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Technical Note 21

Cycle 10 FFS

Khulna, Patuakhali

September 2018



Socioconsult Ltd.
for sustainable development



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Cycle 10 FFS

Khulna, Patuakhali

October 2017 – April 2018

Comparing benchmark and end data

September 2018

Blue Gold Program

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Summary

This report presents the basic data and findings from the tenth cycle of Farmer Field Schools (FFSs) using data collected at the start and end of the FFSs to show the differences in production and household income. The tenth cycle took place from October 2017 to April 2018. A total of 67 FFSs were conducted in Khulna (37) and Patuakhali (30). In Khulna, FFS were implemented in polders 25, 27/1, 27/2, 28/1, 28/2, 34/2-part, and in Patuakhali in polders 55/2A, 55/2C, 47/3 & 47/4. The FFS include Homestead, Poultry and Nutrition modules.

The collected benchmark and end line data are discussed in this report. TA Community Development Facilitators (CDFs) collected the data of individual FFS participant. A semi-structured questionnaire was used for data collection.

Bringing the data of 63 (available for analysis) FFS together creates a data set with information over 1575 farmers. Totals and averages of the collected benchmark and end data are presented side by side for easy visualization. The calculated averages of collected data at the beginning and end of the FFS can be used to get an idea of the impact of the training.

A review of the FFS participants' profile, shows that 1,575 farmers participated in 10th cycle FFS, of whom about 95% were women, with an average age of 35 years – which shows the preference for younger and more dynamic participants. Most participants are educated with only 14.5% illiterate or only able to sign their name. Priority is given to poor farmers so 56.5% of FFS participants owned less than 50 decimal land. The average homestead size was 16.5 decimal - 12 decimal (in Khulna) and 21 decimals (in Patuakhali). Almost all participants are registered WMG members.

Poultry module

Survey reveals that almost all farmers are using *hazals* for hatching chicks, have adopted the practice of candling eggs, and separation of chicks from mother hen after one or two weeks. This was not a common practice before the FFS. Result reflected the positive changes on poultry production. Data reveals that egg production/hen increased 66% and 75% respectively in Khulna and Patuakhali at the end of FFS. Number of selling eggs per months increased 3 to 4 times in Khulna and Patuakhali. On average, annual poultry sales increased by 3 to 6 times. The number of eggs eaten each week by FFS members increased by 32% (in Khulna) and 25% (in Patuakhali). On average, every farmer ate one or two birds per month. Linkages between the Department of Livestock Services (DLS) and FFS members increased during FFS period.

Homestead Vegetable Production Module

The average homestead size was 16.5 decimal. Sessions on the benefits of crop diversification at homestead level resulted in increases in crop diversity from 3.5% to 7.87% in Khulna and from 1.9% to 5 in Patuakhali. 82%. Farmers reported that, selling and/or eating their homestead production increased from 5% to 56% (in Khulna) and 1% to 41% (in Patuakhali). Fruit tree fertilization was farmer adopted by farmers as a general practice. By the end of the FFS, integrated pest management practice was adopted by 90% farmers in Khulna and 80% farmers in Patuakhali. At the start of the cycle, there was little if any use of Farm Yard Manure (FYM), but at the end of the FFS, almost all farmers were preparing FYM. Almost all farmers used their learning to increase their vegetable production in homestead gardens.

Nutrition Module

The nutrition module used the “thousand days dietary approach focused in the module along with proper cooking procedure, dietary status etc. FFS members showed changes in food habit and take-up of the “thousand day’s food requirement”. Moringa leaf nutrition message was given priority for including in their daily meal especially for children under 05 years age.

Market orientation

Survey data shows that FFS farmers adopted record keeping, networking and linkages with market actors, and use of information and communication technologies (ICT) as a result of the FFS. Farmers started communications with market actors using the list of market actors with address and cell phone number provided during the FFS. Information & communication technology use shifted from “never” to “occasional linkage” and increased to 82% (in Khulna) and 72% (in Patuakhali). Farmers started collective action for input collection and product selling. Almost all farmers kept records of income and expenditure.

1. Introduction

Blue Gold Program following Farmer Field School as a prime vehicle for trials, learning and adoption of improved farm technologies at homestead areas. For utilization of homestead resources the program is following a set of modules in each cycle at different polders.

This is a report of data collected in cycle 10, which took place from October 2017 to April 2018, with 33 FFS in Khulna and 30 FFS in Patuakhali. FFS cycle 10 included modules homestead, poultry and nutrition. 69 Farmer Trainers involved as apprentice with Community Development Facilitator (CDFs) to run cycle 10 FFS.

1.1 Methodologies

A semi-structure questionnaire used for collecting bench mark and end line data. The questionnaire focused on content of homestead-poultry-nutrition modules. Data on 1525 FFS members collected by Community Development Facilitators (CDFs). On-line questionnaire prepared by using ODK (Open Data Kit) tools. Open Data Kit (ODK) is a free and open-source set of tools which help manage mobile data collection solutions

The collected benchmark and end data are discussed in this report. Totals and averages of the collected benchmark and end data are presented side by side in Annexes 1 (Khulna), Annexes 2 (Patuakhali).

In Khulna, the FFSs took place in polders 25, 27/1, 28/1, 28/2, 34/2 and in Patuakhali the FFSs were in polders 55/2A, 55/2C, 47/3 and 47/4. Annex 3 shows the locations (WMG) of the 67 FFS.

Bringing the data of 63 FFS out of 67 (available for analysis) together, creates a dataset with information of over 1575 farmers. But some care should be taken when trying to draw conclusions. The data were collected by the same facilitators who organized the FFS, who may be biased to show good results. And the farmers themselves may also be tempted in the end survey to give answers that show how good they are, especially when questions are asked about changes in behaviour.

In the below discussion of the data, comments are included to help with the interpretation of the results.

1.2 Objectives

When comparing and interpreting these data it is important to understand the objectives of data collection in the FFS.

At the start of the FFS, the objectives of the “benchmark survey” are:

- To establish benchmarks that can be used by farmers and facilitators for measuring progress (e.g. in production) or to identify changes in behaviour
- To generate interest among participants and introduce them to the topics which will be discussed and practiced during the FFS.

At the end of the FFS, the “end survey” is a repetition of the same questions. This allows the FFS participants to verify their own progress, and they can present their results (e.g. an increase of egg or vegetable production), during farmer field days.

2. General information of FFS participants

In this chapter, the sets of “end data” are used to describe the profile of the FFS participants.

2.1 Gender

The following table and graph show that 95% FFS participants are women. Homestead gardening and poultry rearing are mainly women dominated activities at polder areas.

Gender of participants	
Area	Percentage Women
Khulna (n=825)	95%
Patuakhali (n=750)	95%
Total (n=1575)	95%

2.2 Age

Young dynamic farmer preferably younger than 50 years old selected for FFS. In cycle 10th participants average age was 35 years.

Area	Age of participants		
	Average age	Youngest	Oldest
Khulna (n=825)	34	18	60
Patuakhali (n=750)	36	17	60
Total (=1575)	35	17.5	60

2.3 Education

The majority of farmers are literate, but a part (about 15%) is illiterate or can sign their name. At Khulna literacy rate is higher than Patuakhali.

Area	Education (percentage)		
	Illiterate or can sign name only	Primary	Secondary/higher
Khulna (n=825)	12	33	55
Patuakhali (n=750)	17	56	27
Total (n=1575)	14.5	44.5	41

2.4 WMG membership

Mainly the WMG executive committee helps selecting FFS participants according to a set of criteria. The following tables show that at the start of cycle 10 about 98% of the FFS participants were registered WMG members. By the end of FFS the percentage increased and it is about 100%.

WMG members	Khulna-benchmark (Number farmers)	Khulna-End line (Number farmers)	Patuakhali- benchmark (number farmers)	Patuakhali- End line (Number farmers)
WMG members	813	825	679	749
Not members	12	0	71	1
Total	825	825	750	750

WMG members	Benchmark	Endline
WMG members Total (n=1575)	1492 (98%)	1524 (99.93%)

2.5 Land for agriculture and homestead area

During participant selection, priority is given to poor and landless households. In Cycle 10, about 57% of the participants belong to landless households (i.e. less than 50 decimal agricultural land and about 19 % have no land at all. The following table shows land holding status (percentages) in both areas.

Area	Agricultural land available		
	No land for agriculture (percentage farmer)	Landless (Less than 50 decimal agricultural land) (percentage farmer)	Farmer (>=50 decimal) (percentage farmer)
Khulna (n=825)	26	68	32
Patuakhali (n=750)	12	45	55
Total (n=1575)	19	56.5	43.5

The following table shows the average size of agricultural land , homestead area (Note: 100 decimal = 1 acre = 0.4 ha) and pond size owned by FFS members.

Area	Land area	
	Agricultural land area (decimal)	Homestead area (decimal)
Khulna (n=825)	51	12
Patuakhali (n=750)	74	21
Total (n=1575)	62.5	16.5

3. Comparing benchmark data with end data

The calculated averages of data collected at the beginning and end of the FFS can be used to get an idea of the effect of the training. However, this should not be seen as an impact study because some of the differences measured are a direct result of the training.

For example if all farmers report that they prepared hazol for broody hen management , this shows that they did that during the training.

The increase of number of vegetable production and increase number of space utilized by distribution of seed during the FFS as a learning by doing approach

In the following chapters we compare some of the benchmark and end data and provide some comments for interpreting the differences. For a complete set of data please see annexes 1 and 2.

4. Poultry Module

FFS cycle 10 included the poultry module. Objective of this module is to increase the production of birds and eggs and reduce losses due to diseases. Technical topics in the poultry module include housing, feeding, use of *haza*, separating chicks from the mother hen, candling, and vaccination. For market orientation linkages with service providers (input providers, community poultry workers and with staff of the department of livestock are strengthened), networking, collective action, information and communication technologies and record keeping included with poultry module.

In this chapter, some poultry related data are presented separately for the 2 districts. See also Annexes 1 (Khulna), 2 (Patuakhali).

4.1 Number of birds

The following tables show the average number of chicken, chicks, ducks and ducklings per household. The end survey shows increases in the number of animals. This can be partly attributed to improved rearing methods, and is also partly explained because some chicks or ducklings were distributed to FFS participants.

Number of birds (Who has birds)	Khulna (average per household)		Patuakhali (average per household)	
	Benchmark (n=825)	End FFS (n=825)	Benchmark (n=750)	End FFS (n=750)
Chickens	4	9	5	11
Chicks	6	19	10	24
Ducks	4	6	5	10
Ducklings	3	12	5	15

Number of birds (all FFS members)	Total cycle 10 (average per household)	
	Benchmark (n=1525)	End data (n=1525)
Chickens	4	9
Chicks	4	18
Ducks	3	7
Ducklings	1	11

4.2 Eggs per bird

In the FFS the participants learn techniques to increase egg production (e.g. separating chicks from hen after 1 week). The following tables show how the farmers estimated the egg production per year for their chickens and ducks. These numbers are of course rough estimates.

Eggs per bird	Khulna (number per year)		Patuakhali (number per year)	
	Benchmark (n=825)	End FFS (n=825)	Benchmark (n=750)	End FFS (n=750)
Eggs per hen	50	83	40	70
Eggs per duck	44	134	49	73

4.3 Egg and poultry consumption

With the increase in birds and the increase in egg production we see that households consume more of their own eggs and birds.

Egg and poultry consumptions	Khulna (percentage farmers)		Patuakhali (percentage farmers)	
Consume own eggs	75%	99%	64%	80%
Consume own birds	27%	90%	47%	80%

Farmers also estimated how many eggs they eat in a week and how many poultry they eat in a month. The following tables show that egg and poultry consumption increased as a result of the higher production. This contributes to better nutrition of the farming households.

Egg and poultry consumptions	Khulna (average)		Patuakhali (average)	
Eggs eaten per week	3.6	9	2.8	6.6
Poultry eaten per month	.3	1.4	.6	1.7

4.4 Selling of eggs

The next tables show that in the FFS the number of farmers selling eggs increased and also that the number of eggs sold per month increased. On average we see that farmers reported selling more than 3-4 times as many eggs each month.

Selling of eggs	Khulna (percentage farmers)		Patuakhali (percentage farmers)	
	Benchmark (n=825)	End FFS (n=825)	Benchmark (n=750)	End FFS (n=750)
Farmers selling eggs	45%	74%	37%	75%

Selling of eggs	Khulna (average)		Patuakhali (average)	
	Benchmark (n=825)	End FFS (n=825)	Benchmark (n=750)	End FFS (n=750)
Eggs sold per month	7.3	21	5	22

4.5 Selling of poultry

Farmers also reported how many poultry they sell per year. The next tables show that the percentage of farmers selling poultry increased and also that the number of poultry sold per year increased. On average they reported selling over 6 times as many birds each year.

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Selling of poultry	Khulna (percentage farmers)		Patuakhali (percentage farmers)	
	Benchmark (n=825)	End FFS (n=825)	Benchmark (n=750)	End FFS (n=750)
Farmers selling poultry	55%	89%	42%	76%

Selling of poultry	Khulna (average)		Patuakhali (average)	
	Benchmark (n=825)	End FFS (n=825)	Benchmark (n=750)	End FFS (n=750)
Poultry sold per year	4	11	5	32

4.6 Poultry rearing practices

In the poultry module, the FFS farmers learn several improved poultry rearing practices, such as vaccination of the birds, the use of hazals, and candling of eggs. Many farmers at the end of the FFS report that they have adopted these practices. Follow up surveys will have to show if these practices are sustained.

Vaccinations depend of course on the availability of vaccination services by community poultry workers, but most farmers report that they practice vaccinations sometimes or always. Facilitators of the FFS invited poultry workers to the FFS sessions and field days in order to link them with the FFS participants.

Almost all farmers report that they started using hazals, and all farmers adopted the practicing of candling their eggs. Most farmers separate chicks from hen after one or two weeks, while this was not a common practice before the FFS.

Poultry rearing practices	Khulna (percentage farmers)		Patuakhali (percentage farmers)	
	Benchmark (n=825)	End FFS (n=825)	Benchmark (n=750)	End FFS (n=750)
Vaccinate always	2%	51%	96%	60%
Vaccinate sometimes	12%	47%	3%	18%
Vaccinate never	87%	2%	<1%	21%
Use hazal	3%	98%	1.7%	80%
Use candling	6%	98%	2%	81%
Separate chicks after 1 week	2%	85%	1%	64%
Separate chicks after 2 weeks	<1%	13%	0%	13%
Separate chicks never	97%	<1%	99%	22%

5. Homestead Module

FFS Cycle 10 included the homestead garden module, which tries to promote and increase the production of vegetables and fruits for home consumption and as an income generating activity.

Technical topics in the module include space planning, preparation of vegetable beds, use of quality seeds and fertilizers, integrated pest management (IPM), and preparation of farm yard manure (FYM). For market orientation, the module emphasizes on production planning, crop budgeting, record keeping, collective action, linkages and networking with input providers and department of agricultural extension (DAE).

In this chapter, some data of the homestead garden module are presented separately for the two districts. See also Annexes 1 (Khulna) and (Patuakhali).

5.1 Growing homestead vegetables

About 11% to 40 % of the farmers did not yet grow homestead vegetables when they started the FFS, but all of them had a homestead vegetable garden. At the end of the FFS all FFS farmers started growing vegetables at their homestead.

Homestead vegetables	Khulna (percentage of farmers)		Patuakhali (percentage of farmers)	
	Benchmark (n=825)	End FFS (n=825)	Benchmark (n=750)	End FFS (n=750)
Farmers growing homestead vegetables	89%	100%	60%	100%

5.2 Types of vegetables grown

The percentage of farmers growing a certain type of vegetable is shown in the following table. For the benchmark data, this percentage is calculated for the farmers who already did grow vegetables. At the end survey, they all have vegetables.

Most types of vegetables became more popular during the FFS. This is partly explained by the fact that some vegetable seeds were provided to the participants.

Ladies finger, Cabbage and cauliflower, radish was less popular in both areas at beginning at homestead production. But at the end farmer included those vegetables at their homestead. FFS learning may help them to increase their production through homestead space utilization.

The increase of drumstick seen in Khulna is probably not an actual increase in trees, but as drumstick was discussed during the FFS this made farmers realize they have more of these trees in their homestead. In Patuakhali the number of drumstick is very low.

Type of vegetables	Khulna (percentage of farmers)		Patuakhali (percentage of farmers)	
	Benchmark (n=825)	End FFS (n=825)	Benchmark (n=750)	End FFS (n=750)
Gourds	75%	98%	95%	98%
Brinjal	60%	93%	56%	95%
Leafy vegetables	78%	96%	54%	95%
Ladies finger	18%	86%	12%	75%
Cabbage / Cauliflower	5%	39%	5%	39%
Radish	16%	59%	49%	93%
Tomato	31%	79%	30%	92%
Aroids	59%	92%	23%	71%
Drumstick	72%	84%	1%	15%
Other vegetables	25%	60%	22%	54%

5.3 Crop diversification

The number of different types of vegetables grown within a homestead increased significantly as the learning sessions focused on the crop diversification scope and benefits at homestead.

Crop diversification	Khulna (average)		Patuakhali (average)	
	Benchmark (n=825)	End FFS (n=825)	Benchmark (n=750)	End FFS (n=750)
Number of different vegetables grown within the same homestead	3.5%	7.87%	1.9%	5.82%

5.4 Selling of surplus vegetables

Increase of vegetable production during the FFS season resulted in surplus vegetables which can be sold. Farmers reported that at the beginning of the FFS, at Khulna and Patuakhali farmer sell and eat half of their homestead production 5% and 1% respectively. At the end of the FFS this percentage had increased to 56% and 41% respectively at Khulna and Patuakhali.

What happens with vegetables produced	Khulna (percentage farmers)		Patuakhali (percentage farmers)	
	Benchmark (n=825)	End FFS (n=825)	Benchmark (n=750)	End FFS (n=750)
Sell none	77%	9.7%	81%	14%
Sell less than half	16%	17.5%	18%	32%
Sell and eat about half	5%	56.3%	1%	41%
Sell more than half	2%	16.2%	0%	12%
Sell all	-	.3	0	-

5.5 Homestead space planning

In the FFS farmers learn to plan their homestead more efficiently and grow vegetables in different locations.

The table shows in which locations the FFS participants grow their vegetables. For the benchmark data, the average number of farmers was calculated for farmers who already grew vegetable before the FFS.

Locations used for vegetables	Khulna (percentage farmers)		Patuakhali (percentage farmers)	
	Benchmark (n=825)	End FFS (n=825)	Benchmark (n=750)	End FFS (n=750)
Sunny open place	96%	99%	88%	99%
Shady place	25%	97%	28%	89%
Wet marshy land	7%	91%	9%	82%
Hedges and fences	11%	75%	16%	85%
Roof	27%	77%	24%	89%
Pond side	17%	73%	50%	93%
Macha	35%	80%	29%	87%
Pond side macha	5%	60%	24%	87%
Pots	5%	33%	3%	39%
Other places	13%	58%	24%	65%

Instead of relying mainly on sunny open areas to grow vegetables farmers started growing their vegetables in more and different locations within their homestead space. The next table shows how many locations were used on average.

Locations used for vegetables	Khulna (average)		Patuakhali (average)	
	Benchmark (n=825)	End FFS (n=825)	Benchmark (n=750)	End FFS (n=750)
Number of different locations used within the same homestead	1.9	7.87	1.73%	6.51%

5.6 Fertilizer use in homestead vegetables

Most farmers who already grew vegetables before they became FFS participants had already experience using fertilizer in their homestead vegetables. At the end of the FFS almost all participants reported that they had applied fertilizers.

Fertilizer use in homestead vegetables	Khulna (percentage farmers)		Patuakhali (percentage farmers)	
	Benchmark (n=825)	End FFS (n=825)	Benchmark (n=750)	End FFS (n=750)
Farmers using fertilizers	63%	96%	44%	91%

The following table shows what types of fertilizers were used. The percentage of farmers is calculated only for farmers who grow vegetables and who used some fertilizers. At the benchmark survey we see that a lot of farmers already used Urea, TSP and cow dung. At the end survey many reported that they were using also MOP, gypsum, zinc, cow dung, chicken manure, FYM and compost.

Type of fertilizers used in homestead vegetables	Khulna (percentage farmers)		Patuakhali (percentage farmers)	
	Benchmark (n=825)	End FFS (n=825)	Benchmark (n=750)	End FFS (n=750)
Urea	97%	99%	97%	99%
TSP	56%	97%	77%	96%
MOP	34%	79%	22%	93%
Gypsum	3%	29%	4%	45%
Zinc	2%	18%	3%	35%
Cow dung	74%	94%	62%	94%
Chicken manure	12%	71%	6%	88%
FYM	3%	85%	1%	95%
Compost	1%	28%	0%	44%

5.7 Fruit trees

Most farmers who participated in the FFS have fruit trees in their homestead area. The following table shows for farmers who have fruit trees the average number of each type of tree. Mango, banana and coconut are the most common fruit trees grown at the homestead, while in Patuakhali also guava and jackfruit are more popular.

Types of fruit trees in homestead garden	Khulna(average)		Patuakhali (average)	
	Benchmark (n=825)	End FFS (n=825)	Benchmark(n=750)	End FFS (n=750)
Mango total	4.3	6	3.28	3.35
Mango grafted	1.6	3	0.63	0.91
Litchi total	0.4	1	0.54	0.69
Litchi grafted	0.2	0.42	0.15	0.35
Lemon total	0.9	2	1.10	1.37
Lemon grafted	0.5	2	0.31	0.59
Guava total	1.8	2	2.68	3.09
Guava grafted	0.8	2	0.51	1.12
Jujube total	0.7	1	0.91	0.82
Jujube grafted	0.3	1	0.09	0.22
Sapodilla total	1.0	1	0.16	0.22
Sapodilla grafted	0.5	1	0.10	0.12
Jackfruit	1.0	1	2.28	2.33
Blackberry	0.6	1	0.42	0.67
Coconut	4.2	4	3.72	4.13
Date palm	1.4	1	2.00	2.03
Palm tree	0.7	1	2.20	2.01
Papaya	1.1	2	1.69	3.75
Banana	6.0	8	8.23	9.85
Other fruit trees	2.2	3	4.47	5.08

The following table shows how many fruit trees were reported by the farmers; it shows the average number of trees in each homestead area. The difference between benchmark and end data is probably not an actual increase in number of trees, but partly the result of more accurate counting during the FFS.

Fruit trees in homestead garden	Khulna (average)		Patuakhali (average)	
	Benchmark (n=825)	End FFS (n=825)	Benchmark (n=750)	End FFS (n=750)
Number of trees	23	33	22	31

5.8 Fertilizer use in fruit trees

Farmers who have fruit trees reported if they use fertilizers for their trees. Before the FFS, most farmers were not doing this, but at the end survey almost all farmers had experience with fertilizing their fruit trees.

Fertilizer use fruit trees	Khulna (percentage farmers)		Patuakhali (percentage farmers)	
	Benchmark (n=825)	End FFS (n=825)	Benchmark (n=750)	End FFS (n=750)
Use fertilizer in fruit trees	16%	100%	14%	99%

5.9 Pest management

In the FFS farmers learn to use Integrated Pest Management (IPM) methods in their vegetables and/or fruit trees. The following table shows the shift in pest management practices.

Pest management	Khulna (percentage farmers)		Patuakhali (percentage farmers)	
	Benchmark (n=825)	End FFS (n=825)	Benchmark (n=750)	End FFS (n=750)
Do nothing	84	3	70.4	20
Use chemicals only	15	7	29.47	.27
Use Integrated Pest Management methods	.24	90	0.13	79.73

5.10 Money used for pesticides

The next table shows the percentage of farmers who spend money on pesticides. This increase is probably linked to the intensification and diversification of vegetable production in the homesteads.

Buying pesticides	Khulna (percentage farmers)		Patuakhali (percentage farmers)	
	Benchmark (n=825)	End FFS (n=825)	Benchmark (n=750)	End FFS (n=750)
Farmers buying pesticides	96%	91%	29%	67.5%

The following two tables show how much money is used on pesticides, but calculated in different ways.

The first table calculates the average amount (Taka) used for all FFS farmers. This shows only in Satkhira a large increase in the amount of money spent on pesticides, as initially the Satkhira farmers did hardly use pesticides.

The second table calculates the average amount used for farmers who do use pesticides. Here we see that these farmers in all cases spend a bit less money to buy pesticides.

The conclusion is that as more vegetables were produced, more farmers started using pesticides, but that the total use per farmer was reduced after the training.

Money for pesticides (all FFS participants)	Khulna (Taka)		Patuakhali (Taka)	
	Benchmark (n=825)	End FFS (n=825)	Benchmark (n=750)	End FFS (n=750)
Total money spend on pesticides	20245	82228	87850	97543
Average money spend per farmer (average for all farmers)	25	100	117	130

Money for pesticides (only participants who use pesticides)	Khulna (Taka)		Patuakhali (Taka)	
	Benchmark (n=825)	End FFS (n=825)	Benchmark (n=750)	End FFS (n=750)
Total money spend on pesticides	20245	82228	87850	97,543
Average money spend per farmer (average for farmers using pesticides)	170	112	401.14	241

5.11 Farm Yard Manure

The following table shows that before the FFS farmers hardly prepared FYM, but at the end of the FFS almost all farmers had started preparing it. A follow up survey after one or two years is needed to verify if this practice will sustain.

Farm Yard Manure	Khulna (percentage farmers)		Patuakhali (percentage farmers)	
	Benchmark (n=825)	End FFS (n=825)	Benchmark (n=750)	End FFS (n=750)
No FYM pit	88%	4%	99%	21%
Pit without shade	13%	61%	<1%	47%
Pit with shade	<1%	35%	<1%	32%

6. Nutrition module

The nutrition module is included in all FFS. The module includes cooking procedures, hygiene, and ingredients of balanced food. Emphasis is given on the “thousand day food requirements” which refers to special requirements for mothers during pregnancy and the first 2 years of the child. Farmers also learn about health benefits of Moringa.

To stimulate farmers to think about their own diet, questions are asked in the benchmark survey on what type of food they eat each week.

In this chapter, some data related to the nutrition module are presented separately for the 2 districts where the FFSs took place. See also Annexes 1 (Khulna), 2 (Patuakhali).

6.1 Cooking procedures

During the nutrition sessions farmers learn about cooking procedures, for example that it is better to wash vegetables before cutting them. The positive reporting at the end of the FFS will have some bias.

Knows correct cooking procedures	Khulna (percentage farmers)		Patuakhali (percentage farmers)	
	Benchmark (n=825)	End FFS (n=825)	Benchmark (n=750)	End FFS (n=750)
Does not know	49.82%	.48%	83%	<1%
Knows partly	39.03%	13.70%	7%	3%
Knows fully	11.15%	85.82%	9%	96%

6.2 Moringa

At the beginning of the FFS most farmers are not familiar about the health benefits of Moringa leaves. They learn about this during the nutrition sessions, and in the cooking sessions leaves are prepared for tasting. In Patuakhali, leaves were not always available which explains why fewer farmers tried eating the leaves.

These results are just showing what happened during the training. Follow up surveys will be needed to see if farmers really adapt the practice of eating Moringa leaves.

Moringa	Khulna (percentage farmers)		Patuakhali (percentage farmers)	
	Benchmark (n=825)	End FFS (n=825)	Benchmark (n=750)	End FFS (n=750)
Does not know that Moringa leaves are healthy	79%	<1%	99%	<1%
Knows, but never ate leaves	15%	12%	<1%	43%
Knows and has eaten leaves	6.42%	88%	<1%	57%

6.3 Thousand day nutrition requirements

At the beginning of the FFS the participants have limited knowledge on the food requirements during the first thousand days (pregnancy period and first 2 years of the child). At the end of the training most seem to have this knowledge, but we can expect some bias towards giving positive answers in such knowledge questions.

Know 1000 day nutrient requirement	Khulna (percentage farmers)		Patuakhali (percentage farmers)	
	Benchmark (n=825)	End FFS (n=825)	Benchmark (n=750)	End FFS (n=750)
Does not know	63%	<1%	92%	<1%
Knows partly	33%	13%	8%	3%
Knows well	4%	87%	<1%	97%

6.4 Food habits

To emphasize the need for a balanced diet, farmers were asked to estimate how many times per week they eat meat, fish, eggs, and fruits. Another question was to estimate how much vegetables they eat in a week.

We see in all cases an increased consumption at the end of FFS. The increase in meat, eggs, vegetables and fruits consumption can be the result of higher homestead production of poultry, eggs and vegetables. Increase in fruit consumption can be caused by more fruits being available during the end survey. But the increase in fish production is also obvious. It may be because of increased awareness on balanced nutrition, but we can also expect some bias in giving desirable answers.

Food habits	Khulna		Patuakhali	
	Benchmark (n=825)	End FFS (n=825)	Benchmark (n=750)	End FFS (n=750)
Meat (times per week)	<1%	1.23%	<1%	1.47%
Fish (times per week)	3.28%	3.69%	1.72%	3%
Eggs (times per week)	1.92%	2.62%	1.19%	2%
Fruits (times per week)	1.43%	2.90%	.95%	2%
Amount vegetables per week (g)	1239	1654	849	1885

6.5 Mati-o-manush

The agricultural TV program Mati-o-manush has on several occasions paid attention to Blue Gold activities, such as poultry production, beef fattening and use of mini ponds to grow water melon. The FFS facilitators mention this to the FFS participants and recommend them to watch the program. A question was included in the benchmark and end surveys about this.

Mati-o-manush	Khulna (percentage farmers)		Patuakhali (percentage farmers)	
	Benchmark (n=825)	End FFS (n=825)	Benchmark (n=750)	End FFS (n=750)
Watch never	86.06	14.91	90.27	26.67
Watch sometimes	12.85	78.06	9.6	66.53
Watch always	1.09	7.03	.13	6.8

7. Trends in market orientation

From cycle-10, market orientation issues like record keeping, networking, collective action, Information, Communication technology were incorporated within FFS sessions to enable farmers produce quality product and increase their income from selling. More emphasis was now evident on improving linkage with value chain actors.

To stimulate farmers to think about market orientation questions are asked in the benchmark survey and end line survey on record keeping ,networking, Information and Communication technologies, collective action, linkages etc.

7.1 Record Keeping

The following table shows that before the FFS farmers hardly keep record on their income and expenditure for homestead production. And the minor percentage was in non-formal mode. But at the end they started to keep record by using in different means.

Food habits	Khulna		Patuakhali	
	Benchmark (n=825)	End FFS (n=825)	Benchmark (n=750)	End FFS (n=750)
Yes	1%	98%	0%	99%
No	99%	2%	100%	1%

7.2 Source of input collection

The table shows that at the end of FFS, farmer collecting their input for vegetables and poultry production from different sources. It was because of the list of input seller and other information supplied to them.

Source of input collection	Khulna		Patuakhali	
	Benchmark (n=825)	End FFS (n=825)	Benchmark (n=750)	End FFS (n=750)
Local hat from hat-day	69%	68%	56%	83%
Local retailer shop	33%	77%	51%	81%
Neighbour	20%	38%	19%	13%
Others	0%	1%	3%	18%

7.3 Market actor phone number

At the beginning of the FFS, a list of market actors supplied to the FFS farmers. The table shows that farmers started to communicate with market actors.

Market actor phone number	Khulna		Patuakhali	
	Benchmark (n=825)	End FFS (n=825)	Benchmark (n=750)	End FFS (n=750)
Yes	1%	100%	2%	94%
No	99%	0%	98%	6%

Information communication Technology (ICT)

During FFS, members are stimulated to use ICT for agricultural information collection and its importance. Farmer oriented with different kind of ICTs . The table shows the positive changes among the members on ICT use.

Use of ICT	Khulna		Patuakhali	
	Benchmark (n=825)	End FFS (n=825)	Benchmark (n=750)	End FFS (n=750)
Never	98%	16%	98%	23%
Sometimes	1%	82%	2%	72%
Always	<1%	3%	0%	5%

7.4 Collective action (Input purchase and product sell)

At the beginning of the FFS, farmer got motivation on benefits of collective actions and the process. The below table shows, the positive changes among the FFS members on collective actions in practice.

Collective action	Khulna		Patuakhali	
	Benchmark (n=825)	End FFS (n=825)	Benchmark (n=750)	End FFS (n=750)
Purchase				
Never	99%	10%	99%	<1%
Sometimes	<1%	67%	<1%	87%
Always	0%	23%	0%	13%
Sell				
Never	98%	11%	99%	<1%
Sometimes	0%	64%	<1%	89%
Always	2%	25%	<1%	10%

8. Conclusion

The data presented in this report were collected in the benchmark survey at the beginning of the FFS and end surveys after completion of the FFSs of cycle 10 and represent the results of about 1525 farmers.

Comparing end data with benchmark shows positive effects of the FFS training, such as a considerable increase in the production of eggs, poultry and vegetable. This has resulted in higher consumption among the FFS families and selling of surplus produces locally and also in the local market to generate extra income. Market orientation to the FFSs participants has helped them for easy access to market and contributed to sell their produces in fair price to enhance their income.

Some Inputs (chicks, vegetable seed) were distributed among the FFS participants during the FFS running period, which make them more inspired to go for more production. Information supplied on market actors and line department experts help increase networking and linkages among farmers and market actors.

We can also expect some bias in the answers, as both the interviewers (FFS facilitators) and the interviewees (farmers) can be tempted to report positive results. However even if we consider this bias, we can conclude that the FFSs in cycle 10 have successfully increased production and income of the participants.

Annex-1: Khulna

FFS modules: Poultry, Homestead garden, Nutrition

Benchmark data of 33
FFS (Cycle 10)

825 records

End data of 33 FFS (Cycle 10)

825 records

GENERAL INFO PARTICIPANTS

Polder

Polder-25	450
Polder-27/1	100
Polder-28/1	50
Polder-34/2	125
Polder-28/2	100
Total	825

Age

Average age	34
Median age	35
Youngest	18
Oldest	60
Total farmers	825

Gender

Men	65
Women	760
Total	825
Percentage women	92

GENERAL INFO PARTICIPANTS

Polder

Polder-25	450
Polder-27/1	100
Polder-28/1	50
Polder-34/2	125
Polder-28/2	100
Total	825

Age

Average age	34
Median age	34
Youngest	18
Oldest	60
Total farmers	825

Gender

Men	44
Women	781
Total	825
Percentage women	95

Education

Illiterate	7
Can sign	83
Primary	239
Secondary	389
HCC and above	107
Total	825

WMG member

Member	813
Not member	12
Total	825

Area agriculture (decimal)

Average	51
Median	30
Zero area (0 decimal)	218
Landless (<50 decimal)	499
Not landless (>=50 decimal)	326
Total	825
Percentage zero area	26
Percentage landless	60
Percentage not landless	40
Min area (decimal)	-
Max area (decimal)	600
Total area	38,261
Households with land (>0 ha)	502
Average area for HH with land	76

Area homestead (decimal)

Average	
---------	--

Education

Illiterate	9
Can sign	88
Primary	272
Secondary	360
HCC and above	96
Total	825

WMG membership

Member	825
Not member	-
Total	825

Area agriculture (decimal)

Average	46
Median	20
Zero area (0 decimal)	217
Landless (<50 decimal)	562
Not landless (>=50 decimal)	263
Total	825
Percentage zero area	26
Percentage landless	68
Percentage not landless	32
Min area (decimal)	-
Max area (decimal)	500
Total area	37,696
Households with land (>0 ha)	608
Average area for HH with land	62

Area homestead (decimal)

Average	
---------	--

Blue Gold Program

	12
Median	10
Min	1
Max	80
Zero area (num farmers)	-
Total	825

VEGETABLES & FRUITS

Grows vegetables

Yes	658
No	167
Total	825

Vegetables

Gourds	493
Brinjal	396
leafy Vegetables	516
Ladies Finger	119
Cabbage/Cauliflower	32
Radish	104
Tomato	204
Aroids	387
Drumstick	471
Other vegetables	163
Total farmers	658

Number of vegetables grown

Min	-
Max	10
Average	3.5
Total	825

What happens with the vegetables

Sell none	507
Sell less than half	

M
M
MOTT
MACDONALD

	12
Median	9
Min	-
Max	90
Zero area (num farmers)	1
Total	825

Grow Vegetables

Yes	825
No	-
Total	825

Vegetables

75	Gourds	809
60	Brinjal	768
78	Leafy vegetables	793
18	Ladies finger	709
5	Cabbage / Cauliflower	323
16	Radish	489
31	Tomato	655
59	Aroids	760
72	Drumstick	693
25	Other vegetables	495
	Total farmers	825

Number of vegetables grown

Min	1
Max	10
Average	7.9
Total	825

What happens with the vegetables

77	Sell none	118
16	Sell less than half	

Blue Gold Program

M
M
MOTT
MACDONALD

	108
Sell and eat about half	30
Sell more than half	13
Sell all	-
Total	658

Vegetable locations

Sunny open place	629
Shady place	164
Wet marshy land	48
Hedges and fences	73
Roof	178
Pond side	111
Macha	228
Pond side macha	34
Pots	33
Other places	87
Total farmers	658

Number of vegetable locations used

Min	-
Max	8
Average	1.9
Total	825

Seeds from

Own seed	452
DAE	2
BADC	5
NGO	25
Company	18
Market	568
Neighbours	295
Total	658

	264	
5	Sell and eat about half	340
2	Sell more than half	103
-	Sell all	-
	Total	825

Vegetable locations

96	Sunny open place	815
25	Shady place	799
7	Wet marshy land	754
11	Hedges and fences	618
27	Roof	634
17	Pond side	606
35	Macha	659
5	Pond side macha	498
5	Pots	271
13	Other places	477
	Total farmers	825

Number of vegetable locations used

Min	-
Max	10
Average	7
Total	825

Seeds from

Own seed	770
DAE	27
BADC	58
NGO	64
Company	248
Market	757
Neighbour	539
Total	825

Fertilizer use

Use no fertilizers	243
Use some fertilizers	415
Total	658

63

Fertilizer use

Use no fertilizers	33
Use some fertilizers	792
Total	825

Type of fertilizers used

Urea	402	61
TSP	231	35
MOP	138	21
Gypsum	12	2
Zinc	9	1
Cowdung	306	47
Chicken manure	48	7
FYM	13	2
Compost	5	1
Total farmers	658	

Type of fertilizer used

Urea	788
TSP	771
MOP	622
Gypsum	232
Zinc	144
Cowdung	745
Chicken manure	562
FYM	677
Compost	219
Total farmers	825

Have fruit trees

Yes	719
No	106
Total	825

Have fruit trees

Yes	818
No	7
Total	825

Fruit trees (total trees all farmers)

Total mango	3104
Grafted mango	1179
Total litchi	271
Grafted litchi	168
Total lemon	625
Grafted lemon	332
Total guava	1298
Grafted guava	563
Total jujube	484
Grafted jujube	224
Total sapodilla	743
Grafted sapodilla	324

Fruit trees (total trees all farmers)

Total mango	4530
Grafted mango	2571
Total litchi	444
Grafted litchi	341
Total lemon	1546
Grafted lemon	1257
Total guava	1287
Grafted guava	1818
Total jujube	720
Grafted jujube	418
Total sapodilla	1081
Grafted sapodilla	718

Total jackfruit	689
Total blackberry	422
Total coconut	3027
Total date palm	970
Total palm tree	518
Total papaya	805
Total banana	4328
Other fruit trees	1603
Total farmers	825

Total jackfruit	820
Total blackberry	623
Total coconut	3480
Total date palm	1157
Total palm tree	652
Total papaya	1834
Total banana	6717
Other fruit trees	2063
Total farmers	825

Fruit trees (average per farmer)

Total mango	4.3
Grafted mango	1.6
Total litchi	0.4
Grafted litchi	0.2
Total lemon	0.9
Grafted lemon	0.5
Total guava	1.8
Grafted guava	0.8
Total jujube	0.7
Grafted jujube	0.3
Total sapodilla	1.0
Grafted sapodilla	0.5
Total jackfruit	1.0
Total blackberry	0.6
Total coconut	4.2
Total date palm	1.4
Total palm tree	0.7
Total papaya	1.1
Total banana	6.0
Other fruit trees	2.2
Total farmers	825

Fruit trees (average per farmer)

Total mango	6
Grafted mango	3
Total litchi	1
Grafted litchi	0.42
Total lemon	2
Grafted lemon	2
Total guava	2
Grafted guava	2
Total jujube	1
Grafted jujube	1
Total sapodilla	1
Grafted sapodilla	1
Total jackfruit	1
Total blackberry	1
Total coconut	4
Total date palm	1
Total palm tree	1
Total papaya	2
Total banana	8
Other fruit trees	3
Total farmers	825

Count fruit trees

Total	18,887
Average	22.9
Min	-
Max	307
Total farmers	825

Pest management

Do nothing	701
Use chemicals	122
Use IPM	2
Total farmers	825

Pesticide cost

No money used on pesticides	5
Used money for pesticides	119
Total farmers	124

How much money used

Total	20,245
Average (of farmers doing pest management)	170
Average (of all farmers)	25
Max	2,000

FYM

No pit	716
Pit without shade	107
Pit with shade	2
Total farmers	825

Use fertilizer on fruit trees

Use fertilizers	114
No fertilizers	605

Count fruit trees

Total	27,485
Average	33.3
Min	-
Max	302
Total farmers	825

Pest management

Do nothing	21
Use chemicals	60
Use IPM	744
Total farmers	825

Pesticide cost

No money used on pesticides	72
Used money for pesticides	732
Total farmers	804

96

How much money used

Total	82,228
Average (of farmers doing pest management)	112
Average (of all farmers)	100
Max	600

FYM

No pit	34
Pit without shade	504
Pit with shade	287
Total farmers	825

Use fertilizer on fruit trees

Use fertilizers	803
No fertilizers	15

Total who have fruit trees	719
----------------------------	-----

Total who have fruit trees	818
----------------------------	-----

POULTRY

Number of chicken

Max chicken	45
Min chicken	-
Farmers with chicken	757
Farmers without chicken	68
Total farmers	825
Total chicken	3,337
Average chicken (of farmers with chicken)	4.4
Average chicken (of all farmers)	4.0

Number of chicks

Max chicks	50
Min chick	-
Farmers with chicks	400
Farmers without chicks	425
Total farmers	825
Total chicks	2,504
Average chicks (of farmers with chicken)	6.3
Average chicks (of all farmers)	3.0

Number of ducks

Max Duck	86
Min Duck	-
Farmers with Duck	532
Farmers without Duck	293
Total farmers	825
Total Duck	1,967

POULTRY

Number of chicken

Max chicken	61
Min chicken	-
Farmers with chicken	811
Farmers without chicken	14
Total farmers	825
Total chicken	6,895
Average chicken (of farmers with chicken)	8.5
Average chicken (of all farmers)	8.4

Number of chicks

Max chick	150
Min chick	-
Farmers with chick	772
Farmers without chick	53
Total farmers	825
Total chick	14,819
Average chick (of farmers with chicken)	19.2
Average chick (of all farmers)	18.0

Number of ducks

Max Duck	117
Min Duck	-
Farmers with Duck	709
Farmers without Duck	116
Total farmers	825
Total Duck	4,466

Blue Gold Program

Average Duck (of farmers with Duck)	3.7
Average Duck (of all farmers)	2.4

Number of ducklings

Max Duckling	20
Min Duck	-
Farmers with Duckling	184
Farmers without Duckling	641
Total farmers	825
Total Duckling	615
Average Duckling (of farmers with Duckling)	3.3
Average Duckling (of all farmers)	0.7

Eggs per hen per year

Max	100
Min	-
Average	45

Eggs per duck per year

Max	350
Min	-
Average	44

Own egg consumption per week

Max	30
Min	-
Total	2,991
Average	3.6
Farmers eat own eggs	615
Farmers not eat own eggs	210
Total farmers	825

Average Duck (of farmers with Duck)	6.3
Average Duck(of all farmers)	5.4

Number of ducklings

Max Duckling	37
Min Duckling	-
Farmers with Duckling	653
Farmers without Duckling	172
Total farmers	825
Total duckling	7,761
Average Duckling (of farmers with duckling)	11.9
Average Duckling(of all farmers)	9.4

Eggs per hen per year

Max	138
Min	-
Average	83

Eggs per duck per year

Max	350
Min	-
Average	134

Own egg consumption per week

Max	35
Min	-
Total	7,137.0
Average	9
Farmers eat own eggs	817
Farmers not eat own eggs	8
Total farmers	825

75

Own poultry consumption per month

Max	5
Min	-
Total	279
Average	0.3
Farmers eat own poultry	224
Farmers not eat own poultry	601
Total farmers	825

Own poultry consumption per month

Max	25
Min	-
Total	1,128
Average	1.4
Farmers eat own poultry	740
Farmers not eat own poultry	85
Total farmers	825

27

Eggs sold per month

Max	250
Min	-
Total	5,172
Average	6.3
Farmers selling eggs	370
Farmers not selling eggs	455
Total farmers	825

Eggs sold per month

Max	500
Min	-
Total	17,751
Average	21.5
Farmers selling eggs	607
Farmers not selling eggs	218
Total farmers	825

74

Poultry sold per year

Max	100
Min	-
Total	3,077
Average	3.7
Farmers selling poultry	458
Farmers not selling poultry	367
Total farmers	825

Poultry sold per year

Max	150
Min	-
Total	13,192
Average	16.0
Farmers selling poultry	738
Farmers not selling poultry	87
Total farmers	825

Poultry vaccinated

Never	716
Sometimes	96
Always	

Poultry vaccinated

Never	14
Sometimes	389
Always	

Blue Gold Program

	13
Total farmers	825

Hazal

Yes	21
No	804
Total farmers	825

Chick separation

After 1 week	15
After 2 weeks	3
After 3 weeks	3
After 4 weeks	1
Never	803
Total farmers	825

Candling

Yes	51
No	774
Total farmers	825

NUTRITION

Know cooking process

Does not know	411
Knows partly	322
Knows fully	92
Total farmers	825

Know Moringa is healthy

Does not know	652
Knows but did not eat	120
Knows and has eaten	53

M
M
MOTT
MACDONALD

	422
Total farmers	825

Hazal

Yes	808
No	17
Total farmers	825

Chick separation

After 1 week	700
After 2 weeks	107
After 3 weeks	14
After 4 weeks	-
Never	4
Total farmers	825

Candling

Yes	806
No	19
Total farmers	825

NUTRITION

Know cooking process

Does not know	4
Knows partly	113
Knows fully	708
Total farmers	825

Know Moringa is healthy

Does not know	4
Knows but did not eat	98
Knows and has eaten	723

Blue Gold Program

Total farmers	825
---------------	-----

Know 1000 day food requirement

Does not know	519
Knows partly	276
Knows well	30

Total farmers 825

Days per week eat meat

Average	0.6
Min	-
Max	4

Days per week eat fish

Average	3.3
Min	-
Max	7

Days per week eat eggs

Average	1.9
Min	-
Max	7

Days per week eat fruit

Average	1.4
Min	-
Max	7

Amount vegetables per week (gram)

Average	1,240
Min	-
Max	3,500

Total farmers	825
---------------	-----

Know 1000 day food requirement

Does not know	2
Knows partly	105
Knows well	718
Total farmers	825

Days per week eat meat

Average	1.2
Min	-
Max	6

Days per week eat fish

Average	4
Min	1
Max	7

Days per week eat eggs

Average	2.6
Min	-
Max	7

Days per week eat fruit

Average	2.9
Min	-
Max	7

Amount vegetables per week (gram)

Average	1,655
Min	2
Max	3,000

Watch Mati-o-manush

Never	710
Sometimes	106
Always	9
Total farmers	825

Watch Mati-o-manush

Never	123
Sometimes	644
Always	58
Total farmers	825

Market orientation

Record keeping

Yes	9
No	816
Total farmers	825

Market orientation

Record keeping

Yes	811
No	14
Total farmers	825

Mode of record keeping

In note book	1
In paper	0
In mind	8
Total	825

Mode of record keeping

In note book	578
In paper	278
In mind	70
Total	825

Input collection source

Local hat from hatday	571
Local retailer Shop	274
Neighbour	173
others	0

Input collection source

Local hat from hatday	563
Local retailer Shop	642
Neighbour	319
others	10

Have market actor phone number

Yes	9
No	816
Total	825

Have market actor phone number

Yes	822
No	3
Total	825

99.64

ICT for Agri.Info

Never	812
Sometimes	9
Always	4
Total	825

ICT for Agri.Info

Never	128
Sometimes	676
Always	21
Total	825

Collectively input collection

Never	818
Sometimes	7
Always	0
Total	825

Collectively input collection

Never	82
Sometimes	554
Always	189
Total	825

Collective sell

Never	809
Sometimes	0
Always	16
Total	825

Collective sell

Never	93
Sometimes	529
Always	203
Total	825

Annex-2: Patuakhali

FFS modules: Poultry, Homestead garden, Nutrition

Benchmark data of 30 FFSs (Cycle 10)

750 records

End data of 30 FFS (Cycle 10)

750 records

GENERAL INFO PARTICIPANTS

Polder

Count Polder 55_2a	300
Count Polder 55_2c	150
Count Polder 47_3	75
Count Polder 47_4	225
Total	750

Age

Average age	36
Median age	35
Youngest	17
Oldest	60
Total farmers	750

Gender

Men	41
Women	709
Total	750
Percentage women	95

Education

Illiterate	12
------------	----

GENERAL INFO PARTICIPANTS

Polder

Count Polder 55_2a	300
Count Polder 55_2c	150
Count Polder 47_3	75
Count Polder 47_4	225
Total	750

Age

Average age	36
Median age	35
Youngest	17
Oldest	60
Total farmers	750

Gender

Men	38
Women	712
Total	750
Percentage women	95

Education

Illiterate	4
------------	---

Can sign	205
Primary	336
Secondary	153
HCC and above	44
Total	750

WMG member

Member	679
Not member	71
Total	750

Area agriculture (decimal)

Average	74
Median	50
Zero area (0 decimal)	91
Landless (<50 decimal)	342
Not landless (>=50 decimal)	408
Total	750
Percentage zero area	12
Percentage landless	46
Percentage not landless	54
Min area (decimal)	-
Max area (decimal)	800
Total area	55,504
Households with land (>0 ha)	659
Average area for HH with land	84

Area homestead (decimal)

Average	22
Median	16
Min	-
Max	

Can sign	127
Primary	418
Secondary	154
HCC and above	47
Total	750

WMG member

Member	749
Not member	1
Total	750

Area agriculture (decimal)

Average	74
Median	50
Zero area (0 decimal)	93
Landless (<50 decimal)	337
Not landless (>=50 decimal)	413
Total	750
Percentage zero area	12
Percentage landless	45
Percentage not landless	55
Min area (decimal)	-
Max area (decimal)	800
Total area	55,517
Households with land (>0 ha)	657
Average area for HH with land	85

Area homestead (decimal)

Average	21
Median	16
Min	1
Max	

Blue Gold Program

	99
Zero area (num farmers)	1
Total	750

VEGETABLES & FRUITS

Grows vegetables

Yes	442
No	308
Total	750

Vegetables

Gourds	422	95
Brinjal	249	56
Leafy vegetables	237	54
Ladies finger	52	12
Cabbage / Cauliflower	21	5
Radish	216	49
Tomato	131	30
Aroids	100	23
Drumstick	5	1
Other vegetables	99	22
Total farmers	442	

Number of vegetables grown

Min	-
Max	9
Average	1.9
Total	750

What happens with the vegetables

Sell none	356	81
Sell less than half		

	99
Zero area (num farmers)	-
Total	750

VEGETABLES & FRUITS

Grows vegetables

Yes	600
No	150
Total	750

Vegetables

Gourds	589
Brinjal	569
Leafy vegetables	568
Ladies finger	452
Cabbage / Cauliflower	231
Radish	558
Tomato	551
Aroids	427
Drumstick	92
Other vegetables	325
Total farmers	600

Number of vegetables grown

Min	-
Max	10
Average	5.8
Total	750

What happens with the vegetables

Sell none	58
Sell less than half	

	78	18
Sell and eat about half	6	1
Sell more than half	2	0
Sell all	-	-
Total	442	

	105
Sell and eat about half	338
Sell more than half	97
Sell all	2
Total	600

Vegetable locations

Sunny open place	387
Shady place	118
Wet marshy land	41
Hedges and fences	70
Roof	106
Pond side	219
Macha	130
Pond side macha	108
Pots	14
Other places	106
Total farmers	442

Vegetable locations

Sunny open place	592
Shady place	531
Wet marshy land	493
Hedges and fences	508
Roof	536
Pond side	555
Macha	521
Pond side macha	521
Pots	234
Other places	388
Total farmers	600

Number of vegetable locations used

Min	-
Max	8
Average	1.7
Total	750

Number of vegetable locations used

Min	-
Max	10
Average	6.5
Total	750

Seeds from

Own seeds	388
DAE	10
BADC	2
NGO	9
Company	9
Market	295
Neighbours	183
Total farmers	600

Seeds from

Own seeds	584
DAE	115
BADC	102
NGO	334
Company	424
Market	526
Neighbours	412
Total farmers	600

Fertilizer use

Use no fertilizers	248	56
Use some fertilizers	194	44
Total	442	

Type of fertilizers used

Urea	189
TSP	149
MOP	42
Gypsum	8
Zinc	6
Cowdung	120
Chicken manure	12
FYM	2
Compost	0
Total farmers	442

Have fruit trees

Yes	478
No	272
Total	750

Fruit trees (total trees all farmers)

Total mango	1568
Grafted mango	302
Total litchi	256
Grafted litchi	70
Total lemon	525
Grafted lemon	146
Total guava	1281
Grafted guava	243
Total jujube	435
Grafted jujube	45
Total sapodilla	78
Grafted sapodilla	47
Total jackfruit	1092
Total blackberry	202
Total coconut	1779
Total date palm	956
Total palm tree	1053

Fertilizer use

Use no fertilizers	56
Use some fertilizers	544
Total	600

Type of fertilizer used

Urea	538
TSP	523
MOP	505
Gypsum	245
Zinc	193
Cowdung	514
Chicken manure	478
FYM	515
Compost	238
Total farmers	600

Have fruit trees

Yes	586
No	164
Total	750

Fruit trees (total trees all farmers)

Total mango	1961
Grafted mango	534
Total litchi	405
Grafted litchi	204
Total lemon	801
Grafted lemon	345
Total guava	1811
Grafted guava	657
Total jujube	483
Grafted jujube	130
Total sapodilla	128
Grafted sapodilla	70
Total jackfruit	1366
Total blackberry	391
Total coconut	2419
Total date palm	1189
Total palm tree	1175

Total papaya	808
Total banana	3936
Other fruit trees	2139
Total farmers	478

Total papaya	2199
Total banana	5772
Other fruit trees	2974
Total farmers	586

Fruit trees (average per farmer)

Total mango	3.28
Grafted mango	0.63
Total litchi	0.54
Grafted litchi	0.15
Total lemon	1.10
Grafted lemon	0.31
Total guava	2.68
Grafted guava	0.51
Total jujube	0.91
Grafted jujube	0.09
Total sapodilla	0.16
Grafted sapodilla	0.10
Total jackfruit	2.28
Total blackberry	0.42
Total coconut	3.72
Total date palm	2.00
Total palm tree	2.20
Total papaya	1.69
Total banana	8.23
Other fruit trees	4.47
Total farmers	478

Fruit trees (average per farmer)

Total mango	3.35
Grafted mango	0.91
Total litchi	0.69
Grafted litchi	0.35
Total lemon	1.37
Grafted lemon	0.59
Total guava	3.09
Grafted guava	1.12
Total jujube	0.82
Grafted jujube	0.22
Total sapodilla	0.22
Grafted sapodilla	0.12
Total jackfruit	2.33
Total blackberry	0.67
Total coconut	4.13
Total date palm	2.03
Total palm tree	2.01
Total papaya	3.75
Total banana	9.85
Other fruit trees	5.08
Total farmers	586

Count fruit trees

Total	16,108
Average	21.5
Min	-
Max	184
Total farmers	750

Count fruit trees

Total	23,074
Average	30.8
Min	-
Max	184
Total farmers	750

Pest management

Do nothing	528
Use chemicals	221
Use IPM	1

Pest management

Do nothing	150
Use chemicals	2
Use IPM	598

Total farmers	750
---------------	-----

Total farmers	750
---------------	-----

Pesticide cost

No money used on pesticides	3
Used money for pesticides	219
Total farmers	222

Pesticide cost

No money used on pesticides	195
Used money for pesticides	405
Total farmers	600

29

How much money used

Total	87,850
Average (of farmers doing pest management)	401
Average (of all farmers)	117
Max	1,200

How much money used

Total	97,543
Average (of farmers doing pest management)	241
Average (of all farmers)	130
Max	1,000

FYM

No pit	745
Pit without shade	3
Pit with shade	2
Total farmers	750

FYM

No pit	155
Pit without shade	356
Pit with shade	239
Total farmers	750

Use fertilizer on fruit trees

Use fertilizers	70
No fertilizers	408
Total who have fruit trees	478

Use fertilizer on fruit trees

Use fertilizers	580
No fertilizers	6
Total who have fruit trees	586

POULTRY

Number of chicken

Max chicken	66
Min chicken	-
Farmers with chicken	677
Farmers without chicken	73
Total farmers	750
Total chicken	

POULTRY

Number of chicken

Max chicken	140
Min chicken	-
Farmers with chicken	597
Farmers without chicken	153
Total farmers	750
Total chicken	

	3,059
Average chicken (of farmers with chicken)	4.5
Average chicken (of all farmers)	4.1

Number of chicks

Max chicks	50
Min chicks	-
Farmers with chicks	397
Farmers without chicks	353
Total farmers	750
Total chicks	3,778
Average chicks (of farmers with chicks)	9.5
Average chicks (of all farmers)	5.0

Number of ducks

Max ducks	34
Min ducks	-
Farmers with ducks	573
Farmers without ducks	177
Total farmers	750
Total ducks	2,755
Average ducks (of farmers with ducks)	4.8
Average ducks (of all farmers)	3.7

Number of ducklings

Max ducklings	15
Min ducklings	-
Farmers with ducklings	186
Farmers without ducklings	564
Total farmers	750

	6,778
Average chicken (of farmers with chicken)	11.4
Average chicken (of all farmers)	9.0

Number of chicks

Max chicks	185
Min chicks	-
Farmers with chicks	590
Farmers without chicks	160
Total farmers	750
Total chicks	14,156
Average chicks (of farmers with chicks)	24.0
Average chicks (of all farmers)	18.9

Number of ducks

Max ducks	60
Min ducks	-
Farmers with ducks	594
Farmers without ducks	156
Total farmers	750
Total ducks	6,015
Average ducks (of farmers with ducks)	10.1
Average ducks (of all farmers)	8.0

Number of ducklings

Max duckling	120
Min duckling	-
Farmers with duckling	584
Farmers without duckling	166
Total farmers	750

Total ducklings	988
Average ducklings (of farmers with ducklings)	5.3
Average ducklings (of all farmers)	1.3

Total duckling	8,848
Average duckling (of farmers with duckling)	15.2
Average duckling (of all farmers)	11.8

Eggs per hen per year

Max	60
Min	-
Average	40

Eggs per hen per year

Max	120
Min	-
Average	70

Eggs per duck per year

Max	90
Min	-
Average	49

Eggs per duck per year

Max	150
Min	-
Average	73

Own egg consumption per week

Max	20
Min	-
Total	2,065
Average	2.8
Farmers eat own eggs	477
Farmers not eat own eggs	273
Total farmers	750

Own egg consumption per week

Max	66
Min	-
Total	4,942
Average	6.6
Farmers eat own eggs	599
Farmers not eat own eggs	151
Total farmers	750

64

Own poultry consumption per month

Max	25
Min	-
Total	476
Average	0.6
Farmers eat own eggs	353
Farmers not eat own eggs	397
Total farmers	750

Own poultry consumption per month

Max	20
Min	-
Total	1,272
Average	1.7
Farmers eat own poultry	599
Farmers not eat own poultry	151
Total farmers	750

47

Eggs sold per month

Max	54
Min	-
Total	3,816
Average	5.1
Farmers selling eggs	283
Farmers not selling eggs	467
Total farmers	750

Eggs sold per month

Max	200
Min	-
Total	16,128
Average	21.5
Farmers selling eggs	567
Farmers not selling eggs	183
Total farmers	750

Poultry sold per year

Max	54
Min	-
Total	4,043
Average	5.4
Farmers selling poultry	314
Farmers not selling poultry	436
Total farmers	750

Poultry sold per year

Max	195
Min	-
Total	24,731
Average	33.0
Farmers selling eggs	590
Farmers not selling eggs	160
Total farmers	750

Poultry vaccinated

Never	720
Sometimes	26
Always	4
Total farmers	750

Poultry vaccinated

Never	163
Sometimes	138
Always	449
Total farmers	750

Hazal

Yes	13
No	737
Total farmers	750

Hazal

Yes	597
No	153
Total farmers	750

Chick separation

After 1 week	8
After 2 weeks	-

Chick separation

After 1 week	479
After 2 weeks	101

After 3 weeks	-
After 4 weeks	3
Never	739
Total farmers	750

After 3 weeks	-
After 4 weeks	2
Never	168
Total farmers	750

Candling

Yes	16
No	734
Total farmers	750

Candling

Yes	605
No	145
Total farmers	750

NUTRITION

Know cooking process

Does not know	624
Knows partly	55
Knows fully	71
Total farmers	750

Know cooking process

Does not know	6
Knows partly	22
Knows fully	722
Total farmers	750

Know Moringa is healthy

Does not know	742
Knows but did not eat	1
Knows and has eaten	7
Total farmers	750

Know Moringa is healthy

Does not know	3
Knows but did not eat	320
Knows and has eaten	427
Total farmers	750

Know 1000 day food requirement

Does not know	689
Knows partly	57
Knows well	4
Total farmers	750

Know 1000 day food requirement

Does not know	1
Knows partly	20
Knows well	729
Total farmers	750

Days per week eat meat

Average	0.6
Min	-

Days per week eat meat

Average	1.5
Min	-

Blue Gold Program

Max	3
-----	---

Max	5
-----	---

Days per week eat fish

Average	1.7
Min	-
Max	6

Days per week eat fish

Average	3.0
Min	-
Max	6

Days per week eat eggs

Average	1.2
Min	-
Max	5

Days per week eat eggs

Average	2.2
Min	-
Max	6

Days per week eat fruit

Average	0.9
Min	-
Max	5

Days per week eat fruit

Average	2.2
Min	-
Max	6

Amount vegetables per week (gram)

Average	850
Min	-
Max	2,000

Amount vegetables per week (gram)

Average	1,886
Min	-
Max	4,000

Watch Mati-o-manush

Never	677
Sometimes	72
Always	1
Total farmers	750

Watch Mati-o-manush

Never	200
Sometimes	499
Always	51
Total farmers	750

Market orientation

Record keeping

Yes	0
No	750
Total farmers	750

Market orientation

Record keeping

Yes	745
No	5
Total farmers	750

Mode of record keeping

Keep in mind	0
In note book	0
Keep in mind and notebook	1
Total	1

Input collection source

Local hat from hatday	418
Local retailer Shop	385
Neighbour	140
others	23

Have market actor phone number

Yes	12
No	738
Total farmers	750

ICT for Agri.Info

Never	733
Sometimes	17
Always	0
Total	750

Collectively input collection

Never	747
Sometimes	3
Always	0
Total	750

Collective sell

Never	747
Sometimes	3
Always	0
Total	750

Mode of record keeping

Keep in mind	20
In note book	689
Keep in mind and notebook	161
Total	870

Input collection source

Local hat from hatday	626
Local retailer Shop	610
Neighbour	116
others	137

Have market actor phone number

Yes	707
No	43
Total	750

ICT for Agri.Info

Never	169
Sometimes	541
Always	40
Total	750

Collectively input collection

Never	5
Sometimes	657
Always	97
Total	759

Collective sell

Never	4
Sometimes	678
Always	77
Total	759

Annex- 3: WMG List

FFS ID	WMG Name	Polder	Union	Upazila	Facilitators
568	Tolna	25	Dhamalia	Dumuria	hafsa
569	Pakuria tolna dhakkin	25	Dhamalia	Dumuria	hafsa
570	Kharsongo	25	Raghunathpur	Dumuria	hafsa
571	Chaybaria	25	Dhamalia	Dumuria	hafsa
575	Bamondia	25	Kharnia	Dumuria	monalisa
576	Bujbuniya	34_2	Baliadanga	Batiaghata	monalisa
577	Jalbari	34_2	Baliadanga	Batiaghata	monalisa
578	Dhadua	34_2	Baliadanga	Batiaghata	monalisa
579	Ronojitter hula	34_2	Baliadanga	Batiaghata	monalisa
580	Khoria	27_1	Gutudia	Dumuria	nasima
581	Araji Sajiara	27_1	Dumuria	Dumuria	nasima
583	Maduhbkati	27_1	Raghunathpur	Dumuria	nasima
584	Khajura	27_1	Dumuria	Dumuria	nasima
585	Moshiali	25	Atragilatola	Fultola	nasir
586	Dakathaia	25	Atragilatola	Fultola	rasel
587	Taligati	25	Jogipul	Digholia	rasel
588	Sardardhanga	25	Atragilatola	Fultola	rasel
589	Thukra	25	Raghunathpur	Dumuria	rasel
590	J B S R	28_2	Jalma	Batiaghata	sabina
591	Sachibunia	28_2	Jalma	Batiaghata	sabina
592	Gola	28_2	Jalma	Batiaghata	sabina
593	Choygoriya	28_2	Jalma	Batiaghata	sabina
594	Baruna	25	Dhamalia	Dumuria	waliullah
595	Paspota pachuriya	25	Kharnia	Dumuria	waliullah
596	Alka	25	Damodor	Fultola	waliullah
597	Damodor Poschim	25	Damodor	Fultola	waliullah
598	Rangpur Madhya	25	Rangpur	Dumuria	zahida
599	Madhugram	25	Rangpur	Dumuria	zahida
600	Cumrail	25	Raghunathpur	Dumuria	zahida
601	Gojendropur	25	Raghunathpur	Dumuria	zahida
603	Alaipur	28_1	Gutudia	Dumuria	zakir
604	Poscim bil pabla	28_1	Gutudia	Dumuria	zakir
611	Madhupura Denath kha khal	55_2c	Alipura	Dshamina	basar
612	Katakhali khal	55_2c	kolagachia	golachipa	basar

FFS ID	WMG Name	Polder	Union	Upazila	Facilitators
613	Guabaria Ranuar khal	55_2c	Bokulbaria	golacghipa	basar
626	Uttar chapara khal	47_3	mithagonj	kolapara	eusuf
627	Tegachia Azimuddin khal	47_3	mithagonj	kolapara	eusuf
628	Melapara khal	47_3	mithagonj	kolapara	eusuf
601	Bot o char balaikati ffs	55_2a	Komlapur	Patuakhali	feroj
605	Char moishadi sluice ffs	55_2a	Komlapur	Patuakhali	feroj
606	Madhya dharandi chendipur ffs	55_2a	Komlapur	Patuakhali Sadar	Feroj
629	Dakshin dharandi bazar ffs	55_2a	Komlapur	Patuakhali Sadar	Feroj
630	Hazirhat sluice ffs	55_2a	Adabaria	Baufol	Feroj
631	Dharandi kamlapur adharsha ffs	55_2a	Komlapur	Patuakhali Sadar	Feroj
620	Saplar duge khal	47_4	Baliatoli	Kolapara	mijan
621	Varane khal	47_4	Baliatoli	Kolapara	mijan
622	Dhora khal	47_4	Dulashor	Kolapara	mijan
608	Betagi sunkipur radhasetaram	55_2a	Betagi sankipur	Dashmina	nahar
609	Betagi chikerbandh	55_2a	Betagi sankipur	Dashmina	nahar
610	Nomala niz botkazal bhangra	55_2a	Niz batkazol bhanra	Golachipa	nahar
633	Kharija betagi	55_2a	Bokulbaria, betagi	Dashmina, Golachipa	nahar
634	Patabunia	55_2a	Bulbaria	Golachipa	nahar
614	Bhadrabaria khal	55_2c	Kolagacgia	Golachipa	nargis
616	Kharizzam khal	55_2c	Kolagacgia	Golachipa	nargis
617	Showrnirver khal	47_4	Bbaliatoli	Kolapara	shahidul
618	Borkotia khal	47_4	Dulbugonj	Kolapara	shahidul
619	Pokkhiapara khal wmg	47_4	Bbaliatoli	Kolapara	shahidul
623	Charnogib khal f f s	47_4	Bbaliatoli	Kolapara	zabber
624	Bolltolin nayakata tarikaka khal f f s	47_4	Dulbugonj	Kolapara	zabber
625	Monosatali khal f f s	47_4	Dulbugonj	Kolapara	zabber

Annex-4: Poultry trial report

Abstract

The poultry FFS is based on principles of promotion and technology transfer on improve poultry farming to the poor WMG members that can help the rural poor to bridge the gap between demand and supply of eggs and poultry meat as well as generate self-employment to reduce poverty, empower rural women and enhance food security aspects. Since time immemorial, backyard poultry farming has played an important role to meet the domestic as well as socio-cultural needs of the rural people. However, the traditional poultry farming in villages has suffered in the wake of commercialization in the recent years. Thus, the present study had been conceptualized with the overall objective to search out the adopted technology through FFS approach of backyard poultry farming in the BGP polder area in Khulna and Patuakhali. The study was conducted in selected 54 FFS trial through a structured questionnaire interviewing 54 FFS and 54 non-FFS farmers. The analysis of data revealed that respondents were predominantly middle age and had medium level of education. Agricultural labor was the major occupation; they had marginal land and medium livestock holding poultry farming. The average flock size was 14 birds and they reared birds in semi-scavenging with little supplementary feeding and free-range/backyard system. Natural hatching was the main source of chicks. Systematic care was taken with regard to the diseases and vaccination of the birds in trials and not in non-FFS control groups.

Keywords: FFS trial farmers, self-employment, rural women

Introduction

Indigenous/native chickens are playing an important role in rural economies in most of the developing and underdeveloped countries. They play a major role for the rural poor and marginalized section of the community with respect to their supplementary income and also provide them with nutritious eggs and meat for their own consumption. i Performance of native fowl can be improved by change in husbandry, feeding, and better health cover through FFS approach. Importance of native poultry birds for rural economy is immense in different countries. Though these birds are being used for rural backyard poultry production, their genetic potentiality has not been fully exploited. Through FFS approach, improve management technologies of backyard poultry rearing have been transferred to explore genetic potentiality of these birds to the poor farmers. This makes the poor farmers interested for growing more backyard poultry at their homestead. Backyard farming has over the years contributed to a great extent to the agrarian economy of different countries including Bangladesh.. It provides livelihood security to the family in addition to increased nutrients uptake. Unemployed youth and women can also earn substantial amount of income through poultry farming.



Objective

1. To identify chicks hatchability percentage, how much body weight of broody hen loss during incubation period, frequency of egg production, benefit of using hazal, improve housing, advantages of disease prevention.
2. To identify adaptation of backyard poultry rearing technology
3. To compare the benefit of improved and traditional poultry rearing system in the rural farmers

Gender

Among the trial farmers, 89% are female and 11% are male whereas, in the control group, 100% are female.

Age

The age range of the trial farmers is from 18 to 48 years and average age is 32.81 years. The control group is from 22 to 50 years and average age is 35.63 years.

Education

The education level of the farmers in trial (case) and control group vary. 4% and 7% farmers know sign only in trial and control groups respectively. 26% and 61% farmers are passed primary school, 59% and 32% are high school level of education in trial and control group respectively. 11% farmers are in college level education in trial group. No farmers have college level education in control group.

Materials and Methods:

The study was conducted at four polders namely 55/2C, 55/2A, 47/3 & 47/4 in Patuakhali and five polders namely 25, 27/1 & 2, 28/1 & 2 in Khulna under local poultry FFS of cycle-10 started from October 17 to March 2018. Data were collected from November 2017 to March, 2018 from 54 FFS trials purposively. Collected data were organized and analyzed by using descriptive statistical tools, paired sample t-test in SPSS program.

Result and discussion

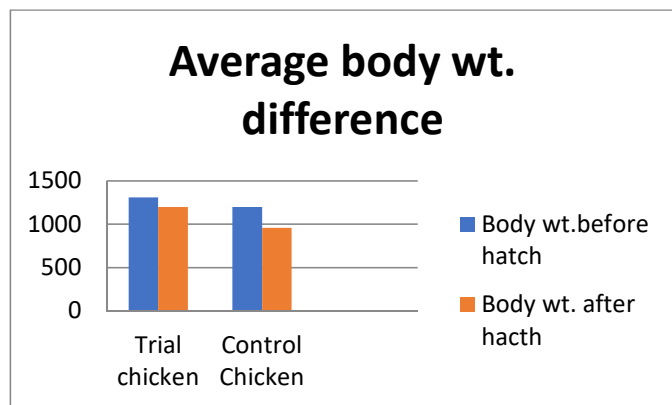
Housing

Housing is essential to chickens as it protects them against predators, theft, rain, sun, cold wind and dropping night temperatures. Moreover, it provides shelter for egg laying and broody hens. The all trial farmers had used improved two storied house but control farmers had no improved poultry houses, they kept bird in their own house with baskets. The study revealed that due to improved housing in trial framers, chicks suffer less diseases attack, enhancing growth, easy feeding and management, increase egg production and chicken feels comfort. iiThe reports of Halima et al. iii the significant size of the rural households of northwest Ethiopia to have separate sheds for their chickens. In case of trial farmers chicks have been separated from mother hen by one week and kept them on upper chamber of housing in improved shed but after hatching in control groups, the chicks were allowed to forage and roam freely with their mothers in open areas near the home and surroundings. It is clear from the results that 87% of the chickens are managed under a traditional or extensive chicken management system. 90% of the farmers provided supplementary feeding to their chickens, once per day, with maize, barley, wheat, and household waste products. iv



Body weight of broody hen

The minimum body weight of trial and control groups were 980 and 800 gram and maximum body weight were 1900 and 2000 gram respectively in both groups initially. The difference initial body weight of broody hen in case and control study was 46.66 gram which was not statistically significant ($p < 0.05$). After hatching, minimum body weight of trial and control groups were 700 and 500 gram and maximum were 1800 and 1500 gram respectively. However, average body weights difference of broody hen after hatching between two groups were 240.51 gram which was statistically significant ($p < 0.05$). It reveals that during incubation period of hens, as control farmers not provided supplementary feed to the hen that reduces body weight ultimately production became hampers.



Fertile egg weight

The average fertile egg weight was in trial and control group 39.28 ± 1.49 and 38.54 ± 1.87 respectively and mean difference was 0.741 which was statistically significant ($p < 0.05$). It showed that selected eggs in trial groups were very important for hatchability. But N.O. Ramaphala said in his article that egg weight have no significant effect ($p > 0.05$) on fertility rate percentage and hatchability of COBB 500 broiler chickens. However, fertility rate percentage ranged between 92.40-90.90% while percentage hatchability ranged between 90.89-92.43%, respectively

Candling of egg

Fertile eggs had been candled by the all trial farmers on the day five but 100% farmers did not candle eggs in control groups. It reveals that farmers are almost adopted and reduce egg loss in the trial. It also reveals that due to candling of fertile eggs, 99% eggs are hatched and 50% are not hatched in trial and control groups respectively. It is not the only factor for hatchability of eggs but it has of course important role in this issue.

Vaccination

100% farmers used BCRDV 1st dose in trial groups and 100% farmers did not use BCRDV 1st and 2nd dose in control group. In trial/case group, 98% farmers used BCRDV 2nd dose. In case of RDV, 83 % farmers used in trial group and 100% are not used RDV in control group that reveals mortality occurs in the outside FFS control group. .Data showed that 96% farmers have no mortality of their chicks in trial group and whereas 98% farmer have observed mortality of their chicks in different age level control group.



Deworming

Most chickens have some worms, but it isn't a problem until the chicken becomes overwhelmed with too many. Then it can cause health issues, decreased laying, and even death. In case of trial group 87% farmers used anthelmintics to their chicken but 90% did not deworm chicken in control group. Due to parasitic infestation farmers do not get satisfactory production.

Mortality

96% chicks are survived in trial groups and 98% mortality happened in control group. It shows management of chicks in trial groups was very good and in control groups were careless.

Feeding in the Hazal

Free range scavenging based village chicken production is a common practice in the study area. Many studies reported that most of the chicken owners keep their chicken in backyard scavenging type of production system with occasional supplementary feeds. The supplementary feeds are provided to increase egg production, encourage growth and maintain flock health. Water is important for animals including chickens to keep healthy the flock and promote production. Chickens should have access to clean water in free choice using clean watering trough on hazal. **Error! Bookmark not defined.** Average feed given in the hazal was 59.35 grams but no hazal used in control group which means farmers in the outside of FFS not aware of hazal system for rearing local poultry. It gives many benefits including hatchability, less weight loss of broody hen, easy to turning eggs for proper heating. Feeding provision in the hazal allows hen to start laying again within short period after chicks separation from mother. Data reveals that chicks were separated from mother hen average on 12 days in trial group but average on 81 days in control group. Due feeding and watering in the hazal during incubation and early separation of chicks from hen it comes into laying after 12 days of trial group and 81 days of control group.



Conclusion

The importance of native poultry birds for rural economy in developing and underdeveloped countries mostly in Asia and Africa is very high. They are part of balanced farming system that have vital roles in the rural households as a source of high quality animal protein and emergency cash income and play a significant role in the sociocultural life of the rural community and woman empowerment. One of the most important positive characters of native chicken is their hardiness, which is ability to tolerate the harsh environmental condition and poor husbandry practices without much loss in production. The native chickens are the reservoir of genomes and major genes for improvement of high yielding exotic germplasm for tropical adaptability and disease resistance. The low production performance of native chickens may be improved through improvement in husbandry practices, better healthcare, and supplementary feeds from day old stage to brooding. Comparative analysis between two types of data reveal trial farmers are well trained and followed FFS leanings and non FFS farmers do not know improve management of local poultry rearing so that production and income was more than control farmers.

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ⁱ **Importance of Indigenous Breeds of Chicken for Rural Economy and Their Improvements for Higher Production Performance**, Mahendra Kumar Padhi, Regional Centre, ICAR-Central Avian Research Institute, Baramunda, Bhubaneswar 751003, India

1. ⁱⁱ **Appraisal of Chicken Production with Associated Biosecurity Practices in Commercial Poultry Farms Located in Jos, Nigeria**

C. V. Maduka, I. O. Igbokwe, * and N. N. Atsanda

ⁱⁱⁱ **Halima H, Nesar FW, VanMarle-Koster E, DeKock A (2007) Village-based indigenous chicken production system in north-west Ethiopia.** *Journal of Tropical Animal Health and Production* 39: 189-197.

2. ^{iv} **Indigenous chicken production systems in villages in the south of Tunisia, M Ben Larbi, N M'hamdi and B Haddad** *Laboratoire des ressources animales et alimentaires, Institut National Agronomique de Tunisie, 43 Avenue Charles Nicole, 1082 Tunis, Tunisia*

2.1.1.1 ^v **Nigussie D, VanderWaaij EH, VanArendok JA (2011) Genetic and phenotypic parameter estimates for body weights and egg production in Horro chicken of Ethiopia.** *Journal of Tropical Animal health and Production* 43: 21-28.