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Baseline and Midline Final Report
CREL Beneficiary Survey

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ACRONYM

CREL	Climate-Resilient Ecosystems and Livelihoods
GoB	Government of Bangladesh
FELC	Financial and Entrepreneurship Literacy Center
IR	Intermediate Results
SLG	Saving Loan Group
SoW	Scope of Work

EXECUTIVE SUMMARY

Background

Natural resource extraction from natural sources like forests, wetlands, rivers, and sea by the inhabitants living around the areas where these resources are available is a very common custom in Bangladesh. The livelihood of the people especially poor and landless is dependent on this natural resource extraction. However, as population increases, intensification of this extraction enhances, resulting in scarcity of the resources. Hence, it becomes difficult for extractors to continue livelihood by depending only on extraction. Moreover, replenishment of these resources is a natural process that does not happen immediately, resulting in adverse climatic effect. Under this circumstance, alternative livelihood options are required for these resource extractors, which will reduce their dependence on natural resource extraction, as well as improve their livelihoods through increased income.

To address this issue, Winrock International and the partners, initiated implementing a project called 'Climate-Resilient Ecosystems and Livelihoods (CREL) project' to conserve ecosystems as well as creating alternative income sources in the protected areas of Bangladesh. They aim to improve governance of natural resources and biodiversity, and to increase resilience towards climate change through improved planning and livelihoods diversification. The project works on the four broad geographic areas/regions in Bangladesh targeting beneficiaries that are disadvantaged, poor/ultra-poor, women and youth who are dependent on natural resources. By the end of 2017, CREL targets to create a viable, diversified and climate-resilient livelihood for its 500,000 beneficiaries.

The Baseline and Impact Survey

As a part of assessing project's effectiveness and impact, CREL project hired Innovision consulting to conduct a sample survey to develop a database based on field visit of the survey locations. Broadly, these surveys would indicate changes in return from livelihood enterprises, changes in income, changes in natural resource extraction and dependency and adoption of improved farming/management practices.

The survey was conducted in all four zones (Sylhet, Chittagong, Khulna and Cox's Bazar) where the project is being implemented. Beneficiaries were selected from all four trades i.e. Horticulture, Aquaculture, Handicrafts and Poultry/Duck. The data was collected through 'Recall' method. The sample size of the survey was 1,006 representing a population of 14,723 beneficiary households. The project database (CrelLink) used for sample frame and representativeness was ensured through selecting samples randomly from the survey locations. The sample size of trades, gender and zones were proportionate to the universe (the project database).

The questionnaire was provided by the client and it consisted of:

- Demographic Information of the beneficiaries
- Information on food consumption
- Livestock owned
- Details of cost and income from respective trades
- Use of technology/management practices
- Wild resource collection
- Income from other Sources including income from manual/physical work, renting equipment, salaried jobs and so on.

The household data collection conducted during 24th September – 10 October 2016.

Survey Findings

In this part of the report we have described summary findings strictly based on the information collected from the survey. We have followed the order in which questions are presented in the questionnaire to outline the survey findings.

Food Consumption

The number of households suffered from food deficiency has reduced noticeably from baseline to impact. Since, in most of the cases, beneficiaries' income from the trade for which they are associated with the project has increased, this seems to have helped beneficiaries to exonerate them from food deficiency.

In general, children appear to have received more foods than their adult counterparts of the households in the crisis time. Between male & female children, beneficiaries' disposition of allotting more food for male children seems to have changed in favor of female children from baseline to impact. Nevertheless, it is very likely that the responses were influenced by the existence of gender uniformity of the children in the households or gender of the younger children of the households.

Livestock owned

Incidence of possessing livestock by households was universal across trades. The beneficiaries were asked about livestock rearing for the year 2014-2016. The data was taken for four points of time. These were 1st January 2014, 31st January 2014, 1st July 2015 and 30th June 2016. Chicken is the most common livestock possessed by the beneficiaries. Other mentionable livestock owned by the beneficiaries were Duck, Goat and Cow. Female members of the beneficiaries' households were found to be owned the livestock in majority of the cases. Joint ownership on livestock was also noticed. As finding suggests, the member who took care of livestock had the authority to sell them also and in both cases, preponderance of female members of households was observed as compared with their male counterparts.

Change in Net Income of Four Trades

Net income from respective trades of more than half of the total beneficiaries (59.4%) increased in impact over baseline. The net income was calculated after deducting cost of production from total sales (value of own consumption+ sales value). Among four trades, the increment was found highest among fish farmers (67.1%) followed by handicrafts (65.4%), poultry (55.4%) and horticulture (53.6%). Interestingly, among four trades, the lowest number of horticulture beneficiaries was found to be able to increase income but, the increment in average income per beneficiary was found highest (BDT 4,651 annually) among beneficiaries of this trade. Among other three trades, the average annual increment was as follows: aquaculture (BDT 4,118), Poultry/Duck (BDT 1,222) and Handicrafts (1,140).

Adoption of Improved Technology

Practice of improved technology was increased by 11% across trades in impact over baseline.

In impact, the adoption of improved technology was found to be highest among aquaculture beneficiaries (77.8%) which were 61.4% in baseline whereas the adoption was found lowest among poultry/duck beneficiaries both in impact and baseline, 44.9% and 33.4% respectively. Among horticulture beneficiaries, 70.9% beneficiaries adopted improved technology in impact which was 6.8 percentage points higher than baseline (63.7%).

Extraction of Natural Resources

Overall, Natural Resource Extraction has reduced by six percentage point in impact (49.5%) over baseline(55.6%) and on average, the day wise involvement was reduced by 16 days (baseline 99 days/year, impact 83 days/year) per household in impact over baseline. The man-days reduction was found highest among horticulture beneficiaries (baseline 107 days, impact 85 days). For poultry/duck and handicrafts, the reduction was 15 days (baseline 99, impact 84) and 10 days (baseline 98, impact 88) respectively. The lowest reduction in day wise involvement was found among aquaculture beneficiaries (baseline 88, impact 76). Further analysis reveals that in total 12.9% (out of beneficiaries who extracted natural resources in baseline: 560) beneficiaries were no longer involved in extraction in impact whereas 2% beneficiaries (out of beneficiaries who extracted natural resources in impact: 499) started extraction in impact meaning they did not extract in baseline.

Manual/Physical Work

Across trades, income from manual work emerged as the main source of income for the household of the beneficiaries. It has been calculated that on average, 30%-35% income of total income was generated from this source for the households' income of the beneficiaries' horticulture, poultry/trade and handicrafts. For aquaculture, this source generated half of the total income of the households. It was observed from the responses that working as day labor in either the agriculture field or non-agriculture, pulling rickshaw/van, running petty trade etc. were the main manual/physical work for the family members of the beneficiaries. As expected, on average, considering both survey periods, male members' engagement was far more than female members. Across trades the average man-days involvement was found to be highest among beneficiaries of poultry/duck (baseline 242, impact 224) followed by horticulture (baseline 196, impact 187) and handicrafts (baseline 156, impact 144). The engagement was found to be lowest among aquaculture beneficiaries (baseline 128, impact 124). It should be noted for all cases the average man days have been reduced.

Other sources (renting equipment, salaried job etc)

It was found that 30%-45% households of the beneficiaries generated income from renting equipment or providing services of the equipment, selling other livestock (including own consumption), doing salaried job. This source accounted for generating 3%-5% income of the total average income of the households across trade.

Total average Income of households

Since, households of the beneficiaries had multiple income sources, we have calculated the total average income of the households to assess the contribution of income generated by primary source (the trade for which the beneficiary is associated with the project). We have considered total sample number of each trade for calculating average income. The table shows that the average monthly income of each trade has increased in impact over baseline except aquaculture. Also, % contribution of respective primary trades has increased in impact over baseline. However, the % contribution in total income from the primary trade is not so high to be considered as the main driver of the increased income in impact.

Trades	Sample Number	Baseline (Average)		Impact (Average)		Change in income	Change in %
		Income (yearly)	% contribution of primary trade	Income (yearly)	% contribution of primary trade		
Horticulture	295	91,784	18.3	104,566	19.4	12,782	13.9
Poultry/Duck	296	86,315	4.2	93,854	5.4	11,729	8.6
Aquaculture	158	71,633	12.5	69,031	18.2	-2,602	-3.6
Handicrafts	257	73,886	3.9	80,174	3.1	6,288	8.5

Women Empowerment

The women empowerment is a key issue of CREL project's cross cutting activities. Therefore, through three questions we have tried to assess the status of women empowerment of the study locations. These are: Control over selling of production of primary trade, control over income from other sources (renting equipment, salaried job etc.) and ownership of livestock and authority of selling the same. Except income from other sources, on all other issues, female members of the beneficiaries' households found to be playing greater role than their male counterparts. However, female members did not have control on the income generated from these sources in the most of the cases.

Conclusion

One of the main objectives of the project is to secure improved livelihood for the beneficiaries through creating alternative income sources which would be able to reduce the extraction of natural resources as beneficiaries would be more involved in the project selected alternative income generating activities. The collected data shows the positive indications that are induced by the project initiatives. Firstly, income from the primary trades of the beneficiaries has increased from baseline to impact except one exception. Secondly, the time beneficiaries used to spend on extracting natural resources has reduced. Lastly, more beneficiaries adopted improved technology in impact than that of baseline. However, we would like to shed light on some issues that might be helpful for the project's future execution:

- The average income from the respective primary trades of the beneficiaries though increased but, the contribution of the said income in the total income is still low for handicrafts and poultry/duck. This may be a reason of over 40% beneficiaries' households of these two trades stayed in the food deficit state.
- Extracting natural resource has been practiced by the beneficiaries for years. It is difficult to keep them away from this habit in a short span of time. Albeit, the project successfully reduces the participation of the beneficiaries in the extraction. Now, if beneficiaries cannot earn expected money from the primary trades, the number of days for extracting natural resources may be increased. It should be noted here that income from this source was found to be higher than the income from two trades, handicrafts and poultry/duck.
- Adopting improved technology is inevitable for generating expected income from the primary trades especially in the project implementation areas. In general, the income from primary trades was found to be higher in the zones where majority of the beneficiaries had adopted improved technology. Therefore, project should take initiative to find out why a sizeable portion of beneficiaries did not adopt improved technology and to ensure they will practice the same in the future.
- It has been observed that majority of the beneficiaries engaged in cultivating horticulture or rearing poultry/duck when these two were not their primary trade. A small portion of these beneficiaries adopted improved technology. It may indicate that a self-initiated spillover effect is working here. This is helpful for project outreach and sustainability also. Project may filter out the beneficiaries who engage in other trades along with the primary trade and help them to adopt improved technology. It should increase the income from primary trade along with other trades further and would help to refrain beneficiaries from extracting natural resources in a great extent. Also, beneficiaries' dependency on doing manual/physical work which emerged as the main income source of the beneficiaries would be reduced.
- In rural settings, children participation in manual/physical work is very common. The data reveal that across trades, in majority of the cases, family members of the beneficiaries involved in manual/physical work for earnings. We are assuming that the incidence of children's participation in these activities is there. Since, ensuring improved livelihood system for beneficiaries is an agenda of the project, project should investigate the issue and upon findings, if required, should take appropriate measures on reduction of beneficiaries' dependency on manual/physical work.

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1. BACKGROUND

1.1 About WINROCK

Winrock International is a nonprofit organization that works with people in the United States and around the world to empower the disadvantaged, increase economic opportunity, and sustain natural resources as stated in its official website. Winrock’s missions are to match innovative approaches in agriculture, natural resources management, clean energy and leadership development with the unique needs of its partners. In Bangladesh, Winrock is implementing a project called Bangladesh’s Climate Resilient Ecosystems and Livelihoods (CREL). The project is funded by USAID, Bangladesh.

1.2 CREL Project

Traditionally, rural inhabitants in Bangladesh relied on the resources extracted from natural sources like forests, wetlands, rivers, and sea for their livelihood. Till date, livelihood of the poor, especially, those having limited or no access to land is still dependent on these resources. However, the increase in population means more extraction of these resources. Hence, relying only on natural resources for livelihood has become difficult for the resource extractors. At the same time, due to excess resource extraction, the sources are not being replenished naturally, resulting in adverse climactic effect. Under this circumstance, alternative livelihood options are required for these resource extractors, which will reduce their dependence on natural resource extraction, as well as improve their livelihoods through increased income.

From March 2013, Winrock International and the partners have started implementing the Climate-Resilient Ecosystems and Livelihoods (CREL) project to conserve ecosystems and protected areas in Bangladesh. They aim to improve governance of natural resources and biodiversity, and to increase resilience towards climate change through improved planning and livelihoods diversification. The project works on the four broad geographic areas/regions in Bangladesh targeting beneficiaries that are disadvantaged, poor/ultra-poor, women and youth who are dependent on natural resources. By the end of 2017, CREL targets to create a viable, diversified and climate-resilient livelihood for its 500,000 beneficiaries.

Key Drivers
<ul style="list-style-type: none">• Sustainability• Resiliency to climate change• Natural resource Management• Scaled-up impacts

The project activities bring together women and men from resource-dependent households in targeted landscapes, civil society groups, and the Government of Bangladesh (GOB) to collectively conserve, protect, and manage forests, wetlands, and critical ecosystems. This engagement at multiple levels – from people at the grassroots to key decision-makers at the policy level – is underpinned by targeted initiatives that support policy reforms, institutional strengthening, and alternative livelihoods and incomes for the poorest and the most vulnerable.

GoB Partners of CREL
<ul style="list-style-type: none">• Ministry of Environment and Forest• Ministry of Fisheries and Livestock• Ministry of Land• Department of Fisheries• Department of Environment• Bangladesh Forest Department

The objective is to create an enabling environment for sustainable communities and ecosystems, by improving capacity to co-manage natural resources, adapt to climate variability and change, and diversify livelihoods.

As mentioned above the project beneficiaries are impoverished resource-dependent people who are, for various reasons, not in a position to protect natural resources on which their livelihood depends and unable to adapt to the vagaries of changing climate. It indicates that it is imperative to address

the local needs and vulnerabilities of the inhabitants of such areas in a way that would enable to create different income sources for the inhabitants as an endeavor to reduce dependency on extracting natural resources as well as create awareness and proper plans to preserve the natural resources. Hence, the project activities have been designed to implement market-based climate resilient livelihood solutions and at the same time, initiatives are taken to improve co-management¹ capacity to better protect and conserve natural resources.

The project has adopted a value chain based and market-driven approach to explore different livelihood options that can generate increased incomes for its beneficiaries. This approach enables beneficiaries to integrate to the rapidly growing subsectors and value chains that offer employment opportunities and income. The project supports focus on the following issues:

- *Increasing knowledge about marketing and production*
- *Access to appropriate technology and quality inputs*
- *Linking smallholder producer groups to the private sector, value chains and credit if required.*

These above mentioned supports have been given to the beneficiaries through a training called FELC course. The FELC (Financial and Entrepreneurship Literacy Center) course also known as signature training of CREL project, aims to improve marketing, production, and enterprise development capabilities. The participants are mainly women who are functionally illiterate. They attend two hours per day and 6 days a week for 7 months. They are taught basic math, and how to start an enterprise. Also integrated into the curriculum is information about biodiversity conservation, natural resource management, climate change, and gender equality, as well as life skills, health and nutrition, revolving funds and micro-credit, and issues of gender-based violence.

Intermediate Results (IR) of Result Framework

1. Improved Governance of natural resources and biodiversity
2. Enhanced knowledge and capacity of stakeholders
3. Strengthened planning and implementation of climate resilient NRM and adaption
4. Improved and diversified livelihoods

FELC courses have been conducted in over 183 locations, benefiting 3419 women and 185 men². CREL also helps to develop market linkage for FELC graduates who want to increase production and sales, and/or develop small-scale businesses or enterprises. The project also facilitates connections with micro-finance groups and provides information on ways to establish revolving funds/savings and loan groups (SLGs) to help the beneficiaries who suffer from lack of capital. Besides, CREL also acts as a bridge to connect beneficiaries with Local Service Providers (who provide input-supply services, agricultural and technological knowledge, and market information to CREL beneficiaries and production/cluster groups as well as other local farmers), private sector businesses, governmental and non-governmental organization for creating job opportunities for its beneficiaries especially youth.

The project is executing a strong monitoring and evaluation system that helps the project to monitor progress during project implementation period. In addition, the project has developed a baseline for its different dimensions, socio-economic, biophysical and institutional performance that included a database where basic demographic information of all beneficiaries has been included. In addition, CreLink, a web-based M&E system, has been developed to capture real time data on implementing

¹ Co-management is a collaborative partnership between the Government of Bangladesh (GOB) and local communities to conserve and protect natural resources.

² Project documents

activities. This enables the M&E team of the project to provide feedback and technical support to site members and regional teams on issues that may have adverse effect on the project activities.

1.3 Project Locations

The project is being implemented in four regions. These regions are northeast region, Chittagong region, Cox’s Bazar region and Southwest region. The details can be seen from the following diagram:

Northeast Region	Chittagong Region	Cox’s Bazar Region	Southwest Region
1. Madhupur	10. Baroiyadhala	17. Fasiakhali	24. Sharonkhola
2. Satchari	11. Hazarikhil	18. Medhakachapia	25. Chandpai
3. Rema-Kalenga	12. Halda River	19. Sonadia ECA	26. Dacope-Koyra
4. Lawachara	13. Kaptai	20. Himchari	27. Munshigonj
5. Hail Haor	14. Dudpukuria- Dhopachari	21. Inani	28. Tengragiri
6. Hakaluki Haor	15. Nijhum Dweep	22. Teknaf	
7. Khadimnagar	16. Chunati	23. St. Martins Island	
8. Ratargul Swamp Forest			
9. Tanguar Haor			

1.4 Selected Sectors

After analyzing comparative advantages, environmental feasibility, production easiness, value chain and market demand, the project has selected four sectors (henceforth referred as trade) on which they will work to create alternative livelihoods and income generating options. These sectors are further divided into different sub-sectors which can be seen from the following diagram:

Aquaculture	Horticulture	Livestock	Handicrafts	Ecotourism
1. Tilapia 2. Carp	1. Vegetables 2. Fruits 3. Capsicum 4. Strawberry	1. Chickens 2. Ducks	1. Embroidery 2. Cap Sewing 3. Tailoring 4. Handloom 5. Net Making	1. Eco-guide training 2. Eco-tourism enterprises

1.5 The Survey Context

As a part of assessing project’s effectiveness and impact, CREL project hired Innovision consulting to conduct a sample survey to develop a database based on field visit of the survey locations. Broadly, these surveys would indicate changes in return from livelihood enterprises, changes in income, changes in natural resource extraction and dependency and adoption of improved farming/management practices. The survey was carried out based on ‘Recall’ method i.e. collecting data from beneficiaries for both baseline and impact in one go. The beneficiaries were asked questions for two time periods. The table below shows the timeline used for collecting both periods:

Trades	Baseline	Impact
Horticulture	1 st January 2014 to 31 st December 2014	1 st July 2015 to 30 th June 2016
Livestock		
Handicrafts		
Aquaculture	1 st January 2014 to 31 st December 2014	1 st January 2015 to 31 st December 2015

The data was collected from the beneficiaries of Batch – 2 (aquaculture and handicrafts) and Batch-3 (horticulture and poultry/duck). The total number of total beneficiaries of these sectors from the respective batches is 14,723. The project has prepared a database including basic demographic information of all of its beneficiaries. This database was used as a sample frame for this survey. The table below shows distribution of beneficiaries from the aforementioned sample frame who were considered for the survey:

Table 1 : Distribution of beneficiaries based on beneficiary database

	Aquaculture (batch 2)		Handicrafts (batch 2)		Horticulture (batch 3)		Poultry and Duck (batch 3)		Total
	Female	Male	Female	Male	Female	Male	Female	Male	
Chittagong	48	218	208	8	158	395	371	102	1,508
Cox's Bazar			553	25	1,565	584	394	60	3,181
Khulna	5,331	599	395	3	1,501	51	591	54	8,525
Sylhet	137	343			121	255	341	312	1,509
Total	5,516	1,160	1,156	36	3,345	1,285	1,697	528	14,723

Sample was calculated for each cell (region*trade*gender) of the above table where beneficiaries are available. The detail of sample calculation and survey implementation has been described in the methodology section and survey implementation section below.

2 METHODOLOGY

2.1 Research Design

The survey was conducted by following quantitative method. A stratified systemic simple random sampling model was considered. The stratification was done on region and trade. Data was collected by using Face to Face interview technique through PEPI method and a semi structured questionnaires being used for conducting interviews. The survey covered all locations where the project is being implemented.

2.2 Sample Size Calculation

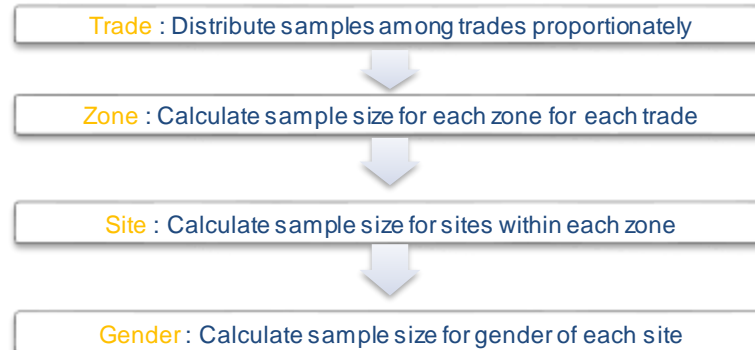
The sample size had been determined using the following formula (taken from FtF handbook):

$$n_0 = N^2 * z^2 * s^2 / MoE^2$$

After plotting the required parameters, the final sample size has been fixed after applying Finite Population Correction factor³. The final calculated sample size was 1003.

2.3 Sample Distribution

The samples had been distributed proportionately among regions, sites, trades and gender. The following steps were followed:



The proposed sample distribution and achieved sample distribution can be seen from tables below:

Table 2 : Proposed and achieved sample distribution

	Aquaculture				Handicrafts			
	Proposed		Achieved		Proposed		Achieved	
	Female	Male	Female	Male	Female	Male	Female	Male
Chittagong	10	47	12	45	72	3	73	4
Cox's Bazar					77	3	81	
Khulna	68	8	65	9	98	1	98	1
Sylhet	12	14	7	20				
Grand Total	90	69	84	74	247	7	252	5

³ $n = 1 / (1 + (n_0 / N))$

Table 3 : Proposed and achieved sample distribution contd...

	Horticultural				Poultry/Duck			
	Proposed		Achieved		Proposed		Achieved	
	Female	Male	Female	Male	Female	Male	Female	Male
Chittagong	25	59	27	55	70	19	70	21
Coxs Bazar	77	28	76	31	67	10	66	12
Khulna	26	1	26	2	30	3	30	3
Sylhet	27	55	28	50	49	44	48	46
Grand Total	155	143	157	138	216	76	214	82

Table 4 : Proposed and achieved sample distribution contd...

	Total		Total		Grand Total	
	Proposed		Achieved		Proposed	Achieved
	Female	Male	Female	Male		
Chittagong	177	128	182	125	305	307
Coxs Bazar	221	41	223	43	262	266
Khulna	222	13	219	15	235	234
Sylhet	88	113	83	116	201	199
Grand Total	708	295	707	299	1003	1006

The above tables show some discrepancies in numbers between proposed and achieved samples. We have discussed the possible reasons of these differences in details under '*Problem Faced during Field Visits*' chapter.

2.4 Sample Selection

Required number of samples was selected from the database systematically. In this procedure However, for each cell, i.e. region*trade*site*gender, an interval was calculated (universe/sample) and then sample was selected based on that interval. For each cell, 5% extra samples were generated randomly as replacement of unsuccessful interviews. We presumed that a few beneficiaries may not be available during survey and waiting for these respondents till their availability may cost valuable times. To avoid such situation, the enumerators would select beneficiaries from the extra list given to them (applying replacement method). Nevertheless, this replacement would have been applicable only if a beneficiary was not available for interview even after making three attempts to convince them.

2.5 Limitations

The main limitation of methodology was not to opt for qualitative assessment along with quantitative assessment. Stick only on quantitative assessment eliminates the probability of getting answers on some issues which need to be addressed properly such as why a portion of households did not adopt improved technology, why some beneficiaries were not involved in primary trades or determining status of women empowerment. The quantitative assessment leads to answer 'what happens' but for some cases answers of 'why happens' is also required. Hence, we could not draw clear conclusions on these issues.

3 SURVEY IMPLEMENTATION

The survey has been executed keeping close collaboration with CREL team. Without the supervision of the CREL local and central team, successful conduction of the field work would have been difficult. The field supervisors used to keep regular contact with CREL local team. The project instructed and accommodated with one internal representative with each field team. The representative kept every possible step to get the selected beneficiary available during interview time.

3.1 Questionnaire Designing

The project team provided the questionnaire where minimum modifications were done. The conduction of field test was considered unnecessary since the CREL team used the questionnaire for a baseline survey. The questionnaire consisted of the following issues:

- Demographic Information of the beneficiaries
- Information on food consumption
- Livestock owned
- Details of cost and income from respective sectors
- Use of technology/management practices
- Wild resource collection
- Income from other Sources including income from manual/physical work, renting equipment, salaried jobs and so on.

3.2 Enumerators and Field Supervisors Recruitment

Eight teams (two from each zone) were deployed to collect data from beneficiaries. Each team comprised of one supervisor and 5/6 enumerators. As suggested by CREL team, 50% of the enumerators were recruited from different survey locations. A three-day long training session was administered where all enumerators were trained by field manager and research coordinator of Innovision. Senior officials of CREL project attended the training session and gave valuable instructions. The number of enumerators attended in the session was 45. After, taking a mock test we selected 42 enumerators, 12 from Cox's Bazar, keeping six in each team and five in each team of other zones. In total, eight supervisors and 42 enumerators were recruited for data collection. All of the enumerators had graduation degree and also, had experiences working in rural settings.



Figure 1: Training Session at INNOVISION

3.3 Quality Control Mechanism

We have implemented quality control mechanism in three ways:

- Accompanied with enumerators by supervisor's/field manager/Quality controller
 - **This had been done for 20% of total samples**
- Physical Call back by supervisors
 - **This had been done for 10% of total samples**
- Checked filled in questionnaire by coding team
 - **This had been done for all filled in questionnaires**

Additionally, the back checked questionnaires had been labeled clearly for further identification, if required.

3.4 Output Generation

Data entry was done by our trained and experienced data entry operators. A data entry form was generated using Fox-pro for punching data with adequate run time checks to capture entry errors. After completing data entry, data cleaning phase started. The cleaning phase was executed by using several Fox-pro based programs and running SPSS syntaxes. A data cleaned data file has been prepared with appropriate value and variables labels. Tables of every questions have been generated after due consultation with CREL M&E team. A summary table has been given below showing implementation activities with dates:

Table 5 : Summary of Survey Implementation Activities

Particulars	Start Date	End Date
Field Training	18.09.2016	20.09.2016
Field Work	24.09.2016	12.10.2016 ⁴
Data coding and Cleaning	01.09.2016	14.10.2016
Initial Finding shared		16.10.2016

3.5 Problem Faced during Field Execution

It is understood that the project is being implemented in ecologically challenged areas. Hence, travelling these areas is not easy as compared with other parts of the country. In few cases, enumerators had to spend a whole day for taking one interview because of communication problem. Incidences like fear of being mugged or facing snake with extended hood had been noticed also. Apart from this, we found some problems related to sample frame and these problems led to create discrepancies in numbers between proposed samples and achieved samples. These are:

1. Wrong name entered
2. Wrong trade entered
3. Wrong gender entered
4. Respondent received training but engaged themselves on other sectors
5. CREL did not provide training on the subject preferred by the beneficiaries, hence they did not continue working with the project

Overall, 66 samples (around 7%) needed to be replaced, highest being from handicrafts sector and lowest from poultry and duck. The table below shows the detailed distribution:



Figure 2: Conducting Field Work

⁴ The data collection was finished by 6th October. However, in the cleaning phase, seven beneficiaries of Hakaluki Char were found to have not been interviewed.

Table 6 : Distribution of alternative samples

Trade	Chittagong	Cox's Bazar	Khulna	Sylhet	Total
Aquaculture	3		10		13
Handicrafts	5	16	9		30
Horticulture	5	7	1		13
Poultry and Duck	6	1		3	10
Total	19	24	20	3	66

4 SURVEY FINDINGS

We have divided survey findings into three (03) main chapters.

- **The Critical Four:**

This chapter will provide findings on Income, Natural Resource Extraction, and Adoption of improved Technology. It is understood from SoW that these are the driving factors on which project's success is largely dependent. Besides, Women Empowerment status would also be discussed in this chapter.

- **Trade wise analysis:**

- Horticulture
- Aquaculture
- Poultry/Duck
- Handicrafts

In these chapters, detailed interpretation and analysis has been given for all the questions asked to the respondents during interviews.

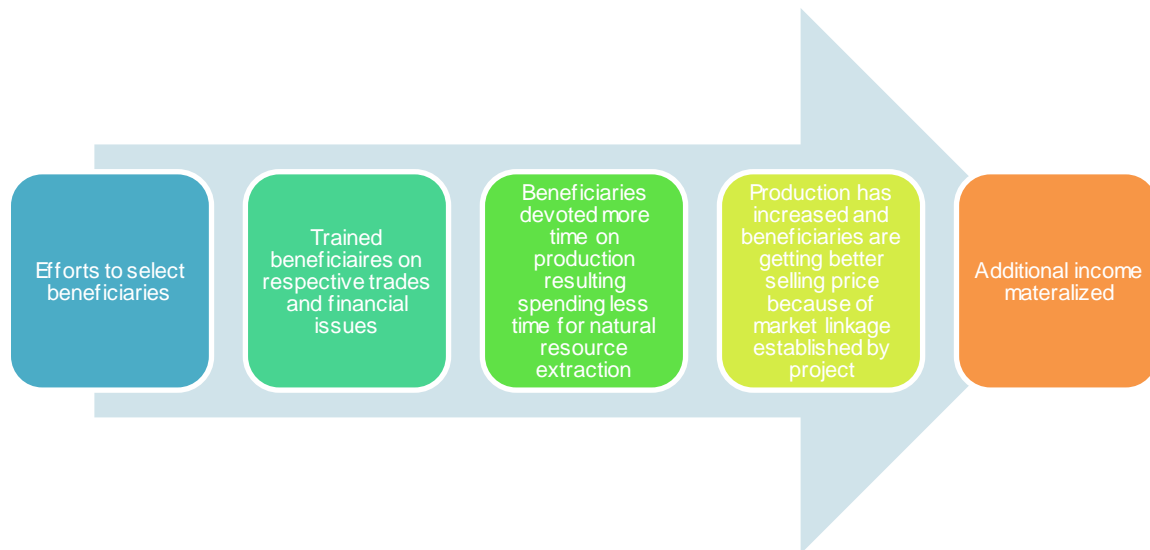
- **Conclusion**

In this chapter, survey results have been described with explanations- why these findings are matter or if these findings are satisfactory in relation to the survey objectives etc.

4.1 The Critical Four

Before describing the survey findings on status of income change, extraction of natural resources and using of improved technology, we would like to express here our assumption on how project activities would be able to secure an improved sustainable livelihood for the beneficiaries. We assume the following theory of change outlined in Figure -2 that is implicit in project's activities like giving training on income generating activities, establishing market linkage, ensuring credit facilities and so on. We understand that these activities would not only benefit beneficiaries by generating additional income but also, reduce their dependency on extracting natural resources. We have not included status of women empowerment in the chain since the issue would indicate qualitative shift that brings project activities for women beneficiaries and also, it is not directly involved with income generating activities.

Figure 3 : Theory of change

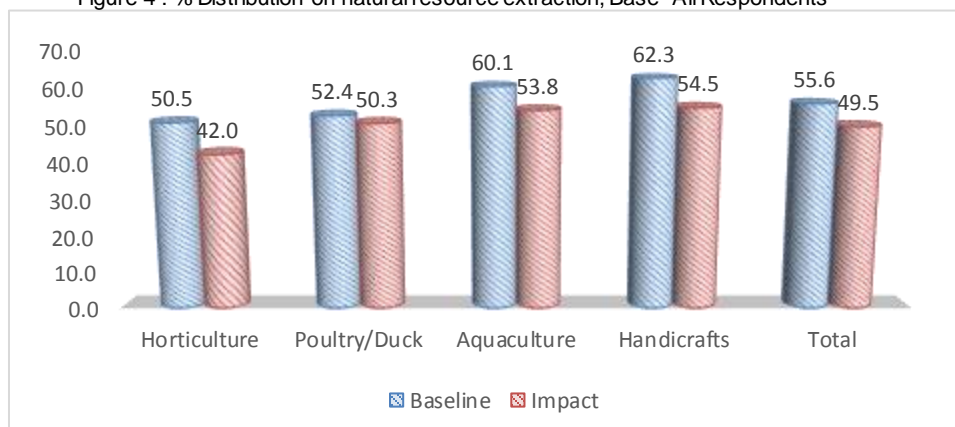


4.1.1. Extraction of Natural Resources

One of the main agendas of the CREL project is to reduce dependency on natural resource extraction of the beneficiaries. However, in general, this is possible only if beneficiaries have available alternative income generating sources where they can spend more time for earnings. Hence, the findings related to natural resources extraction of this survey would give us indication on efficacy of project's activities.

The data reveals that the practice of natural resource extraction of beneficiaries has reduced by about 6% as in baseline about 56% beneficiaries involved in this extraction whereas in impact, it stood at 50%. This reduction was found highest among beneficiaries of horticulture and lowest among poultry/duck. Same phenomenon was observed among different survey locations. *Details can be seen from Table-3 of Annex-1.*

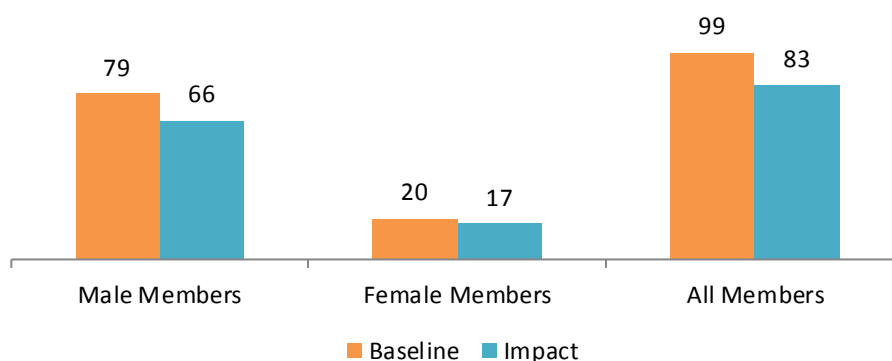
Figure 4 : % Distribution on natural resource extraction, Base- All Respondents



The top three activities in this regards were fishing, collecting fuel wood and collecting fodder. However, among fish farmers collecting shrimp PL was found to be popular.

The data reveals that average number of day involvement of family members in this regards has decreased by 16 days per household from baseline to impact. Male members of a household were involved more than female members for collecting resources and also, their involvement had decreased noticeably in impact over baseline. Involvement of female members decreased also, however not in a great extent.

Figure 5 : Average man-days involvement/per household



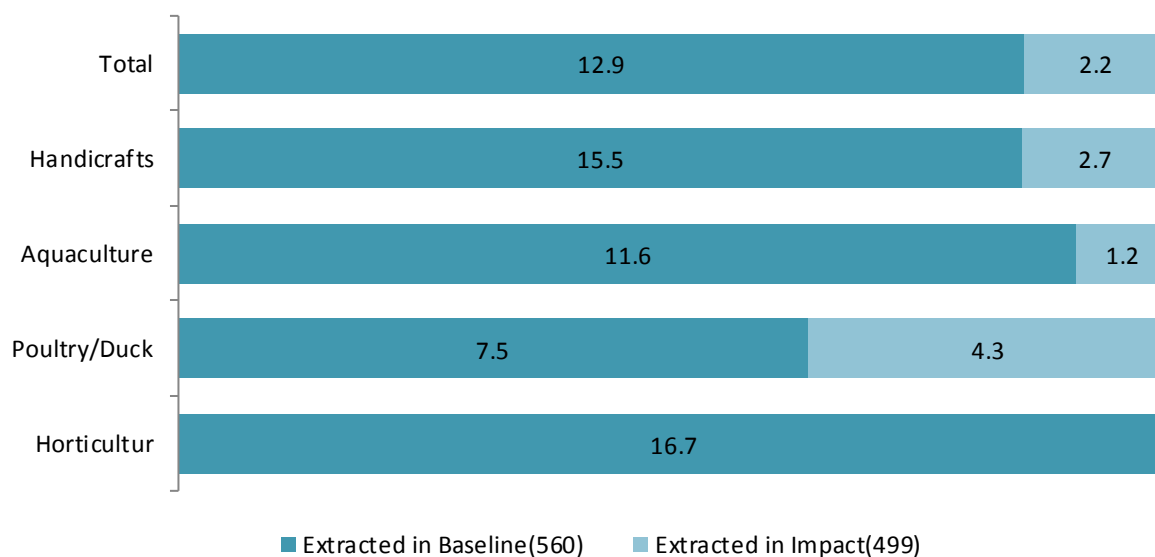
This reduction in involvement for extracting natural resources in terms of man-days has been observed in each zone for each trade, highest being in horticulture (22 days), and lowest in aquaculture (8 days).

Table 7 : Average man-days involvement per household by zone and trade

	Horticulture		Poultry/duck	
	Baseline	Impact	Baseline	Impact
Male Members	81	65	85	73
Female Members	26	20	15	11
All Members	107	85	99	84
Base- All Respondents	295	295	296	296
	Aquaculture		Handicrafts	
	Baseline	Impact	Baseline	Impact
Male Members	73	63	77	64
Female Members	15	13	21	24
All Members	88	76	98	88
Base- All Respondents	158	158	257	257

Further analysis shows that about 12.9% household who had extracted natural resources in baseline left collecting natural resources, meaning these households did not collect natural resources during impact period. In contrast, only 2% household started collecting the same during impact period. It is noteworthy to mention that no new household from horticulture was found who started extracting natural resources during impact.

Table 8 : % distribution of households, involved in collecting natural resources for one time period

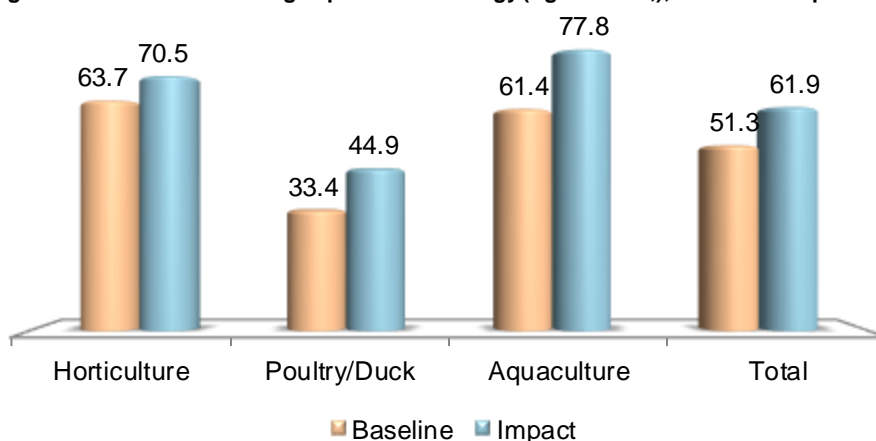


4.1.2 Adoption of Improved Technology

The project had worked with the beneficiaries in developing their skill to practice improved climate resilient techniques for horticulture and aquaculture beneficiaries. The project also conducted training on good practices relating to poultry/duck rearing with beneficiaries of this trade. Hence, a detailed set of questions were asked to beneficiaries to find if they adopted and implemented the same while cultivating or rearing. It is mentionable here that no such training was arranged for handicrafts beneficiaries because of the nature of this trade, however, they did receive training from Pebble child on making handicrafts.

The data show that about 62% of beneficiaries across trades had adopted improved technology for cultivating/rearing, resulting in a growth of 11% over baseline. The adoption was found to be highest among fish farmers (77.8%) with growth of 16.4% over baseline. Less than half (44.9%) of the poultry/duck beneficiaries adopted improved technology, however, it still yielded a growth of 11.5% over baseline. This growth was found to be lower among the horticulture farmers (6.8%).

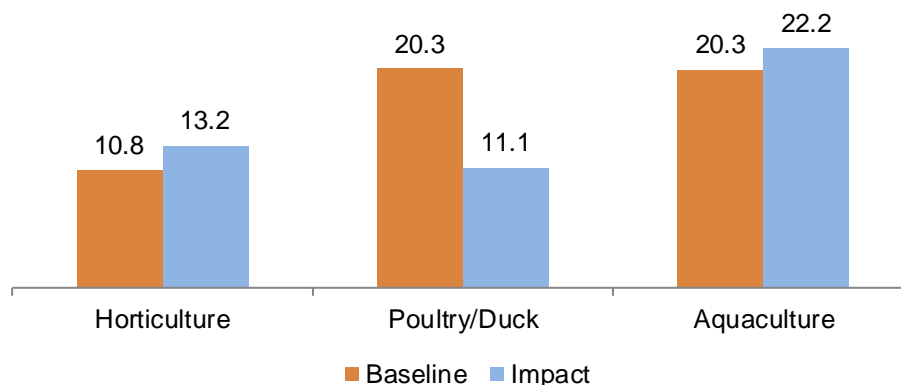
Figure 6 : Incidences of using improved technology (figures in %), Base : All Respondents



One concerning issue here is that though data show positive growth in adopting improved technology from baseline to impact, for each trade 10%-20% beneficiaries had not used any technology at all. Noticeably, number of non-practitioner of poultry/duck has reduced in impact over baseline by about

9% however this portion shows slight growth among beneficiaries of horticulture (2.4%) and aquaculture (1.9%).

Figure 7 : % distribution of beneficiaries who did not adopt any technologies, Base – All Respondents



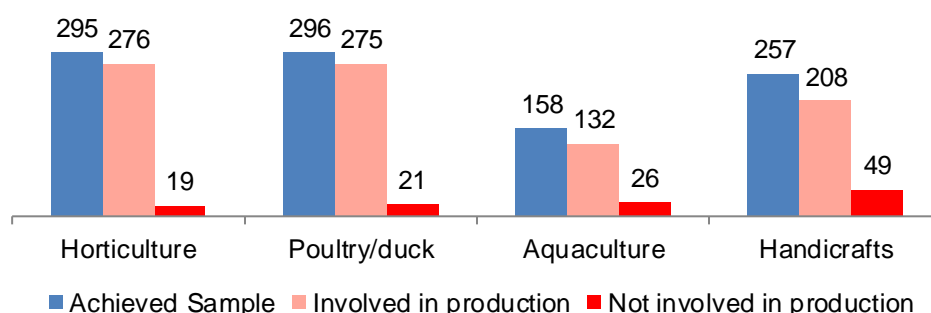
A detailed table with distribution of Top-5 improved technologies adopted by beneficiaries of each trade has been given in the Annex-1 (Table 6,7,8 and 9).

4.1.3 Change in Income

In this chapter we will discuss change in income from baseline to impact. We collected income data considering every source from where a beneficiary can earn. Initially, we will discuss on their earnings from the sector on which they received training from CREL. In the later part, we will discuss on total household income considering all sources.

The data shows that though overall 1006 beneficiaries were interviewed but 891 (89%) beneficiaries were involved in production for both baseline and impact. The trade wise distribution can be seen below:

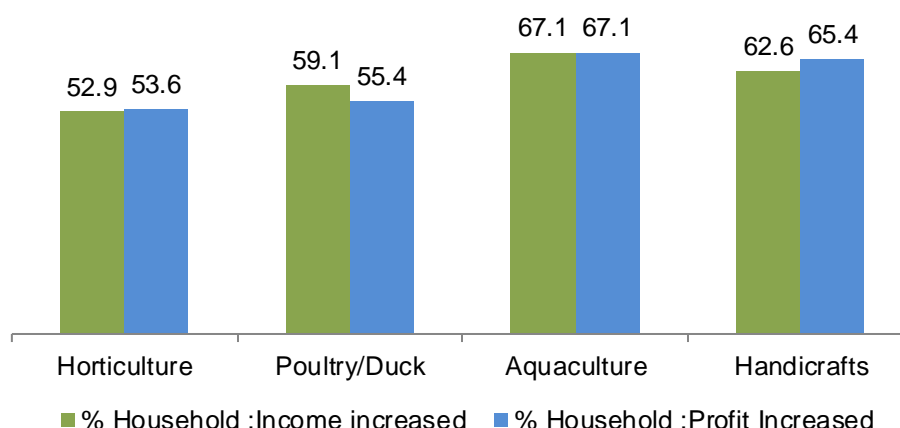
Figure 8: Distribution of achieved sample & involved in production, figures in number



The analysis of income was done based on beneficiaries who engaged in production for both baseline & impact. We have calculated both gross income (summation of own consumption value + sales value) i.e. income without considering production cost and net income or profit after deducting production cost from gross income to assess the program intervention.

According to the findings, irrespective of any trades, overall 59.4% beneficiaries were able to increase gross income and profit. Among four trades, the increment was found higher among fish farmers (67.1%) followed by handicrafts (62.6%), poultry (59.1%) and horticulture (52.9%). Similar trend can be seen with regards to profit as described by the following chart:

Figure 9 : % Distribution of profit and income by trades



Across zones, more than half of the beneficiaries of Chittagong from each trade were found unable to increase their income in impact period over baseline. Natural calamity may be a reason of this declination. However, further investigation suggests this was not the case. Hence, we assume that in some way implementation of project activities had adversely affected as field investigators of this zone claimed that project activities were not being administered in Halda and Kaptai. Project may consider further investigation to find out possible reasons for such declination and impose corrective actions. In case of other three zones, earnings of about 60% beneficiaries (for each zone) were found better in the impact than baseline with few exceptions. *Details can be seen in the Table 1 & 2 in the Annex -1.*

It has been observed that the average income of per household has increased by BDT 1,000-4,000 however, varied by trades. This average income increment was found highest in horticulture (BDT 4,197) and lowest in handicrafts. Nevertheless, in few cases, the average income was found to have decreased in impact over baseline.

Table 9 : Increment in Average Household gross Income and net income in Impact over Baseline

	Horticulture			Poultry/Duck		
	Sample	Income	Profit	Sample	Income	Profit
Sylhet	71	(1,836)	(1,187)	85	8213	3662
Chittagong	73	1,505	4,940	82	1481	821
Cox's Bazar	105	9,958	8,015	76	1047	(502)
Khulna	27	6,207	5,444	32	1320	1,187
Female	146	850	1,624	201	670	42
Male	130	8,833	8,646	74	10903	4550
Total	276	4,197	4,651	275	3423	1222
	Aquaculture			Handicrafts		
Sylhet	27	885	(1,870)		-	-
Chittagong	33	(4,809)	(3,053)	49	1,050	1,305
Cox's Bazar				70	6,973	3,964
Khulna	72	8,089	8,095	89	221	219
Female	78	7,259	8,095	204	1,200	947
Male	54	(1,627)	(2,396)	4	4,629	4,879
Total	132	3,472	4,118	208	1,449	1,140

As mentioned above, we collected income including every possible source from where a beneficiary can generate earn. Hence, we have taken an attempt to calculate total average monthly income per beneficiary. The objective of this exercise is threefold:

- To find out average total income increment of a household from baseline to midline,
- To find out change in come generating from extraction of natural resources
- To assess % contribution of income generating from the trade for which a beneficiary is associated with CREL (primary trade) in the total income

The income contribution of primary trades in the total income was found highest in horticulture(19.4%) followed by aquaculture (18.2%), handicrafts (7.8%) and poultry/duck(5.9%). All of these percentages were higher than that of baseline. As expected, the average income from natural resources of each trade dipped as can be seen by the tables below:

Horticulture					
	Baseline	% Contribution	Impact	% Contribution	% Change over baseline
Horticulture	16,815	18.3	20,323	19.4	20.87
Handicrafts	869	0.9	876	0.8	0.78
Poultry/Duck	4,716	5.1	4,702	4.5	(0.31)
Aquaculture					
Natural Resource	6,758	7.4	5,868	5.5	(13.17)
Manual/Physical work	52,015	56.7	60,401	57.6	16.12
Other Source	9,952	10.8	11,250	10.7	13.04
Remittance	657	0.7	1,146	1.1	74.23
Total Household Income-Yearly	91,784		104,567		13.93
Total Household Income-Monthly	7,648.7		8,714		

Base – All Respondents(295), figures in average

Poultry/Duck					
	Baseline	% Contribution	Impact	% Contribution	% Change over baseline
Horticulture	7,471	10.1	8,223	8.8	10.06
Handicrafts	454	0.4	495	0.5	9.04
Poultry/Duck	3,666	3.9	5,047	5.9	37.68
Aquaculture					
Natural Resource	8,357	8.8	7,952	7.6	(4.84)
Manual/Physical work	57,845	67.6	63,941	68.6	10.54
Other Source	6,766	7.4	6,562	6.6	(3.02)
Remittance	1,794	1.8	1,635	2.0	(8.85)
Total Household Income-Yearly	86,352		93,855		8.69
Total Household Income-Monthly	7,196		7,821		

Base – All Respondents(296), figures in average

Aquaculture					
	Baseline	% Contribution	Impact	% Contribution	% Change over baseline
Horticulture	8,157	11.7	(983)	-1.4	(112.1)
Handicrafts	44	0.1	111	0.2	154.7
Poultry/Duck	3,495	4.9	3,512	5.1	0.5
Aquaculture	9,202	12.5	12,990	18.8	41.2
Natural Resource	8,219	11.6	7,425	10.8	(9.7)
Manual/Physical work	34,911	48.5	37,197	53.9	6.5
Other Source	5,024	7.1	5,213	7.6	3.8
Remittance	2,582	3.7	3,563	5.2	38.0
Total Household Income-Yearly	71,633		69,031		(3.6)
Total Household Income-Monthly	5,969		5,753		

Base – All Respondents (158), figures in average

Handicraft					
	Baseline	% Contribution	Impact	% Contribution	% Change over baseline
Horticulture	2,149	2.9	4,377	5.5	103.7
Poultry/Duck	2,356	3.2	6,004	7.5	154.9
Handicrafts	2,858	3.9	2,470	3.1	(13.6)
Aquaculture	-		-		
Natural Resource	11,145	15.1	9,318	11.6	(16.4)
Manual/Physical work	44,011	59.6	47,203	58.9	7.3
Other Source	8,396	11.4	7,670	9.6	(8.7)
Remittance	2,972	4.0	3,132	3.9	5.4
Total Household Income-Yearly	73,886		80,174		8.5
Total Household Income-Monthly	6,157		6,681		

Base – All Respondents (257), figures in average

4.1.4. Women Empowerment

The women empowerment is a key issue of CREL project's cross cutting activities. Hence, the project took some extra efforts to recruit more women as beneficiaries. The sample frame used in the survey shows that 80% of the beneficiaries were women. Therefore, it is essential to analyze the issue from the findings of the survey data. But, as mentioned above, the survey was exclusively quantitative one and hence, explaining status of women empowerment from the survey findings is little difficult. However, we have tried to assess the issue by analyzing percentage growth of women beneficiaries in impact over baseline in the following issues:

1. Control over selling production of primary trade
2. Control over income from other sources

Besides, ownership of livestock and control of selling have also been considered. We are assuming that analyzing the aforementioned issues might give us enough evidence to draw conclusion on women empowerment.

Ownership of Livestock and Control over selling them

The responses on livestock ownership were recorded under different types of livestock owned by a household. The response shows that for a household, ownership differed for different type of livestock that creates difficulties for analyzing data. To simplify the analysis, we created an additional variable called 'Both' where responses of the households with multiple ownership on livestock were stored. The data show that number of ownership was higher for women beneficiaries than male beneficiaries across trades however, this can be greatly attributed to the excessive presence of women beneficiaries in the sample frame. As per findings, female members owned livestock of about one-fourth households of male beneficiaries (26%-29%) whereas such incident was found for lesser number of female beneficiaries (7%-15%). With regards to decision of selling, women beneficiaries were found to be taking decision in the majority of the cases as can be seen in figure -10.

Table 10 : % distribution of ownership of livestock by family members

	Horticulture			Poultry/Duck		
	Female Beneficiaries	Male Beneficiaries	Total	Female Beneficiaries	Male Beneficiaries	Total
Male Members	7.0	32.6	19.0	15.4	39.0	22.0
Female Members	70.7	29.7	51.5	67.3	25.6	55.7
Both	15.3	29.0	21.7	15.4	31.7	19.9
Base- All Respondent	157	138	295	214	82	296
	Aquaculture			Handicrafts		
Male Members	7.1	32.4	19.0	4.8	20.0	5.1
Female Members	77.4	25.7	53.2	75.0	40.0	74.3
Both	9.5	10.8	10.1	13.5	40.0	14.0
Base- All Respondent	84	74	158	252	5	257

Table 11 : % distribution of taking decision of selling livestock by family members

	Horticulture			Poultry/Duck		
	Female Beneficiaries	Male Beneficiaries	Total	Female Beneficiaries	Male Beneficiaries	Total
Male Members	3.8	13.0	8.1	1.4	7.3	3.0
Female Members	78.3	48.6	64.4	84.6	59.8	77.7
Both	10.8	29.7	19.7	12.1	29.3	16.9
Base- All Respondent	157	138	295	214	82	296
	Aquaculture			Handicrafts		
Male Members	2.4	9.5	5.7	2.0	20.0	2.3
Female Members	88.1	37.8	64.6	81.7	60.0	81.3
Both	3.6	21.6	12.0	9.5	20.0	9.7
Base- All Respondent	84	74	158	252	5	257

The data shows, in general, women members of households owned and controlled selling of chicken and duck in most of the cases regardless of the gender of the beneficiaries. However, for Goat and Cow, male members of the households owned and controlled selling of the same. *Details can be seen from table 4 & 5 of annex-1.*

Control over selling products produced by Beneficiaries:

The question was asked based on different products that the beneficiaries produced. If a beneficiary cultivated multiple types of crops/fish, multiple responses were recorded under this question. Therefore, similar to the previous live stock ownership analysis, we have created an additional 'Both'

variables to store responses of households where both male and female members took decision on selling products.

Female members' participation in taking decision of selling products has increased noticeably from baseline to impact as can be seen from the table below. However, this participation varies among trades. The impact data show that taking decision by both male and female members has increased among beneficiaries of Horticulture in a great extent. In contrast, this tendency decreased slightly in the impact period among Poultry/duck beneficiaries whereas disposition of taking decision solely by both male and female members has increased among beneficiaries of this trade. For other two trades, female members' involvement in decision making has increased in most of the cases.

Table 12: % Distribution of decision makers of selling crops/fish/handicrafts items/poultry

Horticulture						
	Female Beneficiaries		Male Beneficiaries		All	
	Base line	Impact	Base line	Impact	Base line	Impact
Male Members	73.8	40.3	96.6	68.2	84.7	53.4
Female Members	19.8	11.3	2.6	1.8	11.6	6.8
Both	6.3	48.4	0.9	30.0	3.7	39.7
Base- Those who sold	126	124	116	110	242	234
Poultry/Duck						
Male Members	14.9	15.3	21.7	32.8	16.6	19.9
Female Members	44.6	49.7	45.0	43.3	44.7	48.0
Both	40.6	34.9	33.3	23.9	38.7	32.0
Base- Those who sold	175	189	60	67	235	256
Aquaculture						
Male Members	90.4	41.5	98.1	57.1	93.6	47.7
Female Members	9.6	58.5	1.9	42.9	6.4	52.3
Both	0.0	0.0	0.0	0.0	0.0	0.0
Base- Those who sold	73	65	52	42	125	107
Handicrafts						
Male Members	0.0	10.9	7.5	7.5	4.8	0.0
Female Members	100.0	89.1	90.0	89.6	95.2	100.0
Base- All Respondent	27	46	40	67	21	82

Control over Annual Income:

This question was also asked based on different annual income sources and we have followed the same process described in the earlier two questions. The data reveal that male members controlled over this income in most of the cases. No mentionable difference was found in responses between baseline & impact in this regards.

Table 13 : Incidences of controlling annual income, figures in %

	Horticulture					
	Female Beneficiaries		Male Beneficiaries		All	
	Base line	Impact	Base line	Impact	Base line	Impact
Male Members	22.9	23.6	43.5	45.7	32.5	33.9
Female Members	11.5	13.4	3.6	4.3	7.8	9.2
Both	2.5	4.5	1.4	0.7	2.0	2.7
Base- All Respondent	157	157	138	138	295	295
	Poultry/Duck					
Male Members	27.1	20.6	19.5	23.2	25.0	21.3
Female Members	10.3	10.7	2.4	2.4	8.1	8.4
Both	0.0	0.9	1.2	0.0	0.3	0.7
Base- All Respondent	214	214	82	82	296	296
	Aquaculture					
Male Members	22.6	17.9	28.4	27.0	25.3	22.2
Female Members	2.4	6.0	2.7	2.7	2.5	4.4
Both	3.6	4.8	4.1	2.7	3.8	3.8
Base- All Respondent	84	84	74	74	158	158
	Handicrafts					
Male Members	29.4	27.0	20.0	20.0	29.2	26.8
Female Members	10.3	8.3	0.0	0.0	10.1	8.2
Both	1.6	3.6	0.0	0.0	1.6	3.5
Base- All Respondent	252	252	5	5	257	257

5 TRADE WISE FINDINGS

In the subsequent chapters we will discuss findings of some other issues that were collected from the beneficiaries. The discussion will be based on each trade. The endeavor is to present trade-wise brief findings through these chapters.

5.1 Horticulture



The sample size of the horticulture trade was 295. The number of male female beneficiaries was almost similar, 53.2% being male beneficiaries and 46.8% female. The average age of the beneficiaries was found to be 39 years. Out of samples, only 1% beneficiaries were found to be the head of the respective families. Though these beneficiaries associated with CREL for Horticulture only, but 10% beneficiaries was found to have not cultivated any crops in the baseline. The percentage shot up further in the impact (13%). Findings suggest that in Khulna and Sylhet, same number of beneficiaries cultivated crops in both baseline and impact. However, in Chittagong, about one fourth beneficiaries (24.4%) did not cultivate any crops in the impact which is two times higher as compared with baseline (12.2%). In contrast, more beneficiaries were found to be involved in cultivation in impact (93.5%) over baseline (90.7%) in Cox's Bazar.

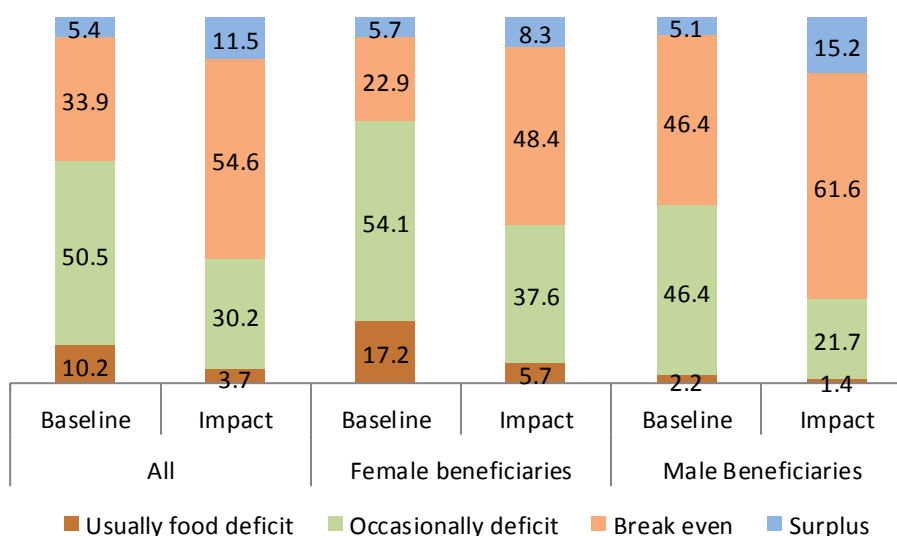
Table 14 : Sample Distribution [Horticulture]

Location	Sample Size	%
Sylhet	78	26.4
Chittagong	82	27.8
Cox's Bazar	107	36.3
Khulna	28	9.5
Female	157	53.2
Male	138	46.8
Total	295	100

5.1.1 Food Consumption

Since the beneficiaries of the project are extremely poor with limited purchase power, food security of the family members was always a concern for them. The project activities had been designed with due focus on the issue. It can be assumed that by increasing production a beneficiary would be able to feed their family members either from own production or from buying food as their purchase power would increase. Hence, we assessed if they and their family members are still in a state of food deficit by comparing responses of baseline and impact in this regards. The question asked was based on four choices – household stays usually in food deficit, occasional food deficit, break even and surplus. The data show that about half of the households suffered with food deficit (either usually or occasionally) in baseline were able to free themselves from such suffering. Findings suggest, more than half of total surveyed households (54.6%) were found in breakeven state in impact which was 30.2% in baseline. In addition, a little more than one tenth household (11.2%) stayed in food surplus state which was two times higher than that of baseline (5.4%). This shift was found higher among households of male beneficiaries than female beneficiaries in impact over baseline.

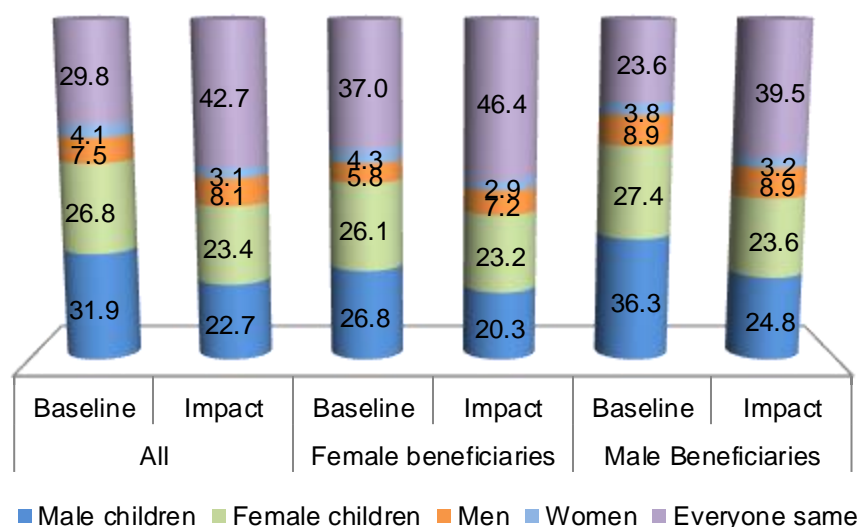
Figure 10: Food security status of households, figures in %



Another question asked to the respondents was if they have any biasness while allotting food in a food deficit state. The objective was to find out whether gender discrimination exists among families from the responses of this question. The data reveals more or less one fourth beneficiaries appeared to have showed gender preference to feed their children in both impact and baseline except one case where 36% male beneficiaries showed favor to male children in baseline which was stood at 25% in impact. However, this preference was found to be more or less similar for both male and female children.

In general, majority of beneficiaries showed their preference to feed children (68.7%, considering both male & female) in baseline however, this inclination reduced in midline noticeably (46.1%). Conversely, allotting same amount of food to everyone increased in midline.

Figure 11 : % Distribution of family members received more food during crisis time



5.1.2 Ownership of Livestock

Across zones, most of the beneficiaries (92.2%) owned livestock in the year 2014-2016 as can be seen from the figure 10. The zone wise distribution was similar except Sylhet where relatively lower number of beneficiaries (84.6%) reared livestock. Chicken was emerged as the most reared animal. Besides cow, duck and goat were other notable livestock reared by beneficiaries. On, average number of chicken owned by beneficiaries was 9-10, duck 6-7, cow 2-3 and goat 4-5. The averages varied by as the data was taken for four time different points for each type of animal. Female members of the households were found as owners of the livestock in 51.5% responses. Also, majority number of beneficiaries (64.4%) described females were responsible for taking care of livestock and they were the key decision makers (64.4%) for selling the same.

Figure 12 : % Distribution of households who owned livestock

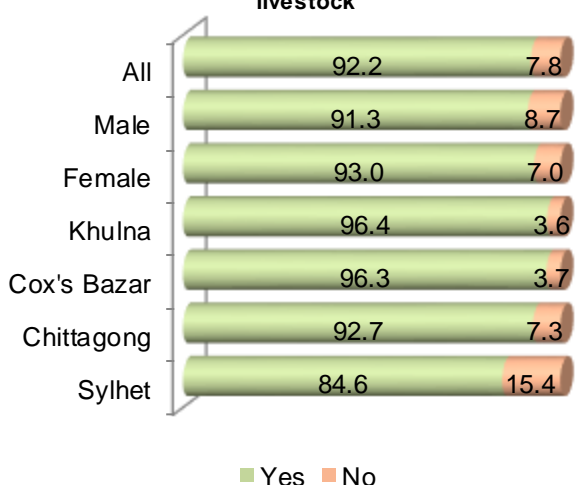
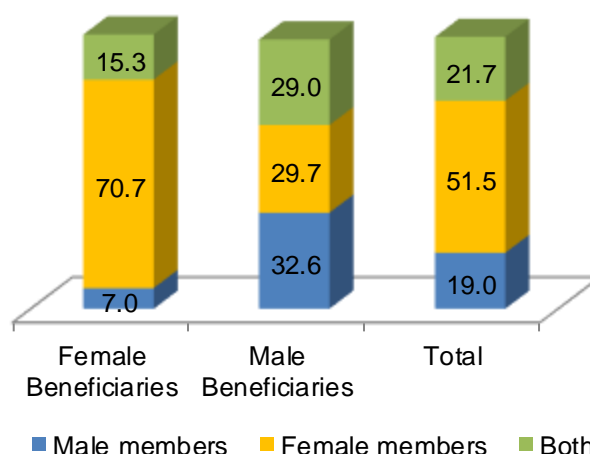


Figure 13 : Livestock ownership status in %



5.1.3 Income Generating Activities

The beneficiaries of horticulture along with their family members were found to be engaging in various income generating activities. The data suggests that majority of the beneficiaries of Horticulture reared poultry/Duck. Other notable activities included were natural resource collection, manual/physical work and income sources such as hiring out equipment/boats, business, job etc. A distribution of these activities has been given below:

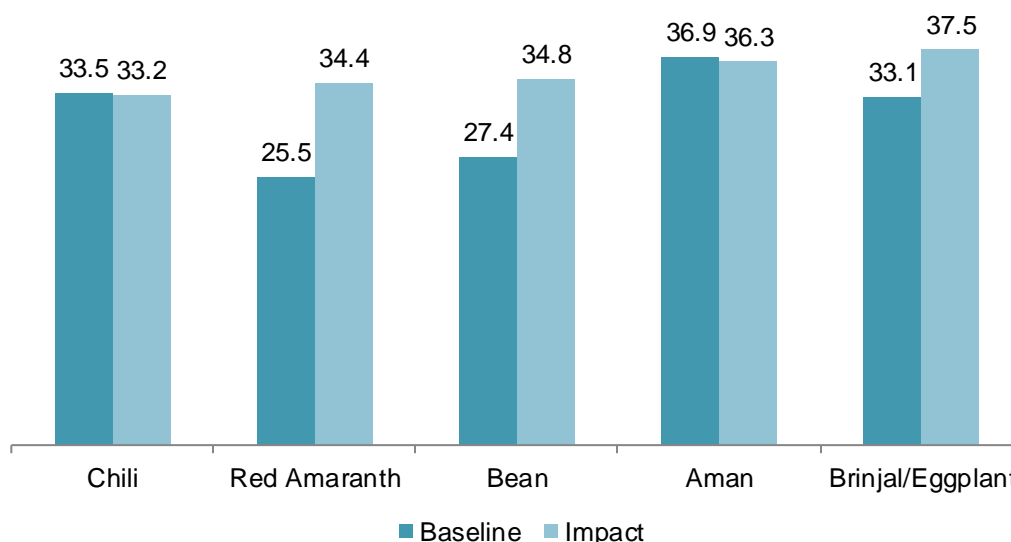
Table 15: % Distribution of beneficiaries by income sources

	Female		Male		All	
	Baseline	Impact	Baseline	Impact	Baseline	Impact
Horticulture	89.2	89.2	89.1	84.1	89.2	86.8
Poultry/Duck	80.3	79.0	77.5	76.1	79.0	77.6
Handicrafts	18.5	23.6	5.1	8.7	12.2	16.6
Natural Resource collection	56.7	47.8	43.5	35.5	50.5	42.0
Manual/physical work	60.5	58.0	59.4	58.7	60.0	58.3
Other sources	36.9	41.4	48.6	50.7	42.4	45.8
Remittance(Inside Bangladesh)	1.9	0.6	0.7	0.7	1.4	0.7
Remittance(Outside Bangladesh)	1.9	0.6			1.0	0.3

Horticulture

The number of crops cultivated by the beneficiaries was about 72. The graph below shows top-5 crops cultivated by the beneficiaries.

Figure 14: Top-5 crops cultivated by beneficiaries figures in %



Most of the beneficiaries (baseline – 89.2%, midline – 86.8%) applied different types of practices for crop cultivation however in midline 70.5% beneficiaries adopted improve climate resilience practices which was about 7% higher than that of baseline (63.7%). The Top-5 improved technology adopted by the beneficiaries has been given below:

Table 16: % Distribution of Top-5 improved Technology

	Female		Male		All	
	Baseline	Impact	Baseline	Impact	Baseline	Impact
Usage of Compost (Soil Management)	56.1	65.6	57.2	62.3	56.6	64.1
Improved bed preparation (raised bed) (Climate-Smart technology)	49.7	53.5	35.5	40.6	43.1	47.5
Use of chemical fertilizer (Soil Management)	49.0	45.9	41.3	41.3	45.4	43.7
used chemical pesticide (Pest Management)	47.8	36.9	43.5	45.7	45.8	41.0
Multi cropping (Cropping pattern)	28.7	36.9	29.0	29.7	28.8	33.6
Didn't use Agriculture Technologies	10.8	10.8	10.9	15.9	10.8	13.2
Base- All Respondent	157	157	138	138	295	295

The average net income for horticulture products in baseline was BDT 18,861 and in impact BDT 23,511 resulting about 24% increase in income in impact over baseline. The table below shows distribution of average net profit and % growth by zone and gender of beneficiaries. A mean test was done to find out if changes are significant. At 0.05 (95% CL) level of significance, we have not found any significant difference however, At 0.1 (90% CL) level of significance, the difference of net profit of male beneficiaries was found significant. Detailed table can be seen in the Annex -2.

Table 17 : Average Net profit and % growth

	Sample	Average Net profit		% growth
		Baseline	Impact	
Sylhet	71	19,285	18,098	(6.2)
Chittagong	73	18,999	23,940	26.0
Cox's Bazar	105	21,091	29,107	38.0
Khulna	27	9,428	14,872	57.7
Female	146	12,733	14,357	12.8
Male	130	25,835	34,481	33.5
Total	276	18,861	23,511	24.7

Natural Resource Extraction

The data reveal that more or less half of the beneficiaries or their family members involved in natural resource extraction in the baseline (50.5%) but, the practice was reduced by about 8% in impact (42%). Also, Frequency of collection reduced noticeably from baseline to impact.

Table 18 : Average man-days involved in natural resource extraction

	Female Beneficiaries		Male Beneficiaries		All	
	Baseline	Impact	Baseline	Impact	Baseline	Impact
Male Members	111.4	88.0	45.6	39.1	80.6	65.1
Female Members	47.0	33.9	2.6	3.2	26.2	19.5
Total	158.4	121.9	48.2	42.3	106.8	84.6
Base - All Respondent	157	157	138	138	295	295

Table 19 : Average man-days involved in natural resource extraction based on region

	Sylhet		Chittagong		Cox's Bazar		Khulna	
	Baseline	Impact	Baseline	Impact	Baseline	Impact	Baseline	Impact
Male Members	30.9	31.8	101.8	69.9	70.5	59.3	195.8	166.2
Female Members	1.2	2.0	69.3	37.2	12.4	8.8	22.5	57.8
Total	32.1	33.8	171.1	107.1	82.9	68.1	218.4	224.0
Base- All Respondent	78	78	82	82	107	107	28	28

Fishing and collect fuel were the top two natural resources collected by the beneficiaries. As incidence and frequency of extraction of natural resources decreased, the average income from this dipped also as can be seen from the table below:

Table 20 : Average Income from Extracting Natural Resource

	Sample	Average Income		% growth
		Baseline	Impact	
Sylhet	78	6,242	4,866	-22.0
Chittagong	82	11,758	6,734	-42.7
Cox's Bazar	107	13,751	7,368	-46.4
Khulna	28	21,812	2,714	-87.6
Female	157	14,285	5,982	-58.1
Male	138	11,802	6,359	-46.1
Total	295	13,292	6,130	-53.9

Manual/Physical Work

More than half of the beneficiaries' households earned money from this source. The average man-days they spent were 187 in impact and 196 in baseline. Working as day labor and petty trader emerged as top-2 manual/physical work. The income from this source was increased by 16.1% in the impact over baseline.

Table 21 : Average Household Income from Manual work

	Sample	Average Income		% growth
		Baseline	Impact	
Sylhet	78	61,459	62,399	1.5
Chittagong	82	46,718	49,695	6.4
Cox's Bazar	107	53,653	70,630	31.6
Khulna	28	34,962	47,100	34.7
Female	157	52,262	57,452	9.9
Male	138	51,735	63,756	23.2
Total	295	52,015	60,401	16.1

Other Sources

Income from other sources included service/salaried job, selling of other livestock, areca selling, fruit selling etc. More or less 45% of the beneficiaries earned from these sources. The average income from this source was increased by 16% in impact over baseline.

Table 22 : Average Income from Other Sources

	Sample	Average Income		% growth
		Baseline	Impact	
Sylhet	78	5,667	4,727	-16.6
Chittagong	82	9,601	11,195	16.6
Cox's Bazar	107	12,981	14,174	9.2
Khulna	28	4,528	5,880	29.9
Female	157	7,795	9,391	20.5
Male	138	11,342	11,466	1.1
Total	295	9,410	10,306	9.5

As mentioned above, beneficiaries had multiple sources of income. We have made a comprehensive table including income of all sources to get the idea on total average income of the beneficiaries and % contribution of each source to the total average income. It should be noted that the table is based on total beneficiaries. Hence, average net profit of the respondents from horticulture products would differ from the one we have shown above. The table shows manual/physical work is the main income generating source for these beneficiaries followed by horticulture products. Contribution of other sources to total income is found to be not significant. As per calculation, the monthly household income of the beneficiaries was BDT 8,714 which was higher than the total average monthly income of baseline (BDT 7,648).

Table 23 : Average income distribution

	Sample	Baseline	% contribution	Impact	% contribution
Horticulture (Female beneficiaries)	157	11,355	6.6	12,711	6.5
Horticulture (Male beneficiaries)	138	23,027	11.7	28,984	13.0
Handicrafts (Female beneficiaries)	157	1,460	0.8	1,391	0.7
Handicrafts (Male beneficiaries)	138	198	0.1	291	0.1
Poultry/Duck (Female beneficiaries)	157	5,101	3.0	4,904	2.5
Poultry/Duck (Male beneficiaries)	138	4,280	2.2	4,472	2.0
Natural Resource (Female beneficiaries)	157	8,189	4.7	7,349	3.7
Natural Resource (Male beneficiaries)	138	5,131	2.6	4,183	1.9
Manual/Physical work (Female beneficiaries)	157	52,262	30.3	57,452	29.2
Manual/Physical work (Male beneficiaries)	138	51,735	26.4	63,756	28.5
Other Source (Female beneficiaries)	157	8,441	4.9	10,767	5.5
Other Source (Male beneficiaries)	138	11,671	5.9	11,799	5.3
Remittance (Female beneficiaries)	157	981	0.6	688	0.4
Remittance (Male beneficiaries)	138	290	0.1	1,667	0.7
Total Household Income (Female)-Yearly	157	87,787		95,262	
Total Household Income (Male)-Yearly	138	96,333		115,152	
Total Household Income-Yearly	295	91,785		104,567	
Total Household Income (Monthly)		7,648		8,713	



5.2 Poultry/Duck

The sample size of the Poultry/Duck trade was 296. The number of male female beneficiaries was varied in great extent, 72.3% being female beneficiaries and 27.7% male. The average age of the beneficiaries was found to be 38 years. Out of samples, only 2% beneficiaries were found to be the head of the respective families. About one-fifth beneficiaries (20.3%) were found to have not raised any chicken/duck in the baseline however, the percentage dipped in the impact (11.1%) noticeably. Findings suggest that in Khulna, same number of beneficiaries reared poultry in both baseline and impact. Same thing can be said about Cox's Bazar where almost same number of beneficiaries reared livestock in baseline (92.3%) and impact (93.6%). However, these numbers differed in case of other two zones. The highest difference was found in the responses of Sylhet where more than one third beneficiaries (36.2%) did not involve in rearing chicken/duck in baseline but in impact, 13.8% did the same. In Chittagong, 5.5% beneficiaries were found who did not rear poultry or duck in the baseline but, started rearing in the impact.

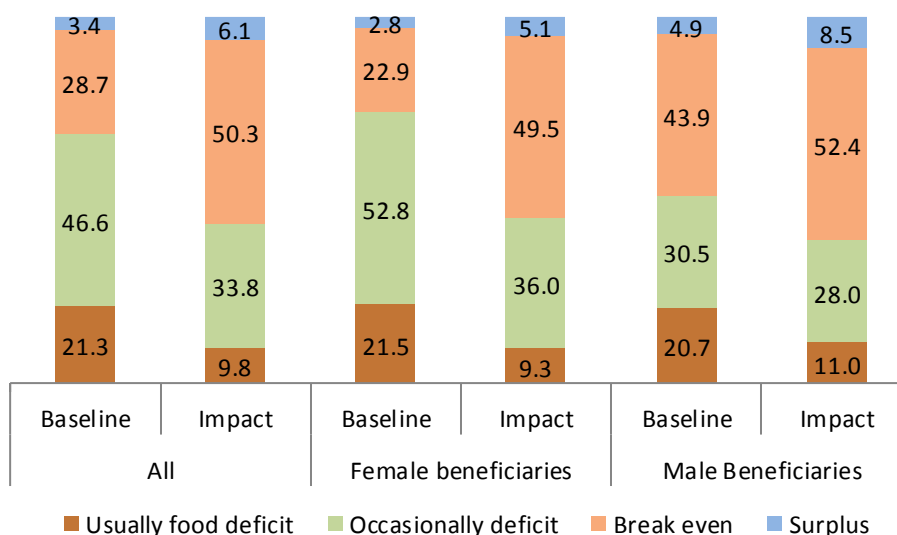
Table 24 : Sample Distribution [Poultry/Duck]

Location	Sample Size	%
Sylhet	94	31.8
Chittagong	91	30.7
Cox's Bazar	78	26.4
Khulna	33	11.1
Female	214	72.3
Male	82	27.7
Total	296	100

5.2.1 Food Consumption

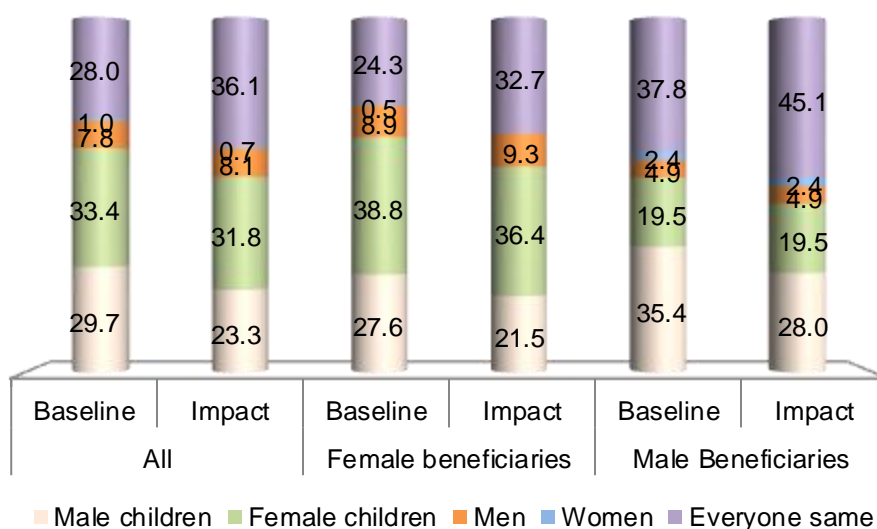
The data show that, number of beneficiaries suffering from both occasional and regular food deficits decreased from baseline to impact evidently. Findings suggest, half of total surveyed households (50.3%) were found in breakeven state in impact which was 28.7% in baseline. A small portion of the beneficiaries were found to be staying in food surplus state in both baseline (3.4%) and impact (6.1%) as mentioned by the beneficiaries.

Figure 15: Food security status of households, figures in %



As revealed by the responses on allotting food in crisis time, majority of beneficiaries showed their preference to feed children (63.1%, considering both male & female) in baseline, though, this inclination reduced in midline slightly (55.1%). This declination can be attributed to the fact that almost same number of beneficiaries decided to allot same amount of food for every one of the households.

Figure 16 : % Distribution of family members received more food during crisis time



5.2.2 Ownership of Livestock

Across zones, almost all of the beneficiaries (97.6%) owned livestock in the year 2014-2016, as can be seen from the figure 15. All of the households of Chittagong and Sylhet claimed to have reared livestock during the aforementioned time period. Chicken came out to be the most reared animal. Besides cow, duck and goat were other mentionable livestock reared by beneficiaries. On average, number of chicken owned by beneficiaries was 10-12, duck 8-7, cow 2-3 and goat 4-5. The averages varied as data was taken for four different time points for each type of animal. In majority of the cases (53.2%), female members of the households were found as owners of the livestock. Also, a large number of beneficiaries (64.6%) described females were responsible for taking care of livestock and they were the key decision makers (64.6%) for selling the same.

Figure 17 : % Distribution of households who owned livestock

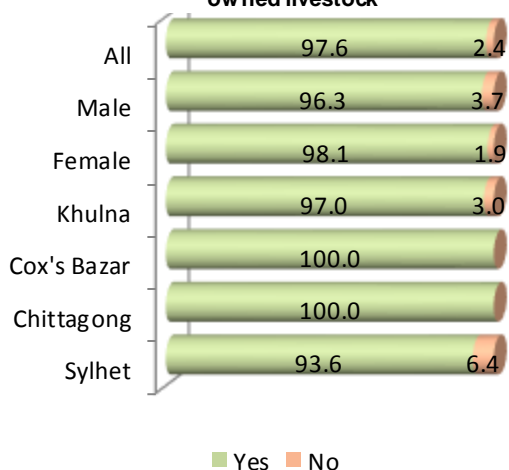
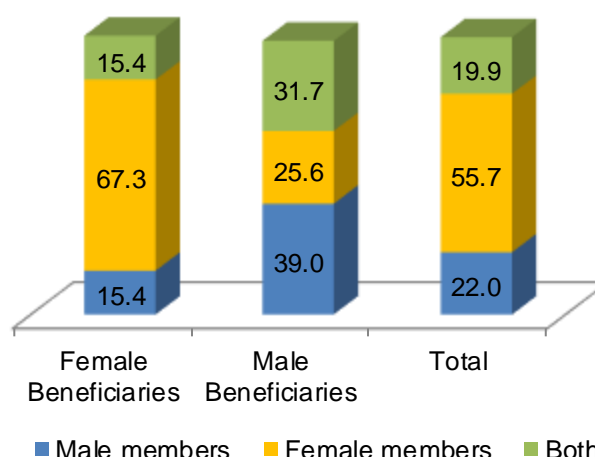


Figure 18 : Livestock ownership status in %



5.2.3 Income Generating Activities

The beneficiaries of Poultry/Duck along with their family members were found to be engaging in various income generating activities. Except poultry rearing, majority of these beneficiaries and their family members earned from horticulture and from Manual/Physical work. Other mentionable sources of income were natural resource collection and income from sources like hiring out firm equipment/boats/small business etc. A distribution of these sources has been given below:

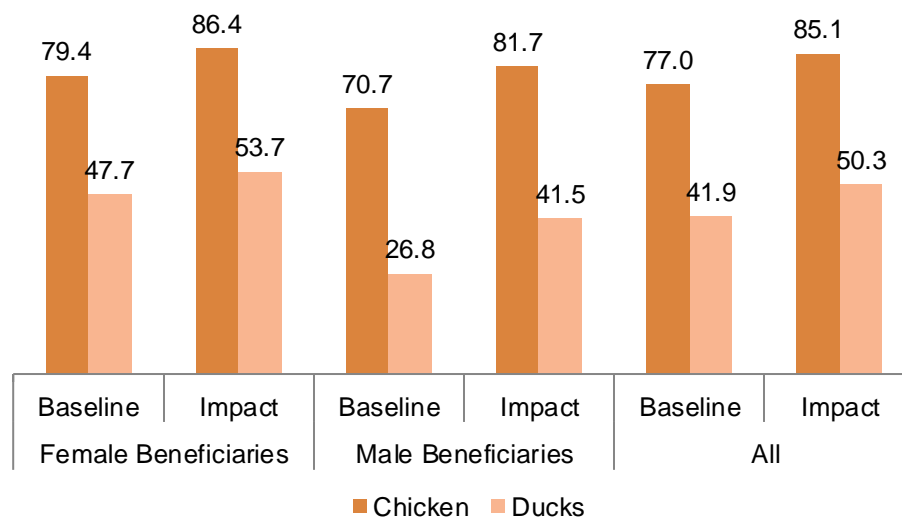
Table 25: % Distribution of income sources of beneficiaries

	Female Beneficiaries		Male Beneficiaries		All	
	Baseline	Impact	Baseline	Impact	Baseline	Impact
Poultry/Duck	82.2	90.2	73.2	85.4	79.7	88.9
Horticulture	61.2	63.1	79.3	76.8	66.2	66.9
Handicrafts	15.0	16.4	8.5	13.4	13.2	15.5
Natural Resource collection	56.5	54.2	41.5	40.2	52.4	50.3
Manual/physical work	78.0	76.6	70.7	65.9	76.0	73.6
Other sources	37.4	32.2	24.4	25.6	33.8	30.4
Remittance(Inside Bangladesh)	3.7	3.3	2.4	0.0	3.4	2.4
Remittance(Outside Bangladesh)	1.4	0.5	0	0	1.0	0.3
Total	214	214	82	82	296	296

Poultry/Duck

Most of the beneficiaries were found to be involved in chicken rearing. However, duck rearing seems to be getting popular especially among male beneficiaries.

Figure 19: Distribution of beneficiaries rearing chicken/bird



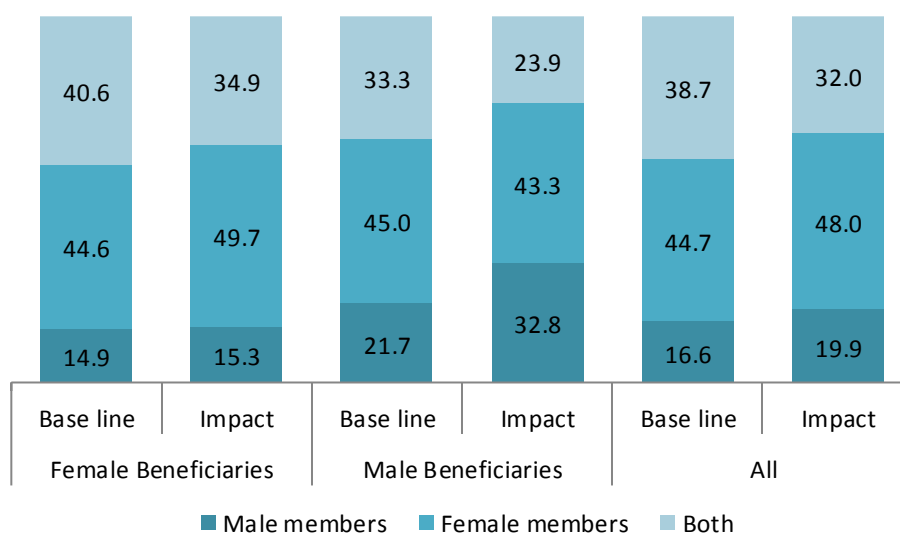
The main two activities in rearing poultry/duck was fattening birds and laying eggs. Between these two, fattening birds seems to be more popular among chicken farmers however, this inclination had not been observed among duck farmers.

Table 26: % Distribution laying eggs and fattening birds

		Female beneficiaries		Male Beneficiaries		All	
		Baseline	Impact	Baseline	Impact	Baseline	Impact
Chickens	Eggs	74.8	79.0	68.3	65.9	73.0	75.3
	Birds	76.2	83.6	62.2	74.4	72.3	81.1
	Didn't raise chicken	20.6	13.6	29.3	18.3	23.0	14.9
Ducks and other birds	Eggs	45.3	48.1	24.4	36.6	39.5	44.9
	Birds	41.6	47.7	26.8	36.6	37.5	44.6
	Didn't raise Ducks	52.3	46.3	73.2	58.5	58.1	49.7
Base - All Respondents		214	214	82	82	296	296

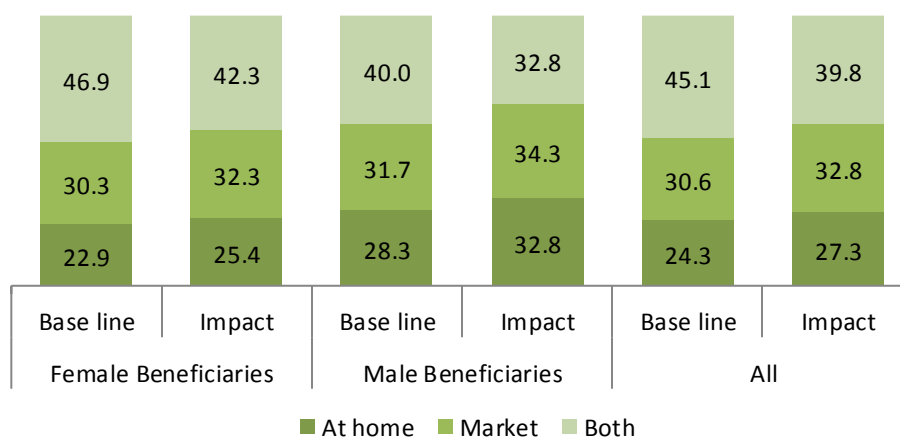
Female members appeared to be the key decision maker of selling poultry in majority of the cases. However, as can be seen, tendency of taking decision exclusively by male or female member has been increased in impact as compared with baseline.

Figure 20: % Distribution of decision maker for selling



The data indicate that beneficiaries sold poultry/duck to the convenient and proximate places. Hence, selling products exclusively from home or in the market was mentioned by comparatively higher number of beneficiaries in both impact and baseline.

Figure 21 : % distribution of selling places



Most of the beneficiaries (baseline –79.7%, midline – 88.9%) applied different type of practices for poultry/duck however in midline 44.9% beneficiaries adopted improve climate resilience practices which was about 11% higher than that of baseline (33.5%). Adoption of improved technology though shows an increased trend still more than half of the beneficiaries did not adopt the same. The Top-5 improved technology adopted by the beneficiaries has been given below:

Table 27: Top-5 Improved technology practiced by beneficiaries, figures in %

Poultry						
	Female Beneficiaries		Male Beneficiaries		All	
	Baseline	Impact	Baseline	Impact	Baseline	Impact
Local variety chicken (Variety/breed)	63.1	66.8	35.4	43.9	55.4	60.5
Rice Bran (Feed)	50.9	61.7	25.6	39.0	43.9	55.4
Cooked rice (Feed)	58.4	61.2	26.8	36.6	49.7	54.4
Traditional poultry house (Poultry shed)	51.9	58.9	23.2	32.9	43.9	51.7
Rice hulls used as bedding (Poultry shed)	20.1	34.6	9.8	22.0	17.2	31.1
Didn't use Duck/Poultry Technologies	17.8	9.8	26.8	14.6	20.3	11.1
Base - All Respondents	214	214	82	82	296	296
Duck						
Cooked rice (Feed)	42.5	45.3	17.1	26.8	35.5	40.2
Rice Bran (Feed)	40.2	43.5	15.9	25.6	33.4	38.5
Local variety duck (Variety/breed)	43.0	41.1	18.3	28.0	36.1	37.5
Traditional poultry house (Shed/house management)	39.3	37.4	18.3	20.7	33.4	32.8
Crop grain (Feed)	16.8	17.8	11.0	19.5	15.2	18.2
Didn't use Duck/Poultry Technologies	17.8	9.8	26.8	14.6	20.3	11.1
Base - All Respondents	214	214	82	82	296	296

The average net income for poultry/duck in baseline was BDT 4,637 and in impact BDT 5,859 resulting about 26.4% increase in income in impact over baseline. The table below shows distribution of average net profit and % growth by zone and gender of the beneficiaries. A mean test was done to find out if changes are significant. At 0.05 (95% CL) level of significance and 0.1 (90% CL) level of significance, we have not found any significant difference. Detailed table can be seen in the Annex -2.

Table 28 : Average Net Profit

	Count	Average Net Profit		% Growth
		Baseline	Impact	
Sylhet	85	2,534	6,196	144.5
Chittagong	82	6,297	7,118	13.0
Cox's Bazar	76	5,758	5,256	(8.7)
Khulna	32	2,279	3,466	52.1
Female	201	4,835	4,877	0.9
Male	74	4,064	8,614	112.0
Total	275	4,637	5,859	26.4

Natural Resource Extraction

The data reveal that more or less half of the beneficiaries or their family members involved in natural resource extraction and the practice was reduced by only about 2% in impact over baseline. However, frequency of collection has reduced noticeably from baseline to impact.

Table 29 : Average man-days involved in natural resource extraction

	Female Beneficiaries		Male Beneficiaries		All	
	Baseline	Impact	Baseline	Impact	Baseline	Impact
Male Members	79.1	68.4	99.1	85.6	84.6	73.2
Female Members	17.9	13.8	6.1	4.6	14.7	11.3
Total	97.0	82.3	105.3	90.2	99.3	84.5
Base - All Respondent	214	214	82	82	296	296

Table 30 : Average man-days involved in natural resource extraction

	Sylhet		Chittagong		Cox's Bazar		Khulna	
	Baseline	Impact	Baseline	Impact	Baseline	Impact	Baseline	Impact
Male Members	58.2	50.7	117.7	119.8	82.3	58.5	74.1	43.6
Female Members	12.8	6.7	14.4	10.3	16.0	17.3	17.8	12.7
Total	70.9	57.4	132.2	130.0	98.3	75.8	91.9	56.2
Base - All Respondent	94	94	91	91	78	78	33	33

Fishing and collect fuel were the top two natural resources collected by the beneficiaries. The average income per household appears to be similar from baseline to impact, BDT 15,959 to BDT 15,796 respectively.

Table 31 : Average Income from Extracting Natural Resource

	Sample	Average Income		% growth
		Baseline	Impact	
Sylhet	94	15,227	17,442	14.5
Chittagong	91	21,421	19,700	-8.0
Cox's Bazar	78	6,995	6,475	-7.4
Khulna	33	21,578	25,283	17.2
Female Beneficiaries	214	15,836	16,218	2.4
Male Beneficiaries	82	16,396	14,323	-12.6
Total	296	15,959	15,798	-1.0

Manual/Physical Work

A little more than three fourths beneficiaries' households earned money from this source. The average man-days they spent were 224 in impact and 242 in baseline. Working as day labor and petty trader emerged as top-2 manual/physical work. The income from this source was increased by 13.4% in the impact over baseline.

Table 32 : Average Household Income from Manual work

	Sample	Average Income		% growth
		Baseline	Impact	
Sylhet	94	54,351	61,054	12.3
Chittagong	91	68,171	65,062	-4.6
Cox's Bazar	78	64,388	86,869	34.9
Khulna	33	49,189	57,376	16.6
Female	214	57,217	66,162	15.6
Male	82	69,871	76,053	8.8
Total	296	60,717	68,824	13.4

Other Sources

Income from other sources included service/salaried job, selling of other livestock, areca selling, fruit selling etc. More or less one third of the beneficiaries earned from these sources. The average income from this sources has been given below:

Table 33 : Average Income from Other Sources

	Sample	Average Income		% growth
		Baseline	Impact	
Sylhet	94	3,304	5,177	56.7
Chittagong	91	12,753	7,884	-38.2
Cox's Bazar	78	6,034	8,211	36.1
Khulna	33	4,326	5,372	24.2
Female	214	7,083	7,184	1.4
Male	82	6,521	5,869	-10.0
Total	296	6,929	6,815	-1.7

Total Average Income

The table shows manual/physical work is the main income generating source for these beneficiaries. Contribution of other sources to total income is found to be less than 5%. As per calculation, the monthly household income of the beneficiaries was BDT 7,821 which was higher than the total average monthly income of baseline (BDT 7,196).

Table 34 : Total Average Income

	Sample	Baseline	% contribution	Impact	% contribution
Horticulture (Female beneficiaries)	214	5,558	4.7	8,038	6.2
Horticulture (Male beneficiaries)	82	12,464	4.0	8,704	2.6
Handicrafts(Female beneficiaries)	214	562	0.5	562	0.4
Handicrafts(Male beneficiaries)	82	170	0.1	319	0.1
Poultry/Duck(Female beneficiaries)	214	3,931	3.3	4,284	3.3
Poultry/Duck(Male beneficiaries)	82	2,974	1.0	7,038	2.1
Natural Resource(Female beneficiaries)	214	8,954	7.5	8,791	6.8
Natural Resource(Male beneficiaries)	82	6,798	2.2	5,764	1.7
Manual/Physical work (Female beneficiaries)	214	54,543	45.7	62,143	47.9
Manual/Physical work (Male beneficiaries)	82	66,462	21.3	68,634	20.3
Other Source (Female beneficiaries)	214	6,951	5.8	6,882	5.3
Other Source (Male beneficiaries)	82	6,283	2.0	5,726	1.7
Remittance(Female beneficiaries)	214	2,019	1.7	1,355	1.0
Remittance(Male beneficiaries)	82	1,207	0.4	2,366	0.7
Total Household Income(Female)-Yearly	214	82,518		92,056	
Total Household Income(Male)-Yearly	82	96,358		98,550	
Total Household Income-Yearly	296	86,352		93,855	
Total Household Income (Monthly)		7,196		7,821	



5.3 Aquaculture

The sample size of the Aquaculture trade was 198. The number of male female beneficiaries was 46.8% and 53.2% respectively. The average age of the beneficiaries was found to be 39 years. Out of total samples, only about 2% beneficiaries were found to be the head of the respective families. Though these beneficiaries associated with CREL for Aquaculture only, 16% beneficiaries were found to have not cultivated fish. In addition, in impact, around 10% beneficiaries among them who cultivated fish did not sell.

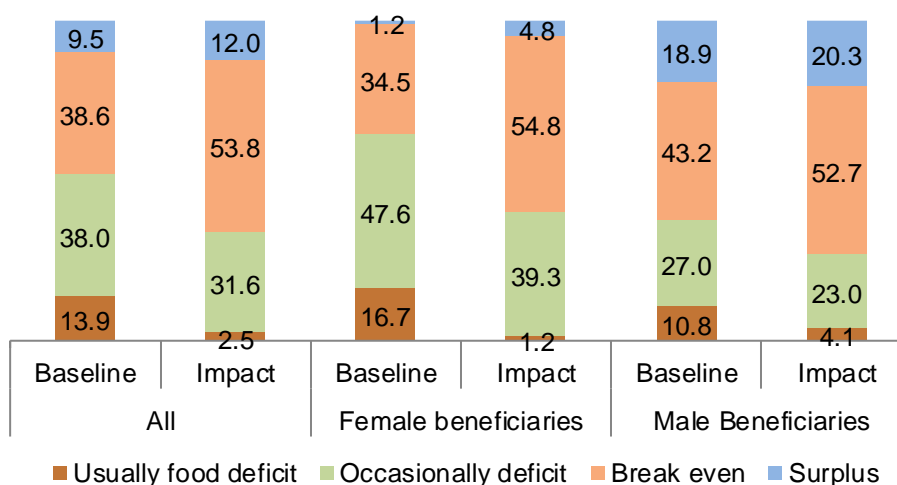
Table 35 : Sample Distribution [Aquaculture]

Location	Sample Size	%
Sylhet	27	17.1
Chittagong	57	36.1
Cox's Bazar	0	0.0
Khulna	74	46.8
Female	84	53.2
Male	74	46.8
Total	158	100

5.2.1 Food Consumption

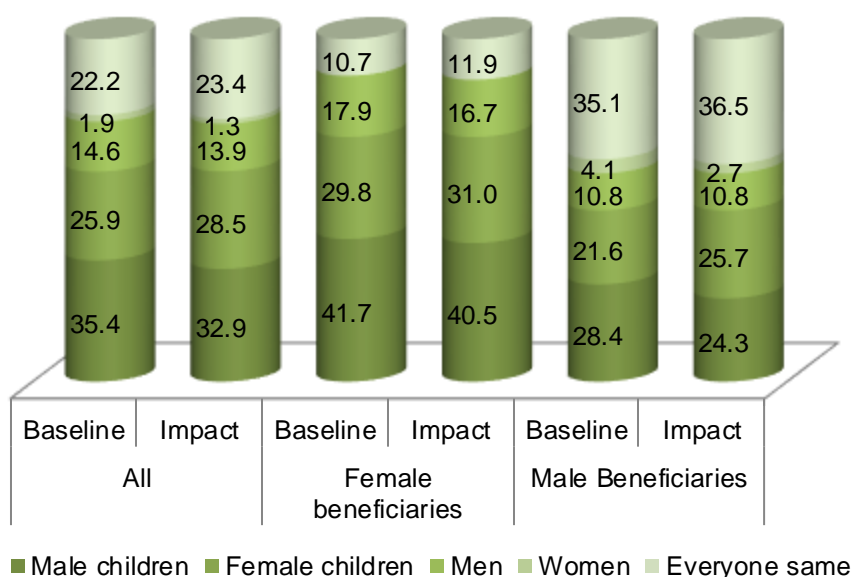
As finding directs, majority of the households suffered from food deficit (either usually or occasionally) in baseline, were able to free themselves from such suffering. Findings suggest, more than half of total surveyed households (53.8%) were found to be in breakeven state in impact which was 38.6% in baseline. About one tenth beneficiaries were appeared to be staying in food surplus state in both baseline (9.5%) and impact (12%) as mentioned by the beneficiaries.

Figure 22: Food security status of households, figures in %



As revealed by the responses on allotting food in crisis time, majority of beneficiaries showed their preference to feed children (around 61%, considering both male & female) in both baseline & impact. Interestingly, female beneficiaries appeared to have given precedence to male children over other family members in both impact and baseline.

Figure 23 : % Distribution of family members received more food during crisis time



5.2.2 Ownership of Livestock

Across zones, majority of the beneficiaries (82.3%) owned livestock in the year 2014-2016, as can be seen from figure 15. All of the households of Sylhet claimed to have reared livestock. Most of the beneficiaries (95.9%) of Khulna claimed the same. However, in Chittagong, a little less than half of the beneficiaries (43.9%) did not rear any livestock. Chicken came out to be the most reared animal. Besides cow, duck and goat were other mentionable livestock reared by beneficiaries. On average, number of chicken owned by beneficiaries was 24-25, duck 7-8, cow 4-5 and goat 4-5. The averages varied as data was taken for four different time points for each type of animal. In majority of the cases (55.7%), female members of the households were found as owners of the livestock. Also, a large number of beneficiaries (64.6%) described females were responsible for taking care of livestock and they were the key decision makers (64.6%) for selling the same.

Figure 25 : % Distribution of households who owned livestock

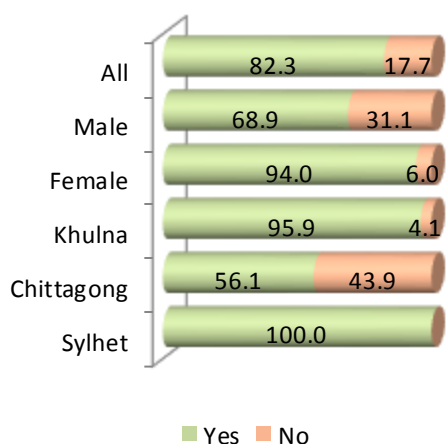
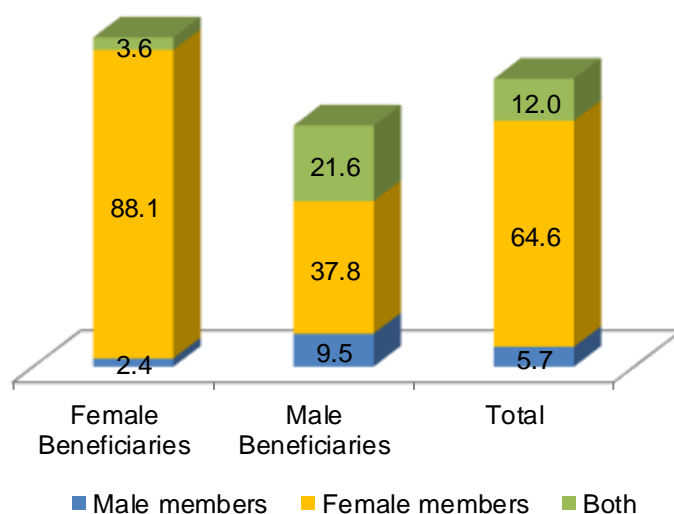


Figure 24 : Livestock ownership status in %



5.2.3 Income Generating Activities

The beneficiaries of Aquaculture along with their family members were found to be engaging in various income generating activities. Except fish farming, majority of these beneficiaries and their family members earned from poultry/duck, horticulture and from Manual/Physical work. Other mentionable sources of income were natural resource collection and income from sources like hiring out firm equipment/boats/small business etc. A distribution of these sources has been given below:

Table 36: % Distribution of income sources of beneficiaries

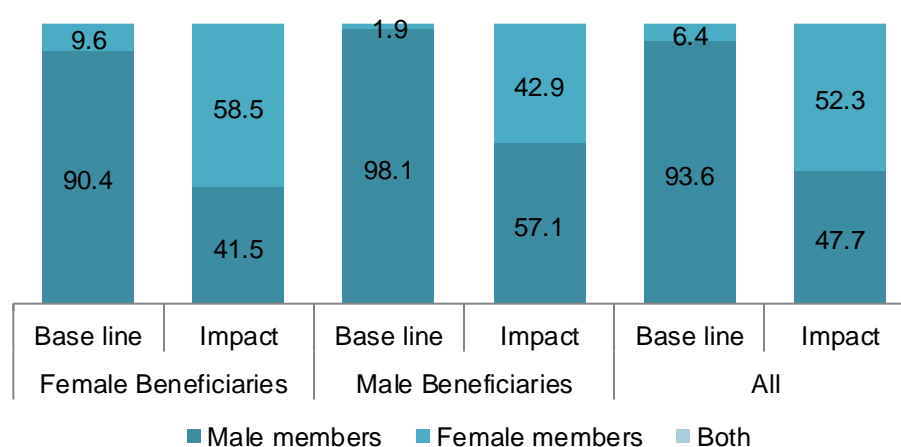
	Female Beneficiaries		Male Beneficiaries		All	
	Baseline	Impact	Baseline	Impact	Baseline	Impact
Aquaculture	86.9	90.5	71.6	63.5	79.7	77.8
Poultry/Duck	83.3	85.7	63.5	58.1	74.1	72.8
Horticulture	73.8	73.8	47.3	45.9	61.4	50.0
Handicrafts	7.1	7.1	0.0	0.0	3.8	3.8
Natural Resource collection	69.0	61.9	50.0	44.6	60.1	53.8
Manual/physical work	76.2	73.8	55.4	52.7	66.5	63.9
Other sources	28.6	28.6	35.1	32.4	31.6	30.4
Remittance(Inside Bangladesh)	3.6	3.6	4.1	4.1	3.8	3.8
Remittance(Outside Bangladesh)	3.6	3.6	6.8	5.4	5.1	4.4
Total	84	84	74	74	158	158

Fish Farming

Majority of the beneficiaries (around 70% in both baseline & impact) used 1 pond/gher for fish farming. Rest of them used two (26.8%) or three (7.3%) ponds/gher.

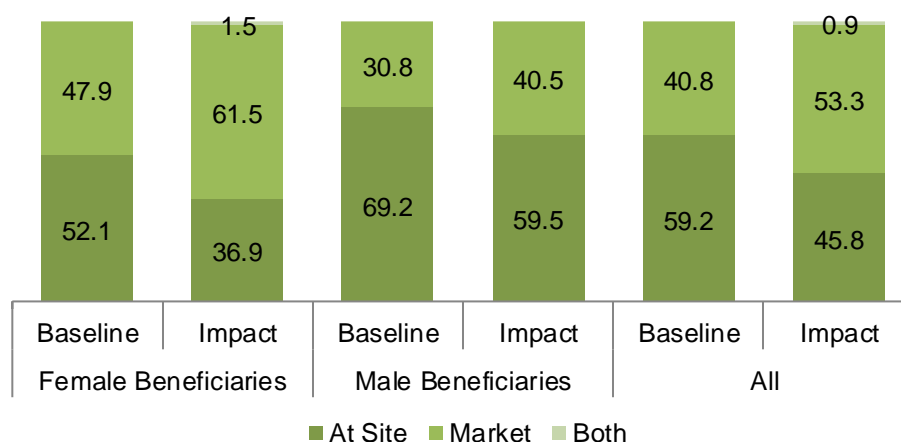
There is a drastic change emerged from the responses in decision making from baseline to impact. In baseline the decision makers were found to be male members of the households in majority of the cases however, in impact female members from more households appeared to be the key decision maker than that of male members though degree of difference was not much.

Figure 26: % Distribution of decision maker for selling



Beneficiaries' seem to have a general disposition to sell fish either exclusively from the site or from their residences. Carrying fish to the market, local or haat, was not considered in this regards.

Figure 27 : % distribution of selling places



All of the beneficiaries (baseline –79.7%, midline – 77.8%) who cultivated fish applied different type of practices for fish farming however in midline 77.8% beneficiaries adopted improved climate resilience practices which were about 16.5% higher than that of baseline (61.4%). This adoption was found highest in Khulna where adopting these practices was increased by 25% in impact (93.2%) over baseline (67.6%). Also, adoption rate was found to be higher among female beneficiaries than male beneficiaries in impact over baseline. The top-5 improved technology adopted by the beneficiaries has been given below:

Table 37: Top-5 Improved technology practiced by beneficiaries, figures in %

	Female Beneficiaries		Male Beneficiaries		All	
	Baseline	Impact	Baseline	Impact	Baseline	Impact
Bran (Pond Management Feeding)	46.4	63.1	45.9	52.7	46.2	58.2
Application of 1-2 kg/dec lime during Pond preparation (Pond Management Other Inputs)	53.6	70.2	41.9	37.8	48.1	55.1
Oilcake (Pond Management Feeding)	33.3	51.2	36.5	52.7	34.8	51.9
Stock natives and exotics (Pond Management Species)	50.0	63.1	23.0	24.3	37.3	44.9
Chemical fertilizer (Pond Management Fertilizing)	34.5	48.8	32.4	35.1	33.5	42.4
Didn't use Aquaculture Technologies	13.1	9.5	28.4	36.5	20.3	22.2
Base- All Respondent	84	84	74	74	158	158

The average net income for aquaculture in baseline was BDT 11,917 and in impact BDT 16,035 resulting about 34.6% increase in income in impact over baseline. Evidently, beneficiaries of Khulna were able to make more profit where adoption rate of improved technology was higher. Same can be said about female beneficiaries as well. The table below shows distribution of average net profit and % growth by zone and gender of the beneficiaries. A mean test was done to find out if changes are significant. At 0.05 (95% CL) level of significance, we have not found any significant difference however, At 0.1 (90% CL) level of significance, the difference of net profit of female beneficiaries and beneficiaries of Khulna were found significant. Detailed table can be seen in the Annex -2.

Table 38 : Average Net Profit

	Count	Average Net Profit		% Growth
		Baseline	Impact	
Sylhet	27	22,924	21,054	(8.2)
Chittagong	33	(2,480)	(5,533)	123.1
Khulna	72	14,383	23,209	61.4
Female	78	14,500	22,595	55.8
Male	54	8,197	5,801	(29.2)
Total	132	11,917	16,035	34.6

Natural Resource Extraction

The data reveal that more than half of the beneficiaries or their family members involved in natural resource extraction and the practice was reduced by only about 6% in impact over baseline. The practice was noticeable more among beneficiaries of Chittagong and Khulna than that of Sylhet. However, frequency of collection has reduced noticeably from baseline to impact.

Table 39 : Average man-days involved in natural resource extraction

	Female Beneficiaries		Male Beneficiaries		All	
	Baseline	Impact	Baseline	Impact	Baseline	Impact
Male Members	95.7	81.7	46.5	42.2	72.7	63.2
Female Members	28.3	22.6	0.6	1.2	15.3	12.6
Total	123.9	104.3	47.1	43.4	88.0	75.8
Base - All Respondent	84	84	74	74	158	158

Table 40: Average man-days involved in natural resource extraction

	Sylhet		Chittagong		Khulna	
	Baseline	Impact	Baseline	Impact	Baseline	Impact
Male Members	12.7	11.4	60.9	55.3	103.6	88.3
Female Members	.	.	9.9	9.0	25.1	19.9
Total	12.7	11.4	70.8	64.2	128.6	108.2
Base- All Respondent	27	27	57	57	74	74

Fishing, collecting shrimp PL, and collecting animals, crab and birds were the top three natural resources collected by the beneficiaries. The average income per household decreased from baseline to impact by 9.7%.

Table 41 : Average Income from Extracting Natural Resource

	Sample	Average Income		% growth
		Baseline	Impact	
Sylhet	27	1277.78	1092.59	-14.5
Chittagong	57	11879.82	10731.58	-9.7
Khulna	74	7931.35	7189.46	-9.4
Female beneficiaries	84	6896.67	6465.71	-6.2
Male beneficiaries	74	9719.59	8514.86	-12.4
Total	158	8218.80	7425.44	-9.7

Manual/Physical Work

A majority of beneficiaries' households (baseline 66.5%, impact 63.9%) earned money from this source. The average man-days they spent were 128 in impact and 124 in baseline. Working as day labor, fishing as wage labor and petty trader emerged as top-3 manual/physical work. The income from this source was increased by 15.1% in the impact over baseline.

Table 42 : Average Household Income from Manual work

	Sample	Average Income		% growth
		Baseline	Impact	
Sylhet	27	39,190	50,536	29.0
Chittagong	57	30,381	33,628	10.7
Khulna	74	39,927	44,246	10.8
Female beneficiaries	84	36,892	40,759	10.5
Male beneficiaries	74	35,601	43,205	21.4
Total	158	36,289	41,784	15.1

Other Sources

Income from other sources included service/salaried job, selling of other livestock, areca selling, fruit selling etc. More than one third of the beneficiaries earned from these sources (baseline 31.6%, impact 30.4%).

Table 43 : Average Income from Other Sources

	Sample	Average Income		% growth
		Baseline	Impact	
Sylhet	27	4,193	4,569	9.0
Chittagong	57	7,262	8,194	12.8
Khulna	74	3,756	3,595	-4.3
Female beneficiaries	84	4,236	4,175	-1.4
Male beneficiaries	74	6,091	6,780	11.3
Total	158	5,121	5,384	5.1

Total Average Income

The table shows manual/physical work is the main income generating source for these beneficiaries followed by income from primary trade. As per calculation, the monthly household income of the beneficiaries was BDT 5,969 in baseline which was higher than the total average monthly income of impact (BDT 11,375).

Table 44 : Total Average Income

	Sample	Baseline	% contribution	Impact	% contribution
Horticulture (Female beneficiaries)	84	4,709	3.5	4,503	3.5
Horticulture (Male beneficiaries)	74	12,070	7.9	(7,210)	(4.9)
Handicrafts (Female beneficiaries)	84	82	0.1	210	0.2
Handicrafts (Male beneficiaries)	74		-		-
Poultry/Duck (Female beneficiaries)	84	3,095	2.3	3,082	2.4
Poultry/Duck (Male beneficiaries)	74	3,948	2.6	4,001	2.7
Aquaculture (Female beneficiaries)	84	12,429	9.2	20,981	16.2
Aquaculture (Male beneficiaries)	74	5,538	3.6	3,920	2.7
Natural Resource (Female beneficiaries)	84	6,897	5.1	6,466	5.0
Natural Resource (Male beneficiaries)	74	9,720	6.4	8,515	5.8
Manual/Physical work (Female beneficiaries)	84	35,574	26.4	39,203	30.2
Manual/Physical work (Male beneficiaries)	74	34,158	22.3	34,920	23.7
Other Source (Female beneficiaries)	84	4,085	3.0	4,075	3.1
Other Source (Male beneficiaries)	74	6,091	4.0	6,505	4.4
Remittance (Female beneficiaries)	84	1,702	1.3	2,000	1.5
Remittance (Male beneficiaries)	74	3,581	2.3	5,338	3.6
Total Household Income (Female beneficiaries) -Yearly	84	68,573		80,520	
Total Household Income (Male beneficiaries) -Yearly	74	75,105		55,989	
Total Household Income-Yearly	158	71,633		69,031	
Total Household Income (Monthly)		5,969.38		5,752.55	



5.4 Handicrafts

The sample size of the Handicrafts trade was 257. Among beneficiaries 252 were female and five were male. The average age of the beneficiaries was found to be 32 years. Out of samples, only 5% beneficiaries were found to be the head of the respective families. Though these beneficiaries associated with CREL for handicrafts only, majority beneficiaries (64%) were found to have not made any handicrafts products in the baseline though the percentage dipped in the impact (21.4%) in a great extent. Findings suggest that in baseline, across zone, highest number of beneficiaries from Cox's Bazar (78.8%) did not make any handicrafts in baseline followed by Chittagong (59.7%) and Khulna (50.6%). In impact, most of the beneficiaries from Khulna (86.9%) and Cox's Bazar (84%) made handicrafts products. However, from Chittagong, relatively lower number of beneficiaries (62.3%) involved themselves for making the same.

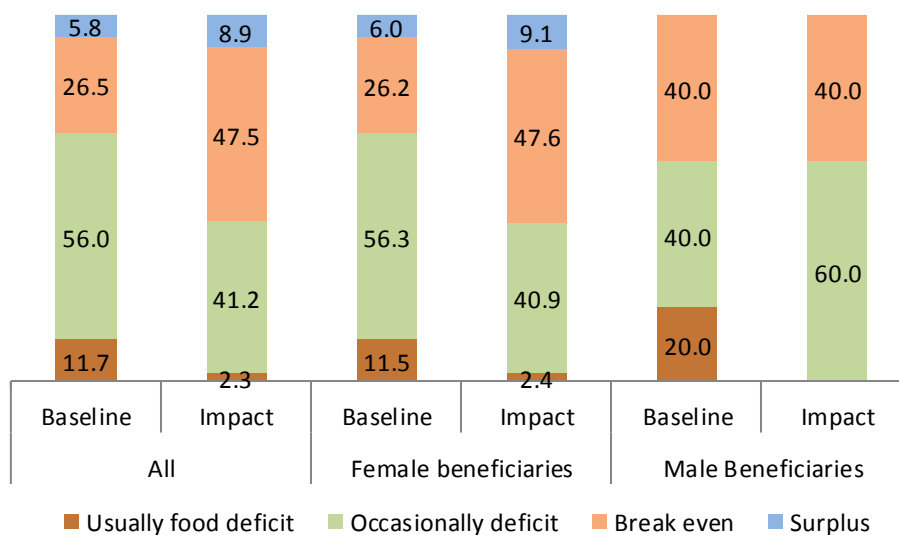
Table 45 : Sample Distribution [Handicrafts]

Location	Sample Size	%
Chittagong	77	30.0
Cox's Bazar	81	31.5
Khulna	99	38.5
Female	252	98.1
Male	5	1.9
Total	257	100

5.2.1 Food Consumption

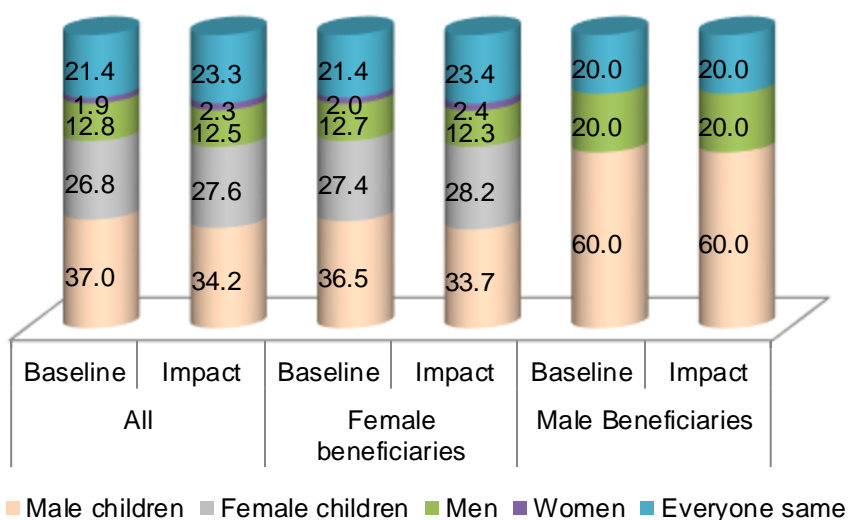
The data show that, number of beneficiaries suffering from both occasional and regular food deficit decreased from baseline to impact evidently. Findings suggest, around half of total surveyed households (47.5%) were found in breakeven state in impact which was 26.5% in baseline. A small portion of the beneficiaries were found to be staying in food surplus state in both baseline (5.8%) and impact (8.9%) as mentioned by the beneficiaries.

Figure 28: Food security status of households, figures in %



As revealed by the responses on allotting food in crisis time, majority of beneficiaries showed their preference to feed children (63.8%, considering both male & female) in baseline and this inclination almost remained same in impact (61.8%).

Figure 29 : % Distribution of family members received more food during crisis time



5.2.2 Ownership of Livestock

Across zones, almost all of the beneficiaries (93.4%) owned livestock in the year 2014-2016, as can be seen from the figure 15. Chicken came out to be the most reared animal. Besides cow, duck and goat were other mentionable livestock reared by beneficiaries. On average, number of chicken owned by beneficiaries was 10-12, duck 5-6, cow 2-3 and goat 4-5. The averages varied as data was taken for four different time points for each type of animal. In majority of the cases (74.3%), female members of the households were found as owners of the livestock. Also, most of the beneficiaries (81.3%) described that females were responsible for taking care of livestock and they were the key decision makers (81.3%) for selling the same.

Figure 30 : % Distribution of households who owned livestock

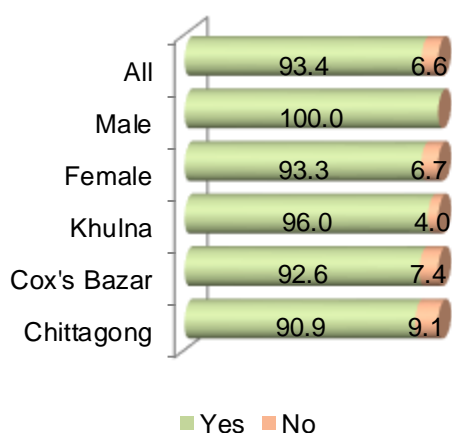
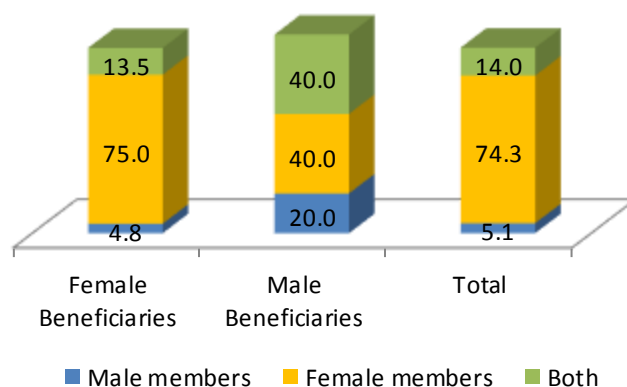


Figure 31 : Livestock ownership status in %



5.2.3 Income Generating Activities

The beneficiaries of Handicrafts along with their family members were found to be engaging in various income generating activities. Except producing handicrafts, majority of these beneficiaries and their family members earned from Poultry/Duck, Horticulture and Manual/Physical work. Other mentionable sources of income were natural resource collection and income from sources like hiring out firm equipment/boats/small business etc. A distribution of these sources has been given below:

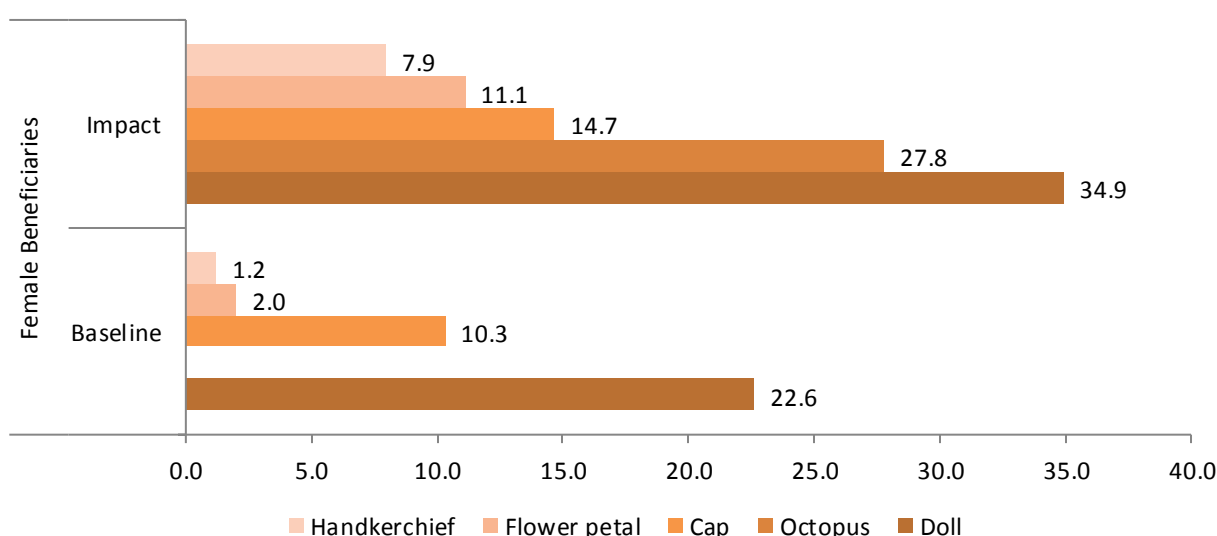
Table 46: % Distribution of income sources of beneficiaries

	Female Beneficiaries		Male Beneficiaries		All	
	Baseline	Impact	Baseline	Impact	Baseline	Impact
Handicrafts	34.9	78.6	80.0	80.0	35.8	78.6
Poultry/Duck	77.0	83.7	100.0	100.0	77.4	84.0
Horticulture	62.3	62.3	40.0	60.0	61.9	62.3
Natural Resource collection	62.3	54.8	60.0	40.0	62.3	54.5
Manual/physical work	67.1	65.1	100.0	80.0	65.8	63.8
Other sources	41.3	39.3	40.0	20.0	41.2	38.9
Remittance(Inside Bangladesh)	4.4	1.6	0.0	0.0	4.3	1.6
Remittance(Outside Bangladesh)	5.6	1.6	0.0	0.0	5.4	1.6
Total	252	252	5	5	257	257

Handicrafts

The beneficiaries produced 64 types of handicrafts products. Among them, Doll emerged as the most popular product followed by Octopus. The top-5 products produced by the beneficiaries can be seen from the chart below. It should be noted that we did not consider responses from male respondents for their small sample size.

Figure 32 : Top-5 products produced by Beneficiaries



In impact, female members appeared as the key decision maker of selling handicrafts in all of the cases. Also, they sold their products to the contractor mostly.

Table 47 : % Distribution of selling point of Handicrafts products

	Female Beneficiaries		Male Beneficiaries		All	
	Base line	Impact	Base line	Impact	Base line	Impact
From home	38.1	23.6	50.0	25.0	38.6	23.6
Market	6.0	2.6	0.0	0.0	5.7	2.6
To contractor/buyer	54.8	70.7	50.0	75.0	54.5	70.8
Both (market or home)	1.2	3.1	0.0	0.0	1.1	3.1
Base – Those sold	27	46	40	67	21	82

The average net income for Handicrafts in baseline was BDT 6,653 and in impact BDT 7,793 resulting about 17.1% increase in income in impact over baseline. The table below shows distribution of average net profit and % growth by zone and gender of the beneficiaries. A mean test was done to find out if changes are significant. At 0.05 (95% CL) level of significance, we have not found any significant difference however, At 0.1 (90% CL) level of significance, the difference of net profit of male beneficiaries was found significant. Detailed table can be seen in the Annex -2.

Table 48 : Average Net Profit

	Count	Average Net Profit		% Growth
		Baseline	Impact	
Chittagong	49	3,282	4,586	39.8
Cox's Bazar	70	10,280	14,244	38.6
Khulna	89	4,227	4,446	5.2
Female	204	6,865	7,811	13.8
Male	4	2,050	6,929	238.0
Total	208	6,653	7,793	17.1

Natural Resource Extraction

The data reveal that more or less half of the beneficiaries or their family members involved in natural resource extraction and the practice was reduced by only about 7.8% in impact over baseline. However, frequency of collection has reduced noticeably from baseline to impact.

Table 49 : Average man-days involved in natural resource extraction

	Female Beneficiaries		Male Beneficiaries		All	
	Baseline	Impact	Baseline	Impact	Baseline	Impact
Male Members	77.7	64.1	44.0	64.2	77.0	64.1
Female Members	21.3	24.2	-	-	20.9	23.8
Total	99.0	88.3	44.0	64.2	97.9	87.8
Base - All Respondent	252	252	5	5	257	257

Table 50: Average man-days involved in natural resource extraction

	Chittagong		Cox's Bazar		Khulna	
	Baseline	Impact	Baseline	Impact	Baseline	Impact
Male Members	49.69	42.43	54.38	49.14	116.75	93.15
Female Members	5.65	6.84	14.72	22.60	37.79	37.84
Total	55.34	49.27	69.10	71.74	154.54	130.99
Base - All Respondent	77	77	81	81	99	99

Fishing, collecting shrimp PL, Collecting animals, crabs, birds and collection of fuel wood were the mentionable natural resources collected by the beneficiaries. The average income per household appears to be similar from baseline to impact, BDT 17,617 to BDT 17,104 respectively.

Table 51 : Average Income from Extracting Natural Resource

	Sample	Average Income		% growth
		Baseline	Impact	
Chittagong	77	4,088	3,111	-23.9
Cox's Bazar	81	7,824	7,170	-8.4
Khulna	99	32,484	30,150	-7.2
Female	252	17,885	17,330	-3.1
Male	5	3,633	1,550	-57.3
Total	257	17,618	17,105	-2.9

Manual/Physical Work

More or less same portion of the beneficiaries' households earned money from this source (baseline 65.8%, impact 63.8%). The average man-days they spent were 144 days in impact and 156 in

baseline. Working as day labor and petty trader emerged as top-2 manual/physical work. The income from this source was increased by 13.4% in the impact over baseline.

Table 52 : Average Household Income from Manual work

	Sample	Average Income		% growth
		Baseline	Impact	
Chittagong	77	46,648	42,051	-9.9
Cox's Bazar	81	56,450	61,673	9.3
Khulna	99	34,278	39,371	14.9
Female	252	44,841	47,064	5.0
Male	5	51,582	54,200	5.1
Total	257	44,972	47,203	5.0

Other Sources

Income from other sources included service/salaried job, selling of other livestock, areca selling, fruit selling etc. More than one third of the beneficiaries earned from these sources (baseline 41.2%, impact 38.9%).

Table 53 : Average Income from Other Sources

	Sample	Average Income		% growth
		Baseline	Impact	
Chittagong	77	8,557	11,480	34.2
Cox's Bazar	81	8,786	7,058	-19.7
Khulna	99	5,778	6,170	6.8
Female	252	7,661	8,081	5.5
Male	5	3,340	1,875	-43.9
Total	257	7,576	7,980	5.3

Total Average Income

The table shows manual/physical work is the main income generating source for these beneficiaries. Contribution of other sources to total income is found to be less than 5%. As per calculation, the monthly household income of the beneficiaries was BDT 6,681 which was almost same with the average income of baseline (BDT 6,157).

Table 54 : Total Average Income

	Sample	Baseline	% contribution	Impact	% contribution
Horticulture (Female beneficiaries)	252	2,178	2.9	4,379	5.4
Horticulture (Male beneficiaries)	5	700	0.0	4,293	0.1
Handicrafts(Female beneficiaries)	252	2,370	3.1	6,013	7.4
Handicrafts(Male beneficiaries)	5	1,640	0.0	5,543	0.1
Poultry/Duck(Female beneficiaries)	252	2,882	3.8	2,477	3.0
Poultry/Duck(Male beneficiaries)	5	11,256	0.3	2,133	0.1
Natural Resource(Female beneficiaries)	252	11,143	14.8	9,490	11.6
Natural Resource(Male beneficiaries)	5	2,180	0.1	620	0.0
Manual/Physical work (Female beneficiaries)	252	44,841	59.5	47,064	57.6
Manual/Physical work (Male beneficiaries)	5	51,582	1.4	54,200	1.3
Other Source (Female beneficiaries)	252	7,540	10.0	7,792	9.5
Other Source (Male beneficiaries)	5	3,340	0.1	1,500	0.0
Remittance(Female beneficiaries)	252	2,964	3.9	3,194	3.9
Remittance(Male beneficiaries)		-		-	
Total Household Income(Female)-Yearly	252	73,917		80,410	
Total Household Income(Male)-Yearly	5	70,698		68,289	
Total Household Income-Yearly	257	73,886		80,174	
Total Household Income (Monthly)		6,157		6,681	

6 ESTIMATION

Since, we have taken representative samples from the universe (CREL beneficiary database), we have calculated total benefitted households based on the survey findings. Please see below detailed tables:

Horticulture	Female	Male
Population Households	3,345	1,285
Sample Household	146	130
Income Increase %	52%	53%
Estimated households Benefitted due to Project Intervention	1,741	682
Estimated People Benefitted due to Project Intervention ⁵	5,937	6,179

Handicrafts	Female	Male
Population Households	1,156	36
Sample Household	196	13
Income Increase %	72%	62%
Estimated households Benefitted due to Project Intervention	837	22
Estimated People Benefitted due to Project Intervention	4,298	2,106

Poultry	Female	Male
Population Households	1,697	528
Sample Household	201	74
Income Increase %	58%	66%
Estimated households Benefitted due to Project Intervention	988	350
Estimated People Benefitted due to Project Intervention	3,277	3,410

Aquaculture	Female	Male
Population Households	5,516	1,160
Sample Household	78	54
Income Increase %	87%	70%
Estimated households Benefitted due to Project Intervention	4,809	816
Estimated People Benefitted due to Project Intervention	13,782	14,344

Besides, for reporting purpose we had generated output by segregating the data into two groups, beneficiaries' with income of above BDT 200.00 and below BDT 200.00. The output tables have been given below:

⁵ Estimation of Number of people has done after considering, a family has five members and male female ratio is 51 and 49.

Trade - **Horticulture**

Sample – 295

Data in calculation – 276

		Female				Male				Region			
		Sylhet	Chittagong	Coxs Bazar	Khulna	Sylhet	Chittagong	Coxs Bazar	Khulna	Sylhet	Chittagong	Coxs Bazar	Khulna
Income >=200.00	No of Households	10	2	44	20	23	21	23	2	33	23	67	22
	Average	7,716.00	3,242.50	16,291.02	6,663.15	11,295.48	17,973.10	42,004.65	3,337.50	10,210.79	16,692.17	25,118.09	6,360.82
	Sum	77,160	6,485	716,805	133,263	259,796	377,435	966,107	6,675	336,956	383,920	1,682,912	139,938
	Standard Deviation	8,246	2,210	24,980	9,501	11,486	20,940	45,010	3,871	10,612	20,417	35,117	9,129
Income < 200.00	No of Households	15	20	30	5	23	30	8		38	50	38	5
	Average	(10,300.33)	(10,100.75)	(16,080.70)	(1,729.00)	(13,020.61)	(22,384.67)	(17,671.25)		(11,946.82)	(17,471.10)	(16,415.55)	(1,729.00)
	Sum	(154,505)	(202,015)	(482,421)	(8,645)	(299,474)	(671,540)	(141,370)		(453,979)	(873,555)	(623,791)	(8,645)
	Standard Deviation	22,499	10,054	19,616	1,711	20,959	22,060	17,678		21,320	19,083	19,004	1,711

Trade - **Handicrafts**

Sample – 257

Data in calculation – 209

		Female				Male				Region			
		Sylhet	Chittagong	Coxs Bazar	Khulna	Sylhet	Chittagong	Coxs Bazar	Khulna	Sylhet	Chittagong	Coxs Bazar	Khulna
Income >=200.00	No of Households		22	51	69		3		5		25	51	74
	Average		5,713.68	23,766.18	4,083.94		6,123.33		4,930.00		5,762.84	23,766.18	4,141.11
	Sum		125,701	1,212,075	281,792		18,370		24,650		144,071	1,212,075	306,442
	Standard Deviation		11,520	51,686	3,556		5,464		3,112		10,892	51,686	3,515
Income < 200.00	No of Households		19	20	15		5				24	20	15
	Average		(1,197.53)	(9,586.00)	(4,156.47)		(640.00)				(1,081.38)	(9,586.00)	(4,156.47)
	Sum		(22,753)	(191,720)	(62,347)		(3,200)				(25,953)	(191,720)	(62,347)
	Standard Deviation		2,399	26,372	4,353		680				2,154	26,372	4,353

Trade – Poultry & Duck

Sample – 296

Data in calculation – 275

		Female				Male				Region			
		Sylhet	Chittagong	Coxs Bazar	Khulna	Sylhet	Chittagong	Coxs Bazar	Khulna	Sylhet	Chittagong	Coxs Bazar	Khulna
Income >=200.00	No of Households	23	36	40	18	32	6	9	2	55	42	49	20
	Average	1,676.09	5,744.36	4,824.55	2,722.78	24,904.69	8,055.00	4,887.78	2,525.00	15,190.91	6,074.45	4,836.16	2,703.00
	Sum	38,550	206,797	192,982	49,010	796,950	48,330	43,990	5,050	835,500	255,127	236,972	54,060
	Standard Deviation	2,338	7,949	5,208	2,985	127,023	11,954	5,309	1,308	96,946	8,487	5,171	2,841
Income < 200.00	No of Households	19	29	24	12	11	11	3		30	40	27	12
	Average	(10,280.63)	(3,683.17)	(6,623.21)	(4,468.75)	(4,946.36)	(3,440.00)	(5,232.00)		(8,324.73)	(3,616.30)	(6,468.63)	(4,468.75)
	Sum	(195,332)	(106,812)	(158,957)	(53,625)	(54,410)	(37,840)	(15,696)		(249,742)	(144,652)	(174,653)	(53,625)
	Standard Deviation	17,815	4,475	9,399	7,999	9,505	3,770	5,940		15,329	4,246	9,003	7,999

Trade – Aquaculture

Sample – 158

Data in calculation – 132

		Female				Male				Region			
		Sylhet	Chittagong	Coxs Bazar	Khulna	Sylhet	Chittagong	Coxs Bazar	Khulna	Sylhet	Chittagong	Coxs Bazar	Khulna
Income >=200.00	No of Households	6	7		55	14	17		7	20	24		62
	Average	5,526.67	11,557.14		12,936.55	20,124.29	9,938.24		14,062.86	15,745.00	10,410.42		13,063.71
	Sum	33,160	80,900		711,510	281,740	168,950		98,440	314,900	249,850		809,950
	Standard Deviation	2,557	19,350		14,271	31,129	15,884		18,068	26,680	16,545		14,578
Income < 200.00	No of Households	1	1		8	6	8		2	7	9		10
	Average	(51,600.00)	(2,000.00)		(10,293.75)	(26,095.00)	(20,043.75)		(9,045.00)	(29,738.57)	(18,038.89)		(10,044.00)
	Sum	(51,600)	(2,000)		(82,350)	(156,570)	(160,350)		(18,090)	(208,170)	(162,350)		(100,440)
	Standard Deviation				23,043	52,853	27,154		10,458	49,202	26,102		20,626

CONCLUSION

- The food security situation of the households improved as more households found to be in breakeven state in impact over baseline. and this might be largely attributed to the fact that households income increased because of project activities.
- Across trade, household income from primary trade increased in impact over baseline. However, average income of households generated by two primary trades (poultry & handicrafts) was found very low.
- The majority of the households of horticulture and aquaculture adopted improved technology. In contrast, more than half of the poultry beneficiaries did not adopt any improved technology.
- The extraction of natural resources decreased in term of both number of beneficiaries and day involvement. As a result, income from this source reduced.
- Manual/physical work was emerged as the main source of the beneficiaries income and around 55% income of the total income is generated from this source.

In conclusion, it can be said that the project activities are able to enhance the rate of adoption of improved technology, to increase household average income from the primary trades and to reduce the natural resource extraction. However, the income generated from the each primary trade is still not satisfactory. Therefore, project may consider broadening its activities in terms of providing help to generate more income from the other trades that a beneficiary follows along with primary trade. This would increase income of the beneficiaries from the project selected trades as a whole, which will in turn reduce beneficiaries' dependency from income generated by natural resource extraction or manual/physical work.

ANNEXURE - 1

Table -1: Distribution of Household (Increased Income)

	Horticulture			Poultry/Duck			Aquaculture			Handicrafts		
	%	Increment	Sample	%	Increment	Sample	%	increment	Sample	%	Increment	Sample
Sylhet	47.4	37	78	61.7	58	94	74.1	20	27		0	0
Chittagong	35.4	29	82	48.4	44	91	40.4	23	57	39.0	30	77
Cox's Bazar	61.7	66	107	65.4	51	78		0	0	61.7	50	81
Khulna	85.7	24	28	66.7	22	33	85.1	63	74	81.8	81	99
Total	52.9	156	295	59.1	175	296	67.1	106	158	62.6	161	257

Table -2: Distribution of Household (Increased Profit)

	Horticulture			Poultry/Duck			Aquaculture			Handicrafts		
	%	increment	Sample	%	increment	Sample	%	increment	Sample	%	increment	Sample
Sylhet	47.4	37	78	54.3	51	94	77.8	21	27		0	0
Chittagong	39.0	32	82	50.5	46	91	38.6	22	57	42.9	33	77
Cox's Bazar	59.8	64	107	56.4	44	78		0	0	66.7	54	81
Khulna	89.3	25	28	69.7	23	33	85.1	63	74	81.8	81	99
Total	53.6	158	295	55.4	164	296	67.1	106	158	65.4	168	257

Table -3 Distribution of Extraction of Natural resources

	Sylhet		Chittagong		Cox's Bazar		Khulna		Female		Male		All	
	Baseline	Impact	Baseline	Impact	Baseline	Impact	Baseline	Impact	Baseline	Impact	Baseline	Impact	Baseline	Impact
Horticulture	29.5	24.4	54.9	45.1	53.3	46.7	85.7	64.3	56.7	47.8	43.5	35.5	50.5	42.0
Poultry/Duck	31.9	33.0	67.0	63.7	59.0	57.7	54.5	45.5	56.5	54.2	41.5	40.2	52.4	50.3
Aquaculture	11.1	11.1	70.2	64.9			70.3	60.8	69.0	61.9	50.0	44.6	60.1	53.8
Handicrafts			46.8	40.3	67.9	53.1	69.7	66.7	62.3	54.8	60.0	40.0	62.3	54.5

Base – All Respondents

Table 4 -Distribution of livestock ownership

		Horticulture		Poultry/Duck		Aquaculture		Handicrafts	
		Female Beneficiaries	Male Beneficiaries	Female Beneficiaries	Male Beneficiaries	Female Beneficiaries	Male Beneficiaries	Female Beneficiaries	Male Beneficiaries
Chicken	Male	7.9	38.3	16.3	43.2	6.5	45.5	6.6	40.0
	Female	92.1	61.7	83.7	56.8	93.5	54.5	93.4	60.0
	Base - Those raised chicken	140	115	202	74	77	44	226	5
Duck	Male	5.6	40.4	17.7	42.2	4.8	41.7	3.6	50.0
	Female	94.4	59.6	82.3	57.8	95.2	58.3	96.4	50.0
	Base - Those raised Duck	72	57	141	45	62	36	139	2
Goat	Male	26.3	53.8	32.3	50.0	20.0	70.0	22.6	0.0
	Female	73.7	46.2	67.7	50.0	80.0	30.0	77.4	100.0
	Base - Those raised Goat	38	39	62	16	20	10	62	1
Cow	Male	51.1	78.6	66.2	79.4	53.8	77.8	52.2	100.0
	Female	48.9	21.4	33.8	20.6	46.2	22.2	47.8	0.0
	Base - Those raised Cow	47	70	71	34	13	27	69	1

Table 5 -Distribution of having control on selling of livestock

		Horticulture		Poultry/Duck		Aquaculture		Handicrafts	
		Female Beneficiaries	Male Beneficiaries	Female Beneficiaries	Male Beneficiaries	Female Beneficiaries	Male Beneficiaries	Female Beneficiaries	Male Beneficiaries
Chicken	Male	25.7	52.2	32.7	51.4	2.6	9.1	16.4	40.0
	Female	74.3	47.8	67.3	48.6	97.4	90.9	83.6	60.0
	Base - Those raised chicken	140	115	202	74	77	44	226	5
Duck	Male	29.2	59.6	41.1	51.1	3.2	5.6	11.5	50.0
	Female	70.8	40.4	58.9	48.9	96.8	94.4	88.5	50.0
	Base - Those raised Duck	72	57	141	45	62	36	139	2
Goat	Male	47.4	76.9	50.0	56.3	10.0	40.0	38.7	100.0
	Female	52.6	23.1	50.0	43.8	90.0	60.0	61.3	0.0
	Base - Those raised Goat	38	39	62	16	20	10	62	1
Cow	Male	59.6	88.6	67.6	82.4	15.4	40.7	66.7	100.0
	Female	40.4	11.4	32.4	17.6	84.6	59.3	33.3	0.0
	Base - Those raised Cow	47	70	71	34	13	27	69	1

Table – 6: **Top - 5 Advanced technologies adopted by beneficiaries of Horticulture**

	Sylhet		Chittagong		Cox's Bazar		Khulna		Female		Male		All	
	Baseli ne	Impa ct	Baseli ne	Impa ct	Baseli ne	Impa ct	Baseli ne	Impa ct	Baseli ne	Impa ct	Baseli ne	Impa ct	Baseli ne	Impa ct
Usage of Compost (Soil Management)	52.6	47.4	48.8	56.1	67.3	84.1	50.0	57.1	56.1	65.6	57.2	62.3	56.6	64.1
Improved bed preparation (raised bed) (Climate-Smart technology)	38.5	32.1	23.2	20.7	57.9	77.6	57.1	53.6	49.7	53.5	35.5	40.6	43.1	47.5
Use of chemical fertilizer (Soil Management)	20.5	23.1	37.8	37.8	71.0	65.4	39.3	35.7	49.0	45.9	41.3	41.3	45.4	43.7
used chemical pesticide (Pest Management)	33.3	33.3	41.5	43.9	56.1	42.1	53.6	50.0	47.8	36.9	43.5	45.7	45.8	41.0
Multi cropping (Cropping pattern)	23.1	17.9	29.3	34.1	28.0	41.1	46.4	46.4	28.7	36.9	29.0	29.7	28.8	33.6
Didn't use Agriculture Technologies	14.1	14.1	12.2	24.4	9.3	6.5	3.6	3.6	10.8	10.8	10.9	15.9	10.8	13.2
Base- All Respondent	78	78	82	82	107	107	28	28	157	157	138	138	295	295

Table – 7: **Top - 5 Advanced technologies adopted by beneficiaries of Poultry**

	Sylhet		Chittagong		Cox's Bazar		Khulna		Female		Male		All	
	Baseli ne	Impa ct	Baseli ne	Impa ct	Baseli ne	Impa ct	Baseli ne	Impa ct	Baseli ne	Impa ct	Baseli ne	Impa ct	Baseli ne	Impa ct
Local variety chicken (C-Variety/breed)	50.0	59.6	58.2	68.1	64.1	66.7	42.4	27.3	63.1	66.8	35.4	43.9	55.4	60.5
Rice Bran (C-Feed)	35.1	47.9	53.8	64.8	46.2	64.1	36.4	30.3	50.9	61.7	25.6	39.0	43.9	55.4
Cooked rice (C-Feed)	43.6	53.2	58.2	61.5	48.7	51.3	45.5	45.5	58.4	61.2	26.8	36.6	49.7	54.4
Traditional poultry house (C-Poultry shed)	34.0	47.9	56.0	65.9	41.0	44.9	45.5	39.4	51.9	58.9	23.2	32.9	43.9	51.7
Rice hulls used as bedding (C-Poultry shed)	20.2	24.5	16.5	29.7	19.2	48.7	6.1	12.1	20.1	34.6	9.8	22.0	17.2	31.1
Didn't use Duck/Poultry Technologies	36.2	13.8	18.7	13.2	7.7	6.4	9.1	9.1	17.8	9.8	26.8	14.6	20.3	11.1
Base - All Respondents	94	94	91	91	78	78	33	33	214	214	82	82	296	296

Table – 8: **Top - 5 Advanced technologies adopted by beneficiaries of Duck**

	Sylhet		Chittagong		Cox's Bazar		Khulna		Female		Male		All	
	Baseline	Impact	Baseline	Impact	Baseline	Impact	Baseline	Impact	Baseline	Impact	Baseline	Impact	Baseline	Impact
Cooked rice (D-Feed)	34.0	41.5	53.8	57.1	16.7	17.9	33.3	42.4	42.5	45.3	17.1	26.8	35.5	40.2
Rice Bran (D-Feed)	27.7	35.1	52.7	59.3	17.9	20.5	33.3	33.3	40.2	43.5	15.9	25.6	33.4	38.5
Local variety duck (D-Variety/breed)	34.0	39.4	56.0	61.5	19.2	15.4	27.3	18.2	43.0	41.1	18.3	28.0	36.1	37.5
Traditional poultry house (D-Shed/house management)	29.8	30.9	53.8	51.6	12.8	12.8	36.4	33.3	39.3	37.4	18.3	20.7	33.4	32.8
Crop grain (D-Feed)	21.3	27.7	24.2	20.9	1.3	1.3	6.1	24.2	16.8	17.8	11.0	19.5	15.2	18.2
Didn't use Duck/Poultry Technologies	36.2	13.8	18.7	13.2	7.7	6.4	9.1	9.1	17.8	9.8	26.8	14.6	20.3	11.1
Base - All Respondents	94	94	91	91	78	78	33	33	214	214	82	82	296	296

Table – 9: **Top - 5 Advanced technologies adopted by beneficiaries of Aquaculture**

	Sylhet		Chittagong		Khulna		Female		Male		All	
	Baseline	Impact	Baseline	Impact	Baseline	Impact	Baseline	Impact	Baseline	Impact	Baseline	Impact
Bran (Pond Management Feeding)	48.1	59.3	43.9	49.1	47.3	64.9	46.4	63.1	45.9	52.7	46.2	58.2
Application of 1-2 kg/dec lime during Pond preparation (Pond Management Other Inputs)	33.3	14.8	42.1	47.4	58.1	75.7	53.6	70.2	41.9	37.8	48.1	55.1
Oilcake (Pond Management Feeding)	37.0	63.0	42.1	50.9	28.4	48.6	33.3	51.2	36.5	52.7	34.8	51.9
Stock natives and exotics (Pond Management Species)	48.1	51.9	3.5	5.3	59.5	73.0	50.0	63.1	23.0	24.3	37.3	44.9
Chemical fertilizer (Pond Management Fertilizing)	40.7	40.7	26.3	28.1	36.5	54.1	34.5	48.8	32.4	35.1	33.5	42.4
Didn't use Aquaculture Technologies	0.0	3.7	45.6	52.6	8.1	5.4	13.1	9.5	28.4	36.5	20.3	22.2
Base- All Respondent	27	27	57	57	74	74	84	84	74	74	158	158

Table -10: Incidences of cultivating corps [Trade: Horticulture]

	Sylhet		Chittagong		Cox's Bazar		Khulna		Female		Male		All	
	Baseline	Impact	Baseline	Impact	Baseline	Impact	Baseline	Impact	Baseline	Impact	Baseline	Impact	Baseline	Impact
Yes	85.9	85.9	87.8	75.6	90.7	93.5	96.4	96.4	89.2	89.2	89.1	84.1	89.2	86.8
No	14.1	14.1	12.2	24.4	9.3	6.5	3.6	3.6	10.8	10.8	10.9	15.9	10.8	13.2
Base - All Respondents	78	78	82	82	107	107	28	28	157	157	138	138	295	295

Table – 11 % Distribution of beneficiaries by Income Sources [Horticulture]

	Sylhet		Chittagong		Cox's Bazar		Khulna		Female		Male		All	
	Baseline	Impact	Baseline	Impact	Baseline	Impact	Baseline	Impact	Baseline	Impact	Baseline	Impact	Baseline	Impact
Horticulture	85.9	85.9	87.8	75.6	90.7	93.5	96.4	96.4	89.2	89.2	89.1	84.1	89.2	86.8
Poultry/Duck	66.7	67.9	75.6	75.6	87.9	86.0	89.3	78.6	80.3	79.0	77.5	76.1	79.0	77.6
Handicrafts	3.8	6.4	6.1	11.0	23.4	25.2	10.7	28.6	18.5	23.6	5.1	8.7	12.2	16.6
Natural Resource collection	29.5	24.4	54.9	45.1	53.3	46.7	85.7	64.3	56.7	47.8	43.5	35.5	50.5	42.0
Manual/physical work	62.8	57.7	53.7	50.0	61.7	62.6	64.3	67.9	60.5	58.0	59.4	58.7	60.0	58.3
Other sources	34.6	34.6	50.0	53.7	46.7	54.2	25.0	21.4	36.9	41.4	48.6	50.7	42.4	45.8
Remittance(Inside Bangladesh)			2.0	1.0			2.0	1.0	3.0	1.0	1.0	1.0	4.0	2.0
Remittance(Outside Bangladesh)			1.0		1.0		1.0	1.0	3.0	1.0			3.0	1.0

ANNEXURE – 2

Test of Significance

Horticulture

Test Level – 5% Level of Significance

	Base	Midline
	Average	
Sylhet	19,285	18,098
Chittagong	18,999	23,940
Cox's Bazar	21,091	29,107
Khulna	9,428	14,872
Female	12,733	14,357
Male	25,835	34,481

Comparisons of column test

	Base	Midline
	(A)	(B)
Sylhet		
Chittagong		
Cox's Bazar		
Khulna		
Female		
Male		

Results are based on two-sided tests assuming equal variances with significance level 0.05. For each significant pair, the key of the smaller category appears under the category with larger mean.

Test Level – 10% Level of Significance

	Base	Midline
	Average	
Sylhet	19,285	18,098
Chittagong	18,999	23,940
Cox's Bazar	21,091	29,107
Khulna	9,428	14,872
Female	12,733	14,357
Male	25,835	34,481

	Base	Midline
	(A)	(B)
Sylhet		
Chittagong		
Cox's Bazar		
Khulna		
Female		
Male		A

Results are based on two-sided tests assuming equal variances with significance level 0.0999999999999999. For each significant pair, the key of the smaller category appears under the category with larger mean

a. Tests are adjusted for all pairwise comparisons within a row of each innermost sub table using the Bonferroni correction.

Poultry & Duck

Test Level - 5% Level of Significance

	Base	Impact
	Average	
Sylhet	2,534	6,196
Chittagong	6,297	7,118
Cox's Bazar	5,758	5,256
Khulna	2,279	3,466
Total	4,637	5,859
Total	4,637	5,859
Female	4,835	4,877
Male	4,064	8,614

Comparisons of Column Means

	Base	Impact
	(A)	(B)
Sylhet		
Chittagong		
Cox's Bazar		
Khulna		
Female		
Male		

Results are based on two-sided tests assuming equal variances with significance level 0.05. For each significant pair, the key of the smaller category appears under the category with larger mean.

Test Level -10% Level of Significance

	Base	Impact
	Average	
Sylhet	2,534	6,196
Chittagong	6,297	7,118
Cox's Bazar	5,758	5,256
Khulna	2,279	3,466
Female	4,835	4,877
Male	4,064	8,614

Comparisons of Column Means

	Base	Impact
	(A)	(B)
Sylhet		
Chittagong		
Cox's Bazar		
Khulna		
Female		
Male		

Results are based on two-sided tests assuming equal variances with significance level 0.09999999999999999. For each significant pair, the key of the smaller category appears under the category with larger mean.

a. Tests are adjusted for all pairwise comparisons within a row of each innermost subtable using the Bonferroni correction.

Aquaculture

Test Level -5% Level of Significance

	Base	Impact
	Average	
Sylhet	22924	21054
Chittagong	-2480	-5533
Cox's Bazar	.	.
Khulna	14383	23209
Female	14500	22595
Male	8197	5801

Comparisons of Column Means

	Base	Impact
	(A)	(B)
Sylhet		
Chittagong		
Cox's Bazar	.	.
Khulna		
Female		
Male		

Results are based on two-sided tests assuming equal variances with significance level 0.05. For each significant pair, the key of the smaller category appears under the category with larger mean.

a. Tests are adjusted for all pairwise comparisons within a row of each innermost subtable using the Bonferroni correction.

Test Level -10% Level of Significance

	Base	Impact
	Average	
Sylhet	22924	21054
Chittagong	-2480	-5533
Cox's Bazar	.	.
Khulna	14383	23209
Female	14500	22595
Male	8197	5801

Comparisons of Column Means

	Base	Impact
	(A)	(B)
Sylhet		
Chittagong		
Cox's Bazar	.	.
Khulna		A
Female		A
Male		

Results are based on two-sided tests assuming equal variances with significance level 0.099999999999999999. For each significant pair, the key of the smaller category appears under the category with larger mean.

a. Tests are adjusted for all pairwise comparisons within a row of each innermost subtable using the Bonferroni correction.

Handicrafts

Test Level -5% Level of Significance

	Base	Impact
	Average	
Sylhet		
Chittagong	3282	4586
Cox's Bazar	10280	14244
Khulna	4227	4446
Female	6865	7811
Male	2050	6929

Comparisons of Column Means

	Base	Midline
	(A)	(B)
Sylhet	-	-
Chittagong		
Cox's Bazar	.	.
Khulna		
Female		
Male		

Results are based on two-sided tests assuming equal variances with significance level 0.05. For each significant pair, the key of the smaller category appears under the category with larger mean.

a. Tests are adjusted for all pairwise comparisons within a row of each innermost subtable using the Bonferroni correction.

Test Level -10% Level of Significance

	Base	Midline
	Average	
Sylhet		
Chittagong	10280	14244
Cox's Bazar	4227	4446
Khulna	6865	7811
Female	2050	6929
Male	3282	4586

Comparisons of Column Means

	Base	Midline
	(A)	(B)
Sylhet		
Chittagong		
Cox's Bazar	.	.
Khulna		
Female		
Male		A

Results are based on two-sided tests assuming equal variances with significance level 0.09999999999999999. For each significant pair, the key of the smaller category appears under the category with larger mean.

a. Tests are adjusted for all pairwise comparisons within a row of each innermost subtable using the Bonferroni correction.

