible to bring more attention and concentration of the farmers at the time for actual introduction. Our one to one spot survey of the Research Assistants however revealed adoption of 14 technologies out of 20 introduced (Chapter 1, Figure 12).

4.0 Nutritional Security

Nutrition of the population was a focus of study by the project along with safe production techniques. The status was determined from the fruit trees, fish production, poultry, cow and goat rearing. Sixteen different fruit trees suitable to the agro climatic zone of the area are existing in Anwara and Banskali. Hopefully homestead products are consumed by family members that provide nutrients.

4.1 Fruit Production

Fruit crop production had not significantly increased in the Upazilas during the 17 month period. It is obvious, although plantation had taken place, the plants had not reached the fruit bearing stage. In fact in a few places fruit trees were cut down for selling therefore reducing the number.

4.1.2 Vegetable Production

There is a record of 11-15 types of vegetables grown in Anwara and Banskali (Table 4). In Anwara vegetable production appears to be less and has been attributed to excessive rain in the rainy season. Besides most of the area is suited for rice especially that of local varieties. Banskali seemed to be more suitable for vegetables as the land topography seems to be higher. A number of vegetables in both the seasons are higher in Banskali (Table 4). The result also shows multiple crop introduction as a component of the agroecological concept.

4.1.3 Culture of Fish, poultry, livestock, health care, handicrafts

Farmers also culture fish, poultry, livestock that supplies milk and meat as a good source of income. A combined estimate shows only 24% of the households out of 250 cultured these products for home consumption or for partial sale (Figure 20). The increase of food intake in the farming family was also stated to increase in both locations. However in Banskali a higher percentage of household were consuming quality food according to their response (Figure 21).

Table 4: Rainy and Winter Season Crops grown in Anwara and Banskali During August '15 to Nov '16

Sl. No.	Vegetables	Rainy Season Vegetable	
		Anwara	Banskali
1	Pumpkin	2	11
2	Egg plant	2	6
3	Pointed gourd		1
4	Bottle gourd		5
5	Cucumber		2
6	Ladies finger		1
7	Stem amarnath	1	8
8	Tomato		2
9	Papaya		1
10	Indian spanish		1
11	Red amarnath		1
	Total	5	39

Sl. No.	Vegetables	Winter Season Vegetable	
		Anwara	Banskali
1	Egg plant		2
2	Ladies finger		2
3	Bottle gourd	5	21
4	Cucumber		1
5	Cauli flower		1
6	Tomato	1	2
7	Papaya		4
8	Bankrui		1
9	Bean/seem	3	25
10	Dhanna pata		8
11	Cabbage		1
12	Spanish		3
13	Red amarnath		2
14	Indian spanish	7	25
15	Kalmi shak		1
	Total	16	99

Figure 20: Culture of fish, poultry, livestock, nursery, primary health care and handicrafts

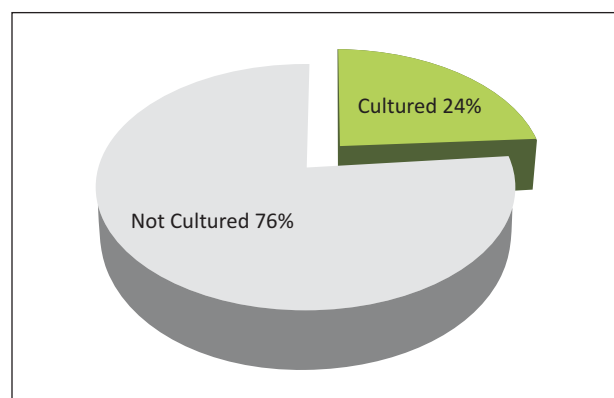
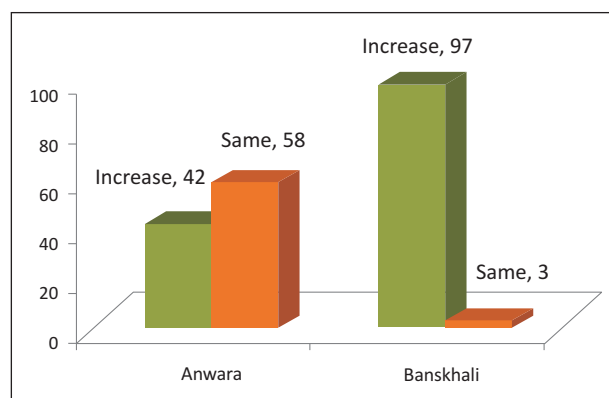


Figure 21: Percent change of status of food habit among the respondents



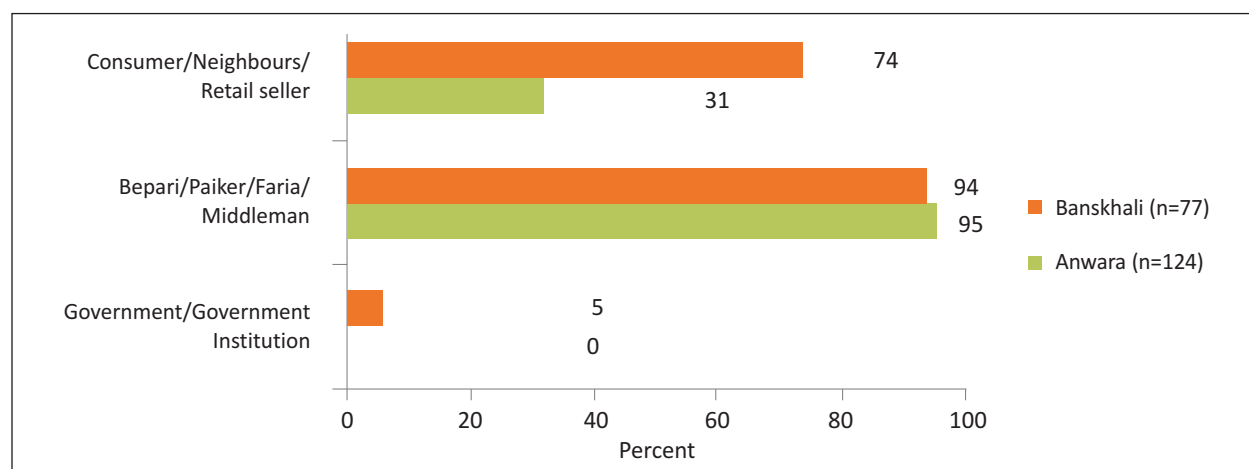
5.0 Marketing of Products

Marketing is a major obstacle of scaling up agricultural products. The survey included information on the present markets available and how farmers sell their products.

5.1 Institutional Markets

Both Anwara and Banskali have institutionalized markets for sale of products. However, only 5 of the stakeholders Government market is in Banskali but absent in Anwara. Most of the producers marketed through middleman and retail sellers (Figure 22).

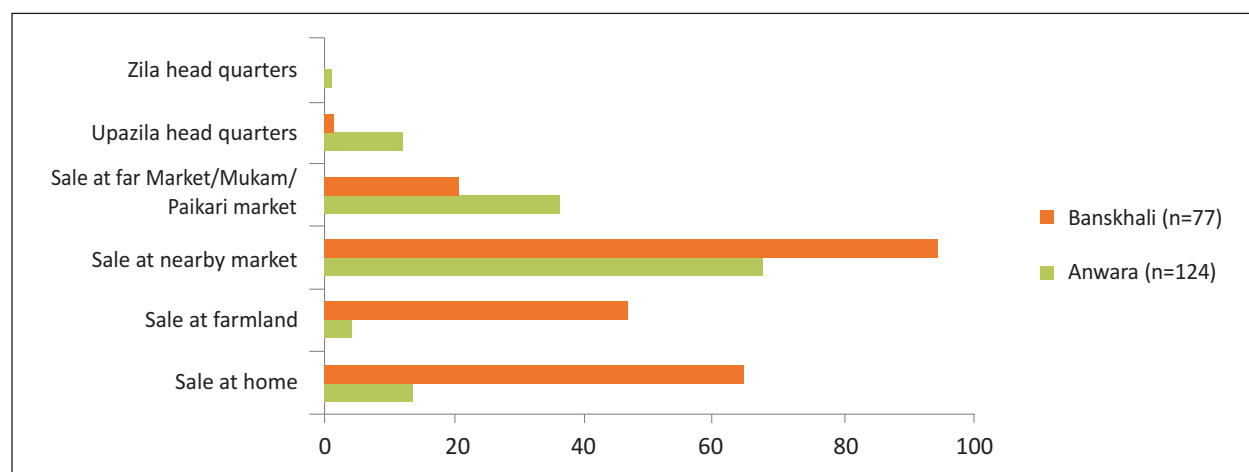
Figure 22: Market Availability of Products in Anwara and Banskali



5.1.2 Other Markets

Farmers also preferred to sell at the nearby market (Figure 23). The preference of market between the two locations differed due to the location of market and area of production. Anwara being a smaller Upazila and not a Pourashava, both production and sale are less than Banskali.

Figure 23: Other Local Markets of sale of agri-products in Anwara and Banskali



6.0 Benefit of Organic Products

All producers of inputs and products have to count benefit from any enterprise new or old. Calculations on benefits are usually done before beginning. The alternative farming practices/ components that the project proposed required very little investment on raw materials that were available from the homesteads of the participating farmers. Thus we have seen the introduction of compost and vermi compost that required cow dung and very little investment. Labour was off course provided from the family. However, sustainability is dependent on return either on the direct sale or the end product use as an input. Sometimes the quality of the product also matters when awareness can be created on the qualitative cost benefit. The RIB-EWOH project included cost-benefit issues a priority in the survey to draw forward future plans of action that will motivate the farmers for a change towards the principle of agroecology for 'One World-No Hunger' objective.

The cost benefit of farmers of Anwara and Banskali on organic farming is shown in Tables 5 and 6. Some farmers used a single product, others used multiple crops obviously in small areas of land. Over the project period besides independently all farmers in both locations made a yearly income of BDT 50,500 and 52,000 in Anwara and Banskali, respectively (Table 5 and 6).

Table 5: Income from Alternative Farming in Anwara (End line survey)

Sl. No.	Name of Farmer	Organic Technology	Location	Money spent BDT	Area of Land	Production (Value) BDT	Amount Consumed BDT	Amount Sold BDT
1	RANJIT SHIL	Compost	Juiri	2000	16	5400		5400
2	MD DIDAR	Compost	Juiri	12000	120	20000	8000	12000
3	KHOKON DAUTTA	Compost	Juiri	2000	4	5000		5000
4	NOOR MOHAMMAD	Compost	Juiri	1500	10	3000		3000
5	DIPOK DAUTTA	Compost	Juiri	1400	8	2500		2500
6	MD ABU TAHER	Compost	Juiri	2500	20	7200		7200
7	MD JABAED	Compost	Juiri	1700	10	4800	2400	2400
8	MD ELIYAS	Compost	Juiri	500	4	1440	440	1000
9	SOJIB SHIL	Compost	Juiri	3000	20	7200		7200
10	MD AKTER	Compost	Gundip	2000	320			
11	MD SHAFIQ	Vermi Compost	Gundip	1000	4	2000	200	1800
12	MAMUNUR RASHID	Compost	Gundip	2000	8	3000		3000
Total				31600		61540	11040	50500

Table 6: Production of Alternative Farming Inputs in Banskali Upazila (End line Survey)

Sl. No.	Name of Farmer	Organic Technology	Location	Money spent BDT	Area of Land	Production (Value) BDT	Amount Consumed BDT	Amount Sold BDT
1	JALAL UDDIN	Pheromone trap use	Paraing	13400	16	40000	1000	39000
2	SIDDIK AHAMMED	Local Rice Production	Paraing	3200	6	5000	3000	2000
3	DOLIL AHAMMAD	Compost	Joldi	1500	3	4000	2000	2000
4	ABDUL MOTLOB	Organic pesticide	Joldi	1500	4	4000	3000	1000
5	ABDUL HAQUE	Organic pesticide	Joldi	1200	6	1500	1500	
6	MD MOSTAFIZUR RAHMAN	Vermi Compost	Joldi	800	10	6000	2000	4000
7	MOSTAFA	Vermi Compost	Joldi	500	4	6000	4000	2000
8	MOSTAFA	Organic pesticide	Joldi	200	4	6000	4000	2000
Total				22300		72500	20500	52000

7.0 Conclusions

The end line survey gave a picture of a moderate rate of change due to the intervention of a very difficult concept of shift of farming leading to food and nutritional security. It is apparent that a combination of participatory approach, motivational training, advocacy, and promotion are the key factors of adaptation of introduced technology. When human minds are given freedom to use their behavioural skills and use traditional concepts within their domain, motivation seems to have an impact on acceptance and adoption.

The end line information shows success of the project activity in a short 17-month time period with farmers of Anwara and Banskali, Chittagong.

Reference

1. End line survey Questioners
2. WDI Report 2007

CHAPTER 5

Women and Farming in Exploring Alternative Farming Practices to End Hunger in Bangladesh

1.0 Introduction

Agriculture is the largest employment sector in Bangladesh. As of 2016, it employs 47% of the total labor force and comprises 16% of the country's GDP (2016). It leads to employment generation, poverty alleviation, human resources development and food security irrespective of sex and age.

Farming began with the first seed of crop sown by women. The truth of the fact on women's role in agriculture remained over centuries as even today 43 percent of women constitute the agricultural labour force (World Bank, 2016). According to World Bank database (2010) employment in agriculture (% of total employment) in Bangladesh was 47.5% in 2016. It also comprises 16% of the country's GDP (2016).

Additionally, women are claimed to produce 60 to 80 percent of food in most developing countries and half of the world's food supply. Women are therefore considered the backbone of the development of rural and national economies of many countries. Bangladesh is a glaring example where directly or indirectly women contribute to farming activities.

A household survey carried out by Jaim and Hossain (2011) 66% of the adult women are employed in agricultural activities such as crop cultivation(3.85%) livestock and poultry (68%), homestead gardening (18%) and fisheries (0.48%). Another study stated that women spend 6451.2 hours in non-household works such as homestead crop cultivation, livestock production, 1418.0 hours for poultry, 404.8 for pisciculture and 7.4 hours for fisheries (2002) Many of these are multiple combined with non- agricultural. Most agricultural activities are not defined as “economically active employment” in national accounts of the country.

2.0 Women' Involvement in Anwara and Banskhal

The project Exploring Alternative Farming Practices to End Hunger in Bangladesh other wise known as Ending War On Hunger (EWOH) selected Anwara and Banskhal Upazilas to intervene agroecological practices in the face of explosive growth of use of fertilizer and pesticide that has become a threat to human health and environment. The project objectives were aimed at creating awareness and introduction of alternative farming practices by farm groups of Participatory Action Researchers (PAR) of both men and women in the unions of Gundip and Juiry (Anwara Upazila) and Sorol and Joldi (Banskhal Upazila). Despite the fact that out of 500603 adult populations engaged in agriculture in Chittagong district, and 29.6% (BBS, 2013) women are engaged in agriculture, no women were willing to join the PAR group. The reason was that the women folk were not allowed to join the men in the same locality and ready to discuss. In several

occasions when women were called to trainings outside the village or even in Dhaka city, they joined the men either in a group or with their spouse (Pictures 1-4).

The project therefore could get participation of women in the training programmes and seminars. The Project Coordinator and the team however made frequent visit to the homes of women and discussed issues that were related to organic farming. They were enthusiastic and agreed on what they were doing on organic farming. The men also stated that the women cooperated in compost making and other farming activities like vegetable gardening, poultry, and livestock rearing.

3.0 Survey Result

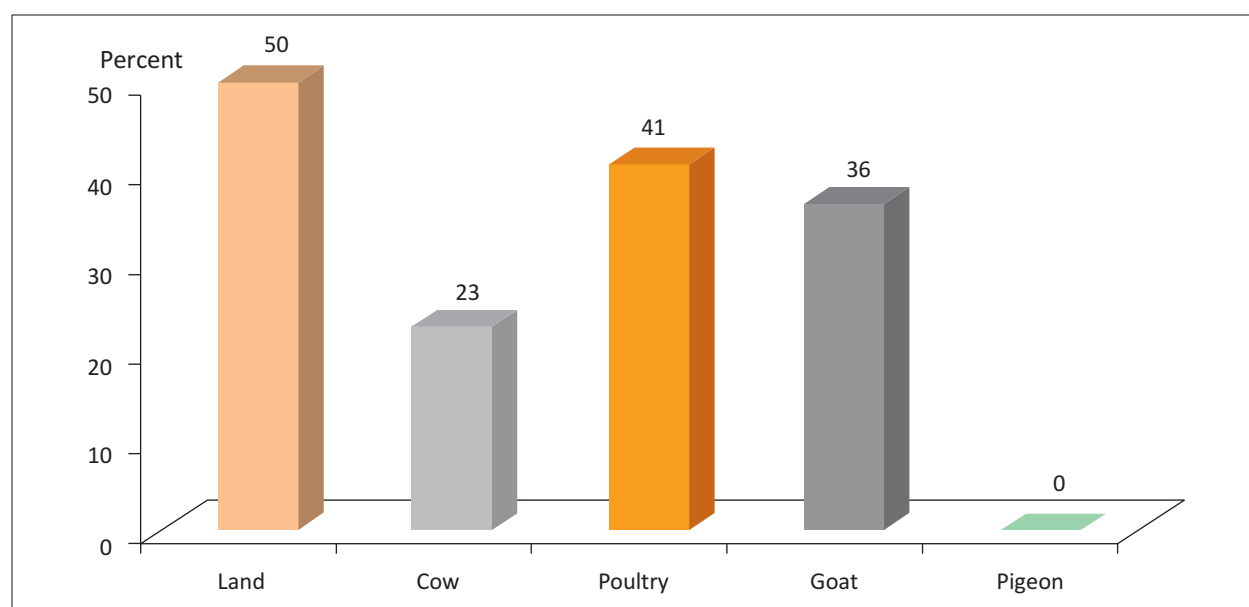
3.1 Role of women in the PAR Groups

A small survey was done to find out the activities done by women of the PAR member's families. A total of 24 relevant questions were asked to get an overview of the involvement of women besides thier age old responsibility of household work and raising children. The survey was carried out in Anwara in the Gundp and Juiry unions. Home visits were made by the animators and data derived from primary open ended questions. The results show 70 responses which means that a single person were doing more than one job.

3.2 Ownership of property

The survey showed that 50% of the women questioned owned land. The average size was observed to be 43 decimals. They specially owned animals such as cow, goat, poultry. They did not have any pigeon (Figure 1).

Figure 1: Ownership of Property and animal products by women of PAR families



3.3 Women in Decision making in Agriculture

Women do make decisions in the family level not usually perceived. They grow crops, decide to consume for the family and even sell part of it (Table 1).

Table 1: Women in Decision making in Agriculture

Work done on own decision	Crop	Animal Product
Grow, consume and sell on their own	Papaya, bean, tomato, vegetables	Cow, goat, duck, hen, egg

3.4 Women in Agricultural Activity

The highest responsibility women has is in rice processing. About 50% of the women are involved in drying, cleaning and preserving paddy (Table 2).

Table 2 Women in Agricultural Activity

Activity	Percent	Type of work
Planting	18	Rice neem tree fruit, lemon, guava.
Processing	50	Dry and process paddy
Organic Farming	0	Help husband in making compost, Need education

3.5 Other activities done by women

Besides household chores and agriculture women were also involved in other activities that brought home some income. It was found that 45 percent of the girls go to school and colleges for study. Some 9% make handicrafts and equal percentages have jobs or do nothing at all. Besides 27% are involved in household activities (Table 3)

Table 3: Other Activities done by women of PAR families.

Other Work	Percent
Politics	0
Study	45
Job	9
Do nothing	9
Household work	27
Handicraft	9

4.0 Pictures of women's participation

Picture 1: Women's participation in Residential Training Programme



Picture 2: Women's Participation in meetings and seminars



Picture 3: Women's Participation in Agroecological Training



Picture 4: Women's participation in field training



Picture 5: Home visit to see achievement of women



Conclusion

Women's traditional role has remained according to the country trend in both Anwara and Banskali. However, being underdeveloped with very little programmes to improve their way of life, a few are coming out of their home. Anwara and Banskali are also conservative areas, menfolk not encouraging women to work outside or even in their own farms. However, our survey and study show their involvement in activities inside the homestead, mostly in rearing animals and paddy processing.

The project exploring Alternative Farming Practices to End Hunger in Bangladesh has however created a slight impact on overcoming the shyness and will to know what was going on. This initiated attendance of a few women in events outside their village. Although the scope of the study did not allow in-depth investigation of the reasons of their introvert behavior, it appears women are not encouraged to join and be partners in their livelihood activities outside the home.

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