

# Report on

## FINAL EVALUATION REPORT AND PROJECT IMPACT EVALUATION REPORT PREPARATION ON AROMATIC RICE PRODUCTION

<b>Title of the project</b>	High value aromatic rice production and income increasing of entrepreneurs through processing” Value Chain Project
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### Submitted to

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We hope that the study findings, insights, programme inputs, recommendation, and key lessons learnt during the project's implementation stage will facilitate GBK to utilise future interventions, particularly in aromatic rice sector in Bangladesh.

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## Indicator based project facts

Target as per log frame	Baseline	Achievements (Final evaluation)	Extent of achievement
Aromatic Rice cultivation		<ul style="list-style-type: none"> <li>100% HH involved in aromatic rice cultivation</li> <li>Average 134 decimal land for aromatic rice cultivation</li> </ul>	
Income from aromatic rice will be increased by 50%	<ul style="list-style-type: none"> <li>Average annual income from aromatic rice is Tk.34,156</li> </ul>	<ul style="list-style-type: none"> <li>Tk.53,025</li> </ul>	55.2% increased
The increase in total production at the end of the project period will be 30%.	<ul style="list-style-type: none"> <li>322 kg/bigha</li> </ul>	<ul style="list-style-type: none"> <li>594 kg per bigha</li> </ul>	84% increased
The total increase in sales will be 50%.	<ul style="list-style-type: none"> <li>Total sale of aromatic rice is 317 kg per bigha</li> </ul>	<ul style="list-style-type: none"> <li>541 kg per bigha</li> </ul>	70.5% increased
Production cost will be reduced to 30%.	<ul style="list-style-type: none"> <li>Production cost per bigha was Tk.14,562</li> </ul>	<ul style="list-style-type: none"> <li>Tk.11,168 per bigha</li> </ul>	30% reduced
An additional 1000 acres of land will be covered under aromatic rice production	<ul style="list-style-type: none"> <li>287 acres of land for aromatic rice cultivation</li> </ul>	<ul style="list-style-type: none"> <li>Currently 4063 acres of land engaged for aromatic rice cultivation</li> </ul>	3776 acres of aromatic rice cultivation increased
The project will generate an additional 500 employment in aromatic rice	<ul style="list-style-type: none"> <li>Total 2931 work force engaged with the project participants</li> </ul>	<ul style="list-style-type: none"> <li>Currently 7105 workforces engaged</li> </ul>	4174 new employment has created

## Abbreviation

BDS	Business Development Services
BDT	Bangladeshi Taka (Bangladesh Currency)
DAE	Department of Agricultural Extension
F2F	Face to Face
FGD	Focus Group Discussion
HH	Households
HSC	Higher Secondary Certificate
IDI	In-depth Interview
Kg	Kilogram
KII	Key Informants Interview
MFI	Micro Finance Institute
NGO	Non-Government Organization
PG	Producer Group
PHM	Post-Harvest Management
PSU	Primary Sampling Unit
SAAO	Sub Assistant Agricultural Officer
SP	Service Providers
SPSS	Statistical Packages for Social Sciences
SSC	Secondary School Certificate
STE	Short Term Enumerator
Tk.	Bangladeshi Taka
ToR	Terms of References
VC	Value Chain
VMFH	Vulnerable, Marginal Farming Households
GBK	Organization for the Poor Community Advancement
PKSF	Palli Karma-Sahayak Foundation
PACE	Promoting Agricultural Commercialization and Enterprises

## Definition of the terms used in this Report

Agro-inputs:	Agricultural products and techniques applied to the land for specific farming benefit
Assets	This includes productive asset i.e. livestock, land, and other equipment and tools for livelihood purpose etc.
Aratdar	An Aratdar serves as a fixed commission agent with a fixed establishment. They operate between the Bepari and retailers, charging a fixed commission for providing storage facilities
Asset / Land Ownership	Any asset including land possess by her, used for productive purpose by her and registered (if needed) on her name in a formal way.
Bepari	A professional trader who purchases agricultural products from farmers or farias in the local market or village. This group handles a larger volume of products than Farias. Bepari sell their products to Aratdar.
Business Operation	Trading of produces / product of specific value chain within the project interventions.
Data triangulation	A effective technique that facilitates validation of data through cross verification from two or more sources and particularly refers to a system of combining several different research methods to study a single subject.
Decimal	A measure of land used in Bangladesh and India equivalent to one hundredth of an acre (e.g. 100 decimals = 1 acres / 100 decimals = 0.4046 hectares).
Faria	A small trader who deals in products within three or four local markets and handles a small volume of products. A faria purchases products from farmers and sells them to either a bepari or direct to consumers. They are usually landless laborers or small farmers with no full-time work.
Household Income	It is defined as the gain in cash or kind received in exchange of goods and services of all family members in a particular period.
LSP	Local Service Provider developed under project intervention from project beneficiaries
Retailer	Retailers are the last link of marketing channel. They purchase products from Beparis through the Aratdars and sell them direct to consumers.
Sales	Individual sales of producers
Start-up Asset / Equipment	Start-up asset/equipment provided to the project beneficiaries under the project starting period of the project under specific project intervention.
Training	All sorts of training and capacity provided under the support of the project.
Union	The lowest administrative unit in Bangladesh – below Upazila
Union Parishad	Union Council.
Upazila	Local level Administrative government structure.
Value chain	The value chain describes the full range of activities that are required to bring a product or service from conception, through the intermediary phases of production, to delivery to the final consumer, and (for physical goods) final disposal after use
Vermicompost	Vermicompost is the product of the decomposition process using various species of worms, usually red wigglers, white worms, and other earthworms, to create a mixture of decomposing vegetable or food waste, bedding materials, and vermicompost. Vermicompost is the end-product of the breakdown of organic matter by earthworms

## Executive summary

Gram Bikash Kendra (GBK) is a national NGO working in the northwest region of Bangladesh. GBK is implementing a project titled **Increasing the income of entrepreneurs through production and processing of high value aromatic rice** funded by PKSF in Parbatipur, Chirirbandar, Fulbari and Birampur under Dinajpur District. GBK has been implementing the project since January 2017 to December 2022 targeting 8,000 household of aromatic rice farming. The objectives of the project are: i) to increase production by using improve technology and access to profitable business for Aromatic rice small entrepreneur, ii) reducing production cost and iii) to create opportunity based on labor for poor and ultra-poor.

The Evaluation team (ET) followed mixed approach combining qualitative and quantitative method for sample survey data collection, analysis and reporting. Data and information collected from primary and secondary sources. Primary data and information collected through qualitative and quantitative survey. For quantitative survey the team surveyed 300 Households those are actively engaged with aromatic rice production and the project has been working directly called as project beneficiary. In addition to that 4 FGDs, 20 KIIs, few meetings and observations also conducted for collecting qualitative information from project related stakeholders such as farmer group, input and output market actors, government officials, project staff, etc. As a part of literature review, the evaluation team reviewed through different documents related to the project.

### Findings of the project intervention:

43% HHs average annual income ranges from Tk.200,000 to Tk.300,000, 25% below two lakhs. Average income of the survey respondents Tk.286,775/ annually, which almost double than baseline 138,376

Average annual income (profit) of a farmer from aromatic rice calculated as Tk.53,025 which **55.2% higher than that of baseline Tk.34,156** and project target was 50% increase from the baseline. Therefore, project achieved more than target.

Average 1.34 acres of land cultivated each season by the farmers and total 4063 acres engaged for aromatic rice cultivation. During baseline **total land area was 287 acres but the achieved tremendously and reached to 4063 acres** with 8000 famers and average land size calculated as 1.34 acres, which **3776 acres higher than baseline** period. BRRIdhan34 seems most (1.35) and BRRIdhan-50 cultivated 1.32 acres of land on average 1.34 acres per farmer.

It was found that land labour cost is higher 28%, followed by lease value cost (24%), land preparation 15%, harvesting 10%, fertilizers 7%, seed & seedling transplantation 5%, irrigation 4%, pest management 2%, however total cost of production calculated as Tk.11,168 per one Bigha land of aromatic rice production. During baseline it was Tk.14562 per bigha. Production/ cultivation **cost is lower (-30.39%)** than that of baseline data 3 years back.

- Aromatic rice area coverage increased from 287 acre to 4063 acres
- Average aromatic rice cultivated land is 1.34 acre
- Production cost 30% reduced
- Production per bigha increased 84%
- Sales 541 per bigha baseline was 317kg
- Sales volume increased by 70.6%
- Profit increased by 55.2%
- Overall income from aromatic rice increased by 55.2%

During baseline average production per Bigha was 322 kg, but present data shows as per survey it is 594 kg per bigha (BRRIdhan-34 was 462kg and BRRIdhan-50 was 726 kg). Simultaneously sales volume of the aromatic rice was 541 kg per bigha after own consumption (5%) and retain as seed (4%). Therefore, **production has increased (84%)** than that of baseline due to good quality of seeds, application of modern production technology, appropriate use of fertilizers, optimum use of irrigation water and timely intercultural operations. Farmers were trained on aromatic rice production, harvesting and post-harvest technologies, preparation of quality seedlings through good nursery management, application of organic fertilizer (vermi compost) and regular field supervision.



It was also found that 5% aromatic rice was used to own consumption and 95% were sold to the market, therefore **sales of the aromatic rice increased by 70.66%** from 317 kg to 541 kg per bigha (BRRIdhan-34 was 420kg and BRRIdhan-50 was 661 kg) compared to baseline and final evaluation data.

As a result of project intervention, approximately 23% farmers have knowledge about good agricultural practices as they received from the training. 22% have idea and followed single hill methods for transplantation, which learned from training.

The beneficiary aromatic farmers receive extension services from different sources mainly from inputs retailers 84%, DAE/SAAO 45%, neighbor farmers 80% for their farming as and when necessary.

Eighty-six per cent respondents stated that they procure inputs (seed, fertilizer, pesticides, organic manure etc.) from relevant retailers, followed by BADC, dealer and lead farmers (neighbor farmer). BADC only provide seed. Most the respondent collected inputs from multiple sources. All purchases in cash.

Project established demonstration plots on ideal nursery, farmers' gained results and methods from the demo consequences of these few of the farmers established commercial nursery (aromatic rice seedling) as a new entrepreneurship.

85% farmers use mechanical techniques for land preparation and only 15% use traditional techniques. 35% respondents mentioned shallow tube well as source of water 65.0% deep tube well and during Amon season mostly rely on rain fed water. Numbers of farmers use AWD for irrigation and use USG for rice cultivation.

10% of the respondents stated that they do the soil test for aromatic rice farming. None did any water test. They do not test the pesticides and fertilizers. Most of the respondents understand about personal protective equipment during use of any chemicals especially during pesticides application. But only 23% farmers use PPE during application of pesticides (mask).

Most of the farmers use solar trap in their aromatic rice field and some them provided by the project. Half of the respondents use vermi-compost or organic manure for the aromatic rice cultivation.

Project has provided numbers of training to the aromatic cultivators, organized workshops for inputs retailers, traders and relevant stakeholders. All respondents mentioned they attended two main training, and they learned about i) HYV Aromatic rice cultivation, pest management and marketing ii) HYV Aromatic rice seed production and storage.

Project demonstrated numbers of demo plots for disseminating aromatic rice farming related results, methods, technologies, information and share lessons learning in the project areas. The project team (GBK) also organized field days. 100% of the survey respondents mentioned that they have visited demonstration plots and/or actively participated in the events.

Project has installed bill boards, signages, market promotional leaflets, posters, and news for branding and promotion of project activities.

The evaluation team found there were multiple sources of loan mostly from NGOs (95%) mainly GBK, 5% formal bank, 2% relatives. Ranges of loan varies from Tk.10,000 to Tk. 250,000/-.

Covid-19 affected Aromatic rice market severely, as the aromatic rice consumed more during special occasions, events (social, marriage, religious, family gathering), it has tremendous negative impact of sales. But price was not dropped, but demand slower and supply also less. 50% respondents stated that farmer could not get labour on-time and little costly, insufficient inputs in the market (70% respondents stated) and many retailers closed the shops.

Aromatic rice requires more labour since seedling, nursery, land preparation, transplantation, mechanization, harvesting special care during post-harvest and transportation. However, 4,174 (total 7105) new employment were created by the 3,000 aromatic rice producers as a result of project intervention within the supply chain

and production/ farming system. This number is much higher than that of baseline 2,931, therefore project activity has achieved little less than target 5,000.

### **Relevance, appropriateness, effectiveness, efficiency, impact, sustainability of the project**

The evaluation team found the project initiative is relevance and appropriate. The project team, farmers themselves, market traders, value chain actors and service providers contributed remarkably for modern agronomic practices, market linkage and effectively operate to enhance crop yield, productivity, and access to financial inclusion. Such initiatives created remarkable multiplier impact to the farming community in the project areas e.g. income increased, yield per acreage increased, production increased, production cost reduced, financial inclusion. The project found to be highly relevant for its importance for expanded economic opportunities in the locality and its appropriateness to the needs of intended beneficiaries, corporate partners and socio-cultural setting. The project staff encountered considerable challenges in managing the business aspect of the project, namely to ensure quality control (e.g. good quality seeds and seedlings, nursery management, GAP, demonstration plots, farmers field days), market the products, inclusion of financial supports and introduce Good Agricultural Practices as model.

### **Relevance**

Before initiating the project, the beneficiaries were lack of business support services, traditional agronomic practices, lack of farming machineries, inadequate agricultural extension services, network with local government agencies, limited access to market, and finance. Lacks of communication beneficiaries are remaining far from the market, lack of financial access due to no organized market system, no contractual production, and poor quality of inputs. Farmers were lack of good quality seeds and limits only one season.

All these evidences showed the relevance of undertaken project interventions which facilitated the process of capacity building in harnessing modern agricultural practices, inclusion of financial linkage for rice farming with NGO like GBK was very much relevant for daily life transactions and paying utility services.

The project took timely and innovative initiatives to address the issues and problems of the beneficiaries in Bangladesh. Systematic and participatory planning, implementation approach was undertaken to implement the project. Entire project activities have been in line with the improvements of economic empowerment, livelihoods, poverty reduction, modern agronomic practices.

### **Effectiveness**

Among the activities, training, counselling, field days, financial inclusion, networking and linkages and mentoring are the key interventions to make the project effective.

### **Modernization of the agronomic practices**

Average annual income (profit) of a farmer from aromatic rice Tk.53,025 which 55.2% higher than that of baseline Tk.34,156. Participants farmers had changed their aromatic rice farming season inclusive of Boro variety BRRIdhan -50 (Banglamati) and aman BRRIdhan-34 in last 4 years due to the project intervention. Linkage with DAE representatives, market actors, nursery owners, aromatic rice processors were established.

**Total land area of aromatic rice cultivation has increased in many folds from 287 acres and reached to 4063 acres** with 8000 famers and average land size calculated as 1.34 acres, which **3776 acres higher than baseline.**

Production cost reduced 30% from the baseline due to project intervention and optimum use of inputs, application of vermi-compost, judicious use of irrigation water (AWD) methods, use of USG, single hill transplantation, and farm mechanization.

**Production has increased by 84%** than that of baseline due to good quality of seeds, application of modern production technology, appropriate use of fertilizers, optimum use of irrigation water and timely intercultural operation. Farmers were trained on aromatic rice production, harvesting and post-harvest technologies, preparation of quality seedlings through good nursery management, application of organic fertilizer (vermi compost) and regular field supervision.

Farmers were using modern machineries for land preparation. The project worked in collaborate with Govt. departments so that the impact of their work can sustain in the long run. The influence of SAAO or Sub Assistant

Agriculture Officer in the changes of land preparation shows that project did good collaboration with the Govt. departments.

According to study it was found 45% of the farmers mentioned SAO used to visit their field it has created good linkage with government officials.

### **Training and Technical Knowledge**

Need assessment was conducted by the project staff accordingly training material were developed and booklets, demonstration plots, field days disseminated modern cultivation messages to the community. They learnt about modern agronomic techniques, using improved seed, line sowing, single hill methods, learnt about modern rice cultivation, production increased, appropriate application of input, pest control became easy, health conscious and quality of the produces and new techniques of aromatic rice cultivation.

Cent percent respondents stated that cost of production decreased, and calculated as 30% decreased than baseline (3 years back). Total cost of production calculated as Tk.11,168 per one Bigha land of aromatic rice production and BRRIdhan-50 Tk.12081, however total cost of production calculated as Tk.11,168 per one Bigha land of aromatic rice production had decreased by 30%.

Because of the project interventions like trainings, awareness, quality inputs selection and many other reasons the production of aromatic rice had increased over the years. The project farmers achieved 84.5% overall increase in their production. During baseline average production per Bigha was 322 kg per bigha, but present data shows as per survey it is 594 kg per bigha (BRRIdhan-34 was 462kg and BRRIdhan-50 was 726 kg). Simultaneously sales volume of the aromatic rice was 541 kg per bigha after own consumption (5%) and retain as seed (4%). Therefore, **production has increased (84.5%)** than that of baseline due to good quality of seeds, application of modern production technology, appropriate use of fertilizers, optimum use of irrigation water and timely intercultural operation. Farmers were trained on aromatic rice production, harvesting and post-harvest technologies, preparation of quality seedlings through good nursery management, application of organic fertilizer (vermi compost) and regular field supervision.

### **Outcomes and Impact**

The project stimulates local farmers to use their land for more usable to increase cropping intensity. The farmers brought changes in their cropping practices due to the intervention of the project. The response showed 100% of the farmers had changed their cropping practices by bringing in new variety. Additionally, new inputs retail shops opened nearby the market that helped local farming communities for their improved agricultural practices. Hence the project created huge spill over effect to the other non-targeted farmers in the locality. 99.5% of the farmers had changed their cropping pattern in last 4 years due to the profitable aromatic rice farming business model intervention. 100% of the farmers were using new variety of seed, 77.5% were using high yielding seed. 25% had ensured improved seedlings or transplanting methods (single hill), 30% had reduced usage of inputs. All of the respondent stated they use recommended dosages of inputs (seed, pesticides, fertilizers) using bio-pesticides. Farmers are using solar trap in rice field for pest control as an IPM methods, which introduced by the project. The learning gained from training by the project, were using PPE during pesticide application, 25% had ensured improved seedlings or transplanting methods, and reduced usage of inputs, results 30% reduction of the production cost and 84% respondents increased in production, 55.5% stated increased in profit.

Due to project interventions like trainings, demonstration field, collaboration with Govt. departments, voluntary works and farmer centre many changes were found in agronomic practices of the farmers. Hundred per cent respondents said that their production had increased.

Overall project has excellent impact in production increase, cost of production reduced, productivity (income and profit) has increased and livelihoods improved.

### **Sustainability**

The project worked to collaborate with Govt. departments so that the impact of their work can sustain in the long run. The influence of Sub Assistant Agriculture Officer in the changes of land preparation, modern cultivation and post-harvest practices shows that the project did good collaboration with the Govt. departments, that shows sustainability of the project.

Beneficiaries already adopt the production, farming systems, access to market and market information, linkage with local public services, availability and awareness on nutritional and health issues etc; however, the knowledge and economic gain remain with them that indicate sustainability of the support services and outputs from the project intervention. A changing asset status is also an indication of sustainability of the HHs. Assurance of Food security, access to land, and other activities seems the project would be sustainable.

It was calculated that relevance, appropriateness and coherence of the project seemed outstanding performance; efficiency, effectiveness, and impact scored performance in line with what would be expected of a well-functioning (very good); sustainability also outstanding as farmers adopted the commercializing of the aromatic rice farming.

#### **Recommendations**

- **Refresher Training to be provided:** The project should provide refresher training (production, GAP, harvest and post-harvest management, farm record keeping and GAP standards) to the farmers and relevant stakeholders.
- **Market Linkage to be strengthened:** To ensure good agricultural prices the project should emphasize on creating market linkage with market actors in the national, big city markets along with processors and large buyers. Linkage with good quality and accredited inputs suppliers to be strengthened.
- **Agri-machineries to be supported:** The farmers during the FGDs expressed dire need of agri-machineries like drip irrigation system, power tiller etc. for agronomic efficiency.
- **Financial inclusion:** The farmers should be provided with sufficient credit so that they can utilize efficiently and earn more money.
- **Collaboration with DAE and other Government departments:** Necessary linkage to be strengthen with DAE and department to enhance GAP in aromatic rice farming as specialised product.
- **Exit Plan:** The project should think of an appropriate and sustainable, safe and friendly exit plan way ahead the end of the project.

It was found that the project has achieved all of its results indicators to the expected extent at the time of evaluation. The findings of the evaluation of the project management cycle indicates that the project is has impacted to social and economic empowerment of the ultra-poor and very poor families as well as ensure better livelihoods.

Finally, the project was very relevant, appropriately identify and select beneficiaries, effectively intervene and implement the set activities, efficiently use of project resources, positively significantly impact on reaching commercialization of aromatic rice farming business model (value chain strengthening, financial inclusion, poverty reduction and social cohesion) sustainably.

## Chapter 1: Introduction

### 1.1 Project background

Gram Bikash Kendra (GBK) is a regional levels non-profit development organization working in the northwest region of Bangladesh. GBK grew from a youth organization formed by a group of socially committed peoples. Gram Bikash Kendra (GBK) is implementing a project titled **Increasing the income of entrepreneurs through production and processing of high value aromatic rice** funded by PKSF in Parbatipur, Chirirbandar, Fulbari and Birampur under Dinajpur District. GBK has been implementing the project since January 2017 to December 2022 targeting 8,000 household (5000 in phase 1 and 3000 in phase 2) of aromatic rice farming.

#### Project Objectives:

- To increase production by using improve technology and access to profitable business for Aromatic rice small entrepreneur.
- Reducing production cost.
- To create opportunity based on labor for poor and ultra-poor.

The ultimate aim is to increase income and improve livelihood for entrepreneur by cultivating Aromatic rice through production increment and reducing production cost

### 1.2 Objective of the assignment:

The evaluation team assessed project's achievements against the set of outcome and impact of the project. The specific objectives are given below, but not limited to:

- To find and calculate enlisted household's assets and present livelihood status of selected Aromatic rice farmer under the project.
- To evaluated the needs and identify the knowledge gaps on the aromatic rice (BRRI 34, BRRI 50, BRRI 80, Black rice & BRRI 90) cultivation.
- To understand the public and private sector policies, program and supply chain structures related to the selected farmer.
- To mention the production area, Income and livelihood status.
- To assess the present situation or identify the household profile of the beneficiaries of year round rice production, processing and marketing in a sustainable manner.
- To assess the land profile, income, expenditure & savings, relationship with other service providing institutions and market actors.
- To create a final evaluation for assessing impact of the project.

### 1.3 Scope of works:

- Conduct final evaluation assessment on rice production in Parbatipur, Chirirbandar, Fullbari and Birampur under Dinajpur District.
- Final evaluation report preparation to be followed by compares the data with baseline survey report and also the project log frame.
- Work closely with the project and stakeholder to selected potential farmers and prepare a report.
- Work closely with the project and company to facilitate the establishment of rice producer groups in the targeted areas.
- Provide recommendation as well as Public Private Dialogue that lead GBK for providing support.

#### **1.4 The production and demand of aromatic rice scenario**

Bangladesh has ranked third globally in rice production for the fourth consecutive year with a projected output of 38.4 million tonnes. The Food and Agriculture Organisation (FAO) published the ranking in its report titled 'Food Outlook-June 2022'. In the report, the FAO projected that Bangladesh's rice production will be increased by 1.4 percent in 2022. Rice production has increased by three times since the liberation of Bangladesh. Bangladesh was fourth in rice production with Indonesia being third, India second and China first. Bangladesh produced 36.5 million tonnes of rice in 2019 and ranked third in the world for the first time that year. Bangladesh was in third place maintaining the continuity of production with a production of 37.4 million tonnes in 2020 and 37.8 million tonnes in 2021, according to the FAO report.

The rich and middle class have polao, biryani, firni, payes at various festivals, and aromatic rice as the main ingredient. Not only middle class but also lower-class people use aromatic rice for entertaining guests. Entertaining guests and relatives with delicious food made from fragrant rice have been a part of our tradition and rituals from time immemorial. Farmers have been cultivating fragrant rice in the corner of their land or a part of it. The purpose is to serve various delicacies including pulao, biryani, kachchi, firni, pitha-puli made of fragrant rice to entertain the guests in various events including religious festivities like Eid and Puja. In addition, aromatic rice dishes have become a commercial staple in any festival or hotel/restaurant's set menu. The use of aromatic rice has also increased in hotels and restaurants. Overall, the demand for aromatic rice is on the rise. However, prices are rising in line with demand. Traders say that although the prices of all types of thick and thin rice fluctuate, the price of aromatic rice is always on the rise.

Dinajpur has a reputation as a paddy district. Boro or Aman, Dinajpur is one of the top districts in paddy production every season. Due to natural advantages, the yield of Kataribhog paddy is higher here. Farmers are also inclined to cultivate aromatic paddy due to increasing demand and higher profits. Badshabhog, Kalijira, Chinigura (BRRI dhan-34), Kataribhog, BRRI dhan-50, Zira Nazir, and Banglamati rice produced here are now valued worldwide. In the meantime, Kataribhog and Kalijira rice of Dinajpur have got Geographical Identification (GI) and are also representing the nature, culture and heritage of Bangladesh in the world.

Growing demand in both local and international markets with lucrative prices of high-yielding aromatic rice has encouraged farmers to increase their cultivation in recent times. Indigenous popular varieties are being sidelined with farmers inclining towards the high-yielding automatic rice varieties because of double yields and higher profits.

There are now eight fine and aromatic rice varieties developed by the BRRI. They are BR5 (Dulabhog), BRRI-dhan 34, BRRI-dhan 37, BRRI-dhan 38, BRRI-dhan 70, BRRI-dhan 75, BRRI-dhan 80 and BRRI-dhan 50. According to the DAE once upon a time farmer used to cultivate BRRI-dhan-34, Jira Katari, Challishajira, Badshabhog, Kalijira, Jata Katari and Kataribhog paddy in small plots of land along with another paddy. The cultivation of aromatic paddy has been increasing from the 2012-13 financial year. In that year 86,994 metric tons of aromatic rice was produced. Since then, the cultivation and production of aromatic paddy has continuously increased. In the last fiscal year 2020-21, 2 lakh 35 thousand metric tons of rice has been produced. Local varieties can yield 187-299 kilograms of rice per bigha of land, while the high-yielding ones produce 448-821 kilograms.

With the evolution of time, the traditional native aromatic varieties have been replaced by high-yielding fragrant rice varieties. Now, aromatic rice is not only being cultivated to fulfil family needs but also for business purposes. However, cultivating aromatic rice is more profitable than traditional or local rice varieties as it requires the same input cost to cultivate. Moreover, the price of aromatic rice is much higher than any other rice. For example, where the price of 1 kg of ordinary rice is 50–60 taka,

the price of 1 kg of loose aromatic rice is about 90 taka. If it is properly packaged, then the price could be 120–130 taka/kg. Deshi aromatic rice has such a good demand in the local and abroad market.

Bangladesh now has a good volume of fine and premium quality aromatic rice which can be exported after ensuring national demand. Last year, BIRRI has sent some samples of premium quality aromatic rice varieties, that is, BIRRI dhan34 and BIRRI dhan50 to the diplomats in Dhaka and also to the United Arab Emirates as a gift. Afterwards, the demand for fragrant rice has increased abroad; it is high mainly in the countries where South Asians live. In addition, the demand for fragrant rice has recently increased among the natives of Europe and America. Aromatic rice is now very popular for fast food and various Chinese dishes. Most of the fragrant rice is exported from Bangladesh to Middle Eastern countries. Especially Europe and America have a huge demand for Bangladeshi aromatic rice.

Some corporate companies of Bangladesh are so far exporting packaged fragrant rice to 137 countries. The list includes various companies including Pran, ACI, Ispahani, Square, etc. They are also selling fragrant rice of different brands in the country. According to the data of some concerned organizations, the export of fragrant rice has been increasing continuously for 10 years. The amount of aromatic rice exported through various private companies is about 10–15 thousand tons every year. Besides, about 5–10 thousand tons of aromatic rice goes abroad through expatriate Bangladeshis working in different countries.

In July 2022, the average retail price of low-quality (coarse) rice was \$0.56 per kilogram, approximately 13 percent higher than the same period last year. The retail price of coarse rice has been trending upward since September 2021 and reached a record high in July 2022. The recent economic turmoil driven by higher fuel costs and record high inflation is contributing to rising rice prices. In May 2022, Bangladesh experienced its highest inflation rate in the past five years.

From July 1, 2022, the government imposed a ban on the export of aromatic rice to control its price in the local market. Following the export ban order, the Ministry of Commerce canceled the export permissions it gave earlier to 41 private companies. According to the Bangladesh Export Policy, Bangladeshi exporters can export 25 types of aromatic rice, subject to special approval from the Ministry of Commerce. On average, Bangladesh exports 10 thousand tons of aromatic rice annually.

According to the current export policy (2018–2021), there is an opportunity to export 25 varieties of aromatic rice. Although there are many types of aromatic rice in the country, the Ministry of

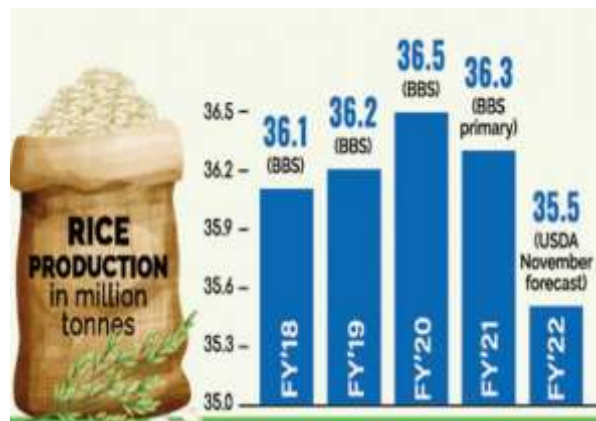
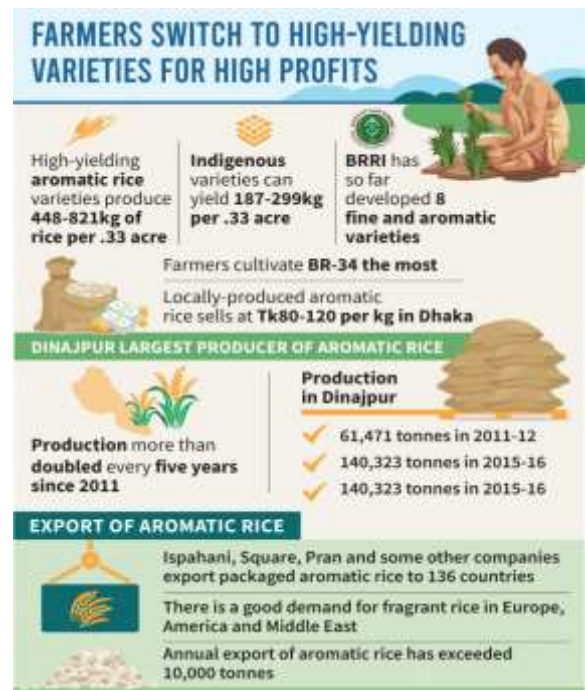


Figure 1: Aromatic rice production status in Bangladesh

Commerce has a list of exportable aromatic rice. To keep the rice market stable in the last few years, the government has decided to export only aromatic rice excluding ordinary rice to keep the supply in the domestic market normal.

Due to the lack of awareness and promotions about the quality of the local aromatic rice, the use of foreign aromatic rice instead of our variants are seen in the reputed hotels and restaurants. It incurs a lot of foreign currency on imports. However, it is possible to save a huge amount of foreign currencies by cultivating commercially more high-yielding aromatic varieties developed by our scientists.

The weather of Bangladesh is very suitable for the cultivation of aromatic rice. However, rice is more aromatic in cold-prone areas. Aromatic rice is being cultivated commercially especially in Dinajpur, Thakurgaon, Panchagarh, Rangpur, Naogaon, Rajshahi, and Mymensingh districts. There are many regional aromatic rice varieties in Bangladesh. BRRI's research has shown that at one time about 57 types of aromatic varieties were cultivated in Bangladesh; now more or less 32 types of aromatic varieties are cultivated. Among these, the most aromatic varieties are Kalijira, Chinigura, Kataribhog, Tulsimala, Badshabhog, Khaskhani, Chini Atap, Bashful, Durbashail, Begunbichi, Kal Pakhari, etc. Krishnabhog, Govindabhog, Punia, Kamini, Jirabhog, Chinishail, Sadagura, Madhumadhab, and Dudhshail are notable among the lightly aromatic varieties. Besides, farmers still cultivate Tepi Boro, Rata Boro, and Lafa during the Boro season and Katari Vhog, Ranisalut, and Radhunipagal varieties during the Aman season. Most of these conventional varieties yield much less per bigha.

Therefore, the scientists of Bangladesh Rice Research Institute are researching to develop new high-yielding varieties. BRRI has so far developed a total of 8 varieties of fine and aromatic rice. These are BR5 (Dulabhog), BRRI dhan34, BRRI dhan37, BRRI dhan38, BRRI dhan70, BRRI dhan75, BRRI dhan80, BRRI dhan90, and BRRI dhan50, which is suitable for cultivation in the Boro season, also known as Banglamati. BRRI scientists have changed the concept of aromatic rice yield. Earlier the yield of conventional varieties was 5–8 maunds per bigha, now the yield per bigha of rice is 12–22 maunds. In addition, the research for developing high-yielding and anthocyanins and anti-oxidants enriched rice by pure line selection of locally popular aromatic rice is going on in full swing at BRRI.

BRRI dhan34 is similar to Chinigura or Kalijira but the yield is almost double. The farmers are thus more interested to cultivate this rice variety. About 80% of the Chinigura rice available in the market is BRRI dhan34. Due to its light sensitivity, this variety is suitable for planting in flood-prone areas. BRRI dhan80 is similar to Kataribhog, and its average yield per bigha is about 17 maunds, which is twice as much as Kataribhog. Also, it is slightly longer than Kataribhog. BRRI dhan80 is light insensitive, has an average yield of about 18 maunds per bigha, and is as fragrant as the popular Thai variety Jasmine rice and delicious to eat. On the other hand, in the Boro season, the fragrant modern variety BRRI dhan50 or Banglamati is a popular choice. The yield of this rice is about 20 maunds per bigha. The profit is higher as the price is much higher than the different varieties of rice prevalent in the market. The quality, taste, and aroma of this variety of rice are similar to that of Basmati rice. Day-by-day, Banglamati rice is replacing imported Basmati rice.

Proper management must be developed to ensure fair price of aromatic rice and the quality and nutritional value of aromatic rice of Bengal should be spread from country to country through wide publicity and promotions. The lost tradition of aromatic rice will come back only if we can reduce the dependence on foreign varieties of rice and encourage new attractive dishes made of local aromatic rice including Banglamati. This will enable the farmers to play a role in the progress of the country as well as getting benefitted financially.



## Chapter 2: Survey Approach and Methodology

### 2.1 Approach of the final evaluation and impact assessment

The Evaluation team (ET) followed mixed approach combining qualitative and quantitative method for sample survey data collection, analysis and reporting. Data and information collected from primary and secondary sources. Primary data and information collected through qualitative and quantitative survey. For quantitative survey the team surveyed 300 Households those are actively engaged with aromatic rice production and the project has been working directly called and project beneficiaries. In addition to that 4 FGDs, 20 KIIs, few meetings and observations also conducted for collecting qualitative information from project related stakeholders such as farmer group, input and output market actors, government officials, project staff, etc. As a part of literature review, the evaluation team reviewed through different documents related to the project.

- Inception phase: Kick-off meeting, document review, survey questions finalization, data collection instruments preparation, test of DCI, details of methodology and inception report submission
- Field exercise phase – team orientation, enumerators training, assessment of Covid-19 scenario, field plan, data collection (quantitative - sample survey and qualitative – FGDs, IDIs KIIs and case studies,
- Data analysis phase: data cleaning, synchronizing, curing, database development, template preparation, analysis and triangulation;
- Reporting phase: draft report and presentation to GBK project team; and final report with recommendation.

Seven sequential interrelated processes were followed for the evaluation process, such as 1) desk review; 2) development of the evaluation work plan and tools; 3) briefing, meetings with the GBK; 4) data collection, including: a) sample survey both from project beneficiaries, b) KIIs, c) FGDs, 5) data analysis and draft report; 6) presenting the preliminary evaluation findings to GBK; and 7) final report and presentation.

- The evaluation team followed mixed methods i.e., quantitative and qualitative from primary and secondary sources.
- Quantitative information collected through formatted questionnaire (interview schedule) as purposive random sampling techniques which 300 respondents also surveyed as per ToR
- Qualitative information collected through PRA methods (KII, FGD, case study and observation).
- Secondary document reviewed and triangulated as supplementary to the primary information both for quantitative and qualitative

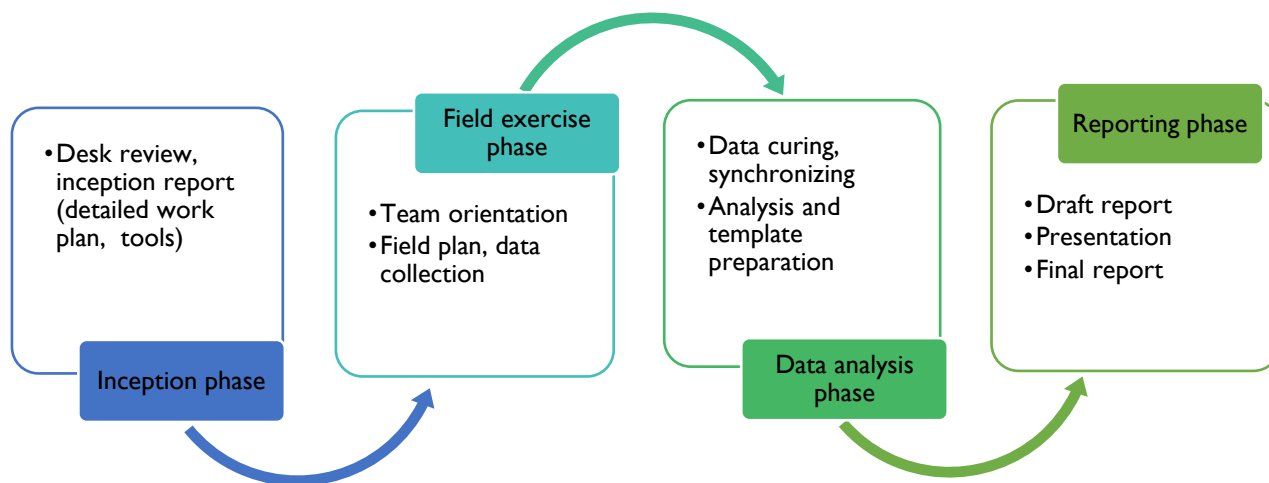


Figure 2: Evaluation process

## 2.2 Project stakeholders and location:

A total of 8000 microenterprise mainly aromatic rice producers in selected unions of Birampur, Fulbari, Chirirbandar and Parbatipur Upazila under Dinajpur district.

## 2.3 Primary data collection

Primary data collection was collected with sectoral focus, aromatic rice producers focusing on project indicators using qualitative and quantitative approaches. The data collected from the beneficiaries, market actors (inputs +outputs), service providers, government officials from project locations of selected unions of Birampur, Fulbari, Chirirbandar and Parbatipur Upazila under Dinajpur district as mentioned in TOR.

### 2.3.1 Quantitative (sample) survey

#### Quantitative data collection tools

The household survey was carried out through structured questionnaires to capture quantitative information from the beneficiary farmer HH respondents. A structured questionnaire was developed through a rigorous and systematic process. The survey covered 300 beneficiary farmer households from the respective four upazila. Sample distribution as per the targeted population. Sample survey schedule (questionnaire) is given in Annexure I.

**Face to Face Interviews (F2F)** Face to Face Interviews (F2F) (individual interview) were conducted with 300 respondents from the field.

#### Determination of Sample size:

The primary units of sampling are the beneficiary households in the project area. A representative sampling approach was undertaken. The sample was considered at a 95% confidence level, with an accuracy rate or amount of admissible error margin of 5%. The following sampling approach and statistical formula had been applied for the sample design.

$$n = \frac{z^2 \cdot p \cdot q \cdot N}{z^2 \cdot p \cdot q + (N - 1)e^2}$$

Where,

$n$  = Sample size

$N$  = Population size

$e$  = Precision rate or amount of admissible error in the estimate

$p$  = Proportion of defectiveness or success for the indicator

$q$  =  $1-p$

$z$  = Standard normal variable at the given level of significance

Total sample (purposive method) size for evaluation appears 300 considering 95% confidence level and 5% margin of error.

**Table 1: Sample distribution of the sample survey**

Upazila	Sample			
	Total Sample	Ultra-poor	poor	Non-poor
Parbatipur	100	34	19	48
Fulbari	67	33	18	16
Birampur	66	15	23	27
Chirirbandar	67	33	17	17
Total	300	115	77	108

## 2.3.2 Qualitative Information Collection Tools and Techniques

### Qualitative

Different PRA tools and techniques, namely Focus Group Discussion (FGD), Key Informants Interview (KII), In-depth Interview (IDI), case study, etc. were exercised to get the qualitative information. Sample survey schedule (questionnaire) is given in Annexure I.

All data, both qualitative and quantitative, collected through the end-line survey segregated by age, gender and area, if necessary and compare with baseline data, achievement and indicators of the project.

**Table 2: Qualitative information collection distribution**

Sl. No.	Tools and methods	Primary respondents	#
1	KII	DAE representative in the project areas Non-sample project beneficiaries, rice millers, service providers, aromatic rice market actors	20
2	FGD	project beneficiaries non-sampled	4
3	Case studies	project beneficiaries	2

**Table 3: Location of the final evaluation with sampling distribution**

Locations / Upazila	Sample survey	KII	FGD	Case study
Parbatipur	100	5	1	2
Fulbari	67	5	1	
Birampur	66	5	1	
Chirirbandar	67	5	1	
Total	300	20	4	

### Focus Group Discussion (FGD)

During the field visit 4 FGDs conducted with the farmer groups. An in-depth checklist applied for collection of qualitative information to ascertain the achievements and impact of the project interventions. This information were triangulated (cross-checked with the quantitative information).

### KII with DAE and Govt. officials

DAE representatives interviewed as KII at upazila level for this evaluation to learn their knowledge or awareness status about the project and aromatic rice cultivation its impact and sustainability.

### KII with other important stakeholders – market traders

Key informants' interviews were conducted with other important stakeholders of the project like inputs suppliers, retailers, market actors, rice millers, rice traders, and community leaders of the project area.

### Meeting

Interactive meetings were conducted with GBK officials in their head office.

### Case study

Four case studies were conducted during the baseline data collection to learn the present livelihood status of the beneficiary farmers.

## **2.4 Data analysis and Report writing:**

The **third step** is data entry template preparation, data entry, data consolidation and analysis. All field data was put into MS access and data editing, cleaning, queries were performed. In addition, for analysis, SPSS-26 and MS excel used to process the data and tabulation, graphs for analysis and to prepare report. Description analysis (frequencies, percentiles, averages, correlations, central tendencies, factors analysis) and cross tabulation analysis applied for data analysis.

Triangulation of data sources, i.e. quantitative data from sample survey, qualitative information from KII, FGDs and secondary data (quantitative and qualitative) and secondary information was analyzing and report writing. The triangulation of data was conducted, based on the similar findings and information, and collected from different respondents. Triangulation process were validated the relevancies of the collected data in different manner.

### **Finalization of the Report:**

**Fourth step** is draft reporting, this draft was shared to receive feedback from GBK representative, and then the **final step** incorporation of comments, suggestions and feedback to finalize the report for submission.

## **2.5 Quality assurance**

A written instruction on data collection was supplied to the enumerators and to the consultants. Following steps was taken into consideration for the quality control and ethical practices for the study:

- A daylong orientation provided to understand data collection methods, quality parameters, and overall guideline for collecting field data.
- Experienced enumerators deployed
- Cross checking was done with secondary review, KII, FGDs, observations, F2F questionnaire survey as per need.
- Survey team sat every afternoon/evening for rechecking, learning and sharing the field information and making a conclusion, as well.
- During fieldwork, the supervisors were diligently check for completeness and for consistency of the information, which returned on a daily basis.

## Chapter 3: Findings and discussion of the baseline survey

Field survey information (both quantitative and qualitative), secondary review, and indicator-based findings are discussed in this chapter. Detail tabular distribution and relevant charts/figures arose from findings are placed with the respective running text and paragraphs.

### 3.1 Demographic information

The project has been implementing in Parbatipur, Fulbari, Birampur and Chirirbandar upazila under Dinajpur district since 2017. Three hundred respondents were interviewed following purposive random sampling method. Among the 300 respondents 33% from Parbatipur, 23% from Fulbari and Birampur and Chirirbandar 22% each, where ultra-poor 38% Transitional poor 26% and 36% enterprising poor. Details of farmer types is given in Table 4.

**Table 4: Age of the respondents**

Upazilla	Ultra-poor	Transitional poor	enterprising poor	Total Sample	Proportion
Parbatipur	34	19	48	100	33%
Fulbari	33	18	16	67	23%
Birampur	15	23	27	66	22%
Chirirbandar	33	17	17	67	22%
Total	115	77	108	300	100%

#### Gender and age of the respondents

Among the 300 respondents 85% were men and 15% were women, where 59% middle aged (36-49), 12% old (50 plus), and 27% young (18-35) during the data collection time. Details shown in the Table 5.

**Table 5: Gender of the respondents**

Gender	Final		Baseline
	#	%	
Female	45	15%	8%
Male	255	85%	92%
Total	300	100%	100%

**Table 6: Age of the respondents**

Categories of the respondents by age group	Final		Baseline
	%	#	
Below 18 years	0	0	0
Young age: 18-35 year	27%	82	13%
Middle age: 36-49 year	59%	181	52%
Old age: 50 plus year	12%	37	35%
Total		300	

### Marital status of respondents

Overall, 93% of the respondents were married, and 5% were unmarried, 1% divorced and 1% widowed. Details is shown in Figure 3.

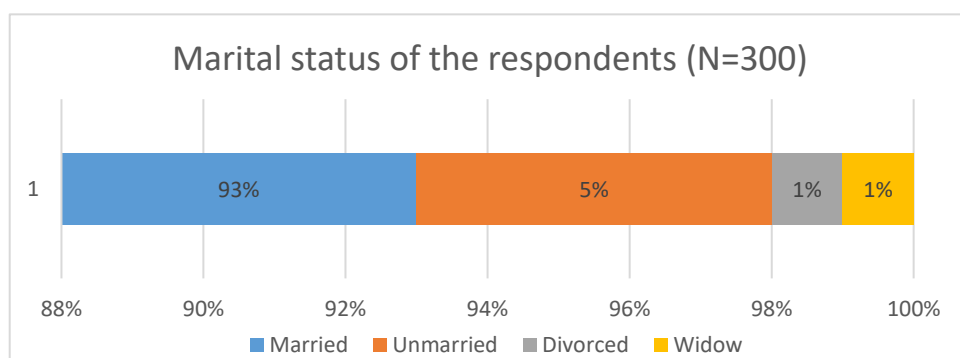


Figure 3 : Marital status of the respondents

### Household member size

A total of 1411 family members were calculated with the 300 survey respondents in the project Area. The maximum number of HH members discovered was 10, while the minimum number of members was two, which similar to baseline data. The average HH size of the project area is 4.63. Details is shown in Table 7.

Table 7: HH Family members

# members in one HH	Final		Baseline
	%	#	%
2	5%	16	54
3	18%	54	
4	28%	84	
5	28%	86	42
6	12%	36	
7	4%	11	
8	2%	7	
9	3%	8	4
10	1%	3	
Avg	100%	4.63	

### Education of the respondents

Years of schooling (successfully passed) were asked to the respondents and calculated as an average, among 300 respondents 1% of the respondents can sign, read and write, 30% read up to class five, 46% grade six to SSC, 15% Higher Secondary Certificate (HSC), 5% bachelor and 3% Masters level of education. Comparing with the time passed and baseline data it shows progressive trend and continuation of the education among the respondents. Details is shown in Table 8.

**Table 8: Level of education of the respondents**

Level of education	Final evaluation		Baseline
	#	%	%
Only read write and sign only	3	1%	1%
Up to 5	90	30%	34%
Grade 6 to SSC	138	46%	52%
HSC	45	15%	9%
Graduate	15	5%	5%
Masters	9	3%	0
Total	300	100	100%

## 3.2 Income of the respondent’s household

### 3.2.1 Household Annual Income:

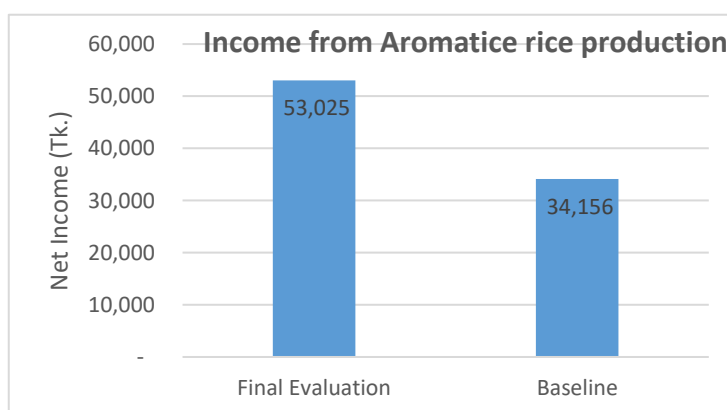
As the project targeted ultra-poor, poor and enterprising poor so, income varies from minimum to the large extent also their ranges and disparity found high. However, 43% HHs average annual income ranges from Tk.200,000 to Tk.300,000, 25% below two lakhs. Average income of the survey respondents Tk.286,775/ annually, which almost double than baseline 138,376/-. Details is shown in Table 9.

**Table 9: Household annual income**

Annual income ranges	Final Evaluation	
	#	%
Up to 100,000	4	2%
100,001-200,000	41	23%
200,001-300,000	205	43%
300,001- 400,000	35	17%
400,001- and above	15	15%
Average	Tk.286,775	
Minimum	Tk.27,000	
Maximum	Tk.470,000	

### 3.2.2 Income from Aromatic Rice:

Average annual income (profit) of a farmer from aromatic rice calculated as Tk.53,025 which **55.2% higher than that of baseline Tk.34,156** and project target was 50% increase from the baseline. Therefore, project achieved more than target. During FGD, KII with farmers and traders it was acknowledged by all the participants that income from aromatic rice increased remarkably than earlier and more farmers are involved in aromatic rice farming.



**Figure 4: Income from Aromatic rice production**

### 3.3 Area coverage for aromatic rice cultivation

From the survey findings, it was calculated that average 1.34 acres of land cultivated each season by the farmers and total 4063 acres engaged for aromatic rice cultivation. During baseline **total land area was 287 acres but the achieved tremendously and reached to 4063 acres** with 3000 farmers and average land size calculated as 1.35 acres, which **3776 acres higher than baseline** period. With that area of land BRRRI dhan34 seems most (1.35) and BRRRI dhan-50 cultivated 1.32 acres of land on average 1.34 acres per farmer. During FGDs with farmers they stated that due to good profit and market demand farmers are encouraged to cultivate aromatic rice and land coverage increasing day by day. Many of the farmers entirely cultivate aromatic rice, they also mentioned that inputs like seeds, fertilizers and trades are available in the market. All the KII with the input retailers, traders and suppliers stated that the inputs sales have been increased due to land area for aromatic rice is increasing day by day, and BRRRI dhan-34 in Aman season and BRRRI dhan-50 in boro season seed sales increased. During the FGDs it was also found that marginal and small farmers are also cultivate aromatic rice in the locality.

### 3.4 Cost – benefit of Aromatic Rice Production:

Production cost of aromatic rice is calculated in terms of unique land size of 33 decimal based on respondent's answers and their regular practices during immediate last season. It was found that land labour cost is higher 28%, followed by lease value cost (24%), land preparation 15%, harvesting 10%, fertilizers 7%, seed & seedling transplantation 5%, irrigation 4%, pest management 2%, however total cost of production calculated as Tk.11,168 per one Bigha land of aromatic rice production. Comparatively found similar information from FGDs with the farmers. During baseline it was Tk.14562 per bigha. Production/cultivation **cost is lower (-30.39%)** than that of baseline data 3 years back. Project target was 30% reduced from baseline, so project has achieved the target and it could be more. Most cost driven factor was the high lease value of the land. All the FGD participants, KII with DAE representatives and input output traders voiced the same responds that lease value increased and some of inputs cost also higher than few years back.

- Aromatic rice area coverage increased from 287 acre to 4063 acres
- Average aromatic rice cultivated land is 1.34 acre
- Production cost 30% reduced
- Production per bigha increased 84%
- Sales 541 per bigha baseline was 317kg
- Sales volume increased by 70.6%
- Profit increased by 55.2%
- Overall income from aromatic rice increased by 55.2%

During baseline average production per Bigha was 322 kg per bigha, but present data shows as per survey it is 594 kg per bigha (BRRRI dhan-34 was 462kg and BRRRI dhan-50 was 726 kg). Simultaneously sales volume of the aromatic rice was 541 kg per bigha after own consumption (5%) and retain as seed (4%). Therefore, **production has increased (84%)** than that of baseline due to good quality of seeds, application of modern production technology, appropriate use of fertilizers, optimum use of irrigation water and timely intercultural operation. Farmers were trained on aromatic rice production, harvesting and post-harvest technologies, preparation of quality seedlings through good nursery management, application of organic fertilizer (vermi compost) and regular field supervision. During FGDs with the farmers the evaluation team surprised to know the wonderful skills and knowledge of the farmers on aromatic rice farming. These makes them more confident and sustainability of the farming.

From the survey findings, it was also found that 5% aromatic rice was used to own consumption and 95% were sold to the market, therefore **sales of the aromatic rice increased by 70.66%** from 317 kg



to 541 kg per bigha (BRRIdhan-34 was 420kg and BRRIdhan-50 was 661 kg) compared to baseline and final evaluation data. During FGDs findings were shown that most of the respondents were sold their aromatic rice and a 4%-6% kept for own consumption, simultaneously income and sales has increased.

**Table 10: Production cost of Aromatic Rice Cultivation**

Production cost (Per bigha – 33 decimal)	Final				Baseline	Change over baseline
	BRRIdhan-34	BRRIdhan-50	Average	%		
Land lease (one season)	2500	2750	2625	24	1,019	145%
Ploughing and land preparation	1635	1799	1716.75	15	5,097	-68%
Seed and seedlings	560	616	588	5	728	-23%
Fertilizers	710	781	745.5	7	728	-2%
Irrigation	0	800	400	4	728	-100%
Pesticides	250	275	262.5	2		
Harvesting	1100	1210	1155	10		
Labour	3000	3300	3150	28	4,514	-34%
Others	500	550	525	5	1,747	-71%
Total cost of production	10255	12081	11,168	100	14,562	-30.39%

**Table 11: Income from aromatic rice production**

HH Income (Total) annual	Final			Actual land	Baseline	Change
	Per bigha					
	BRRIdhan-34	BRRIdhan-50	Average			
Income from Aromatic rice						
Total Production (per bigha)	462	726	594	2,394.00	322	84%
Use for own consumption	23.10	36	30	119.70		
Use as seed	18.48	29.04	23.76	95.76		
Net sold to the market	420	661	541	2,178.54	317	70.5%
Rate/price per unit (kg)	48	42	45	45		
Total income from Aromatic rice	20,180	27,748	47,928	98,034		
Cost of production	10255	12080.5	11168	45,009	14562	(30.39%)
Profit	9,925	15,667	36,760	53,025	34,156	55.2%

## Case study 1: Ataur Rahman

### Case study -1:



Ataur Rahman (39) lives in Aladipur union of Fulbari Upazila in Dinajpur District. He is living with a joint family, where family members are 9 with his parents. He got married at 28 years age to Shahinara in 2014. Prior to its inclusion in the aromatic rice project; his socio-economic status was very poor due to there were no earning people in the family. Therefore, agriculture was the only source of income. He had no idea about modern farming methods and total land area is 5 acres. He used to cultivate coarse varieties of crops in all the lands.

On the other hand, his wife was not at all satisfied with his family and at one stage left him in 2019. In this situation, Ataur is in dilemma - what to do, now?

Once in a day in 2017, he learned from a neighbor Kamrul, about the various activities of the PACE project under Gram Bikash Kendra. Then he joined the south senora aromatic rice producer groups of the project. Ataur used to participate regular monthly meetings in this group on aromatic rice. He has learned many ways to benefit agriculture through this meeting and training and modernization of the farming. He realizes that there is no substitute for applying modern technology to benefit agriculture. He has already acquired modern technical skills through various group meetings and training like as single hill method, leaf color chart, alternate weighting and drying (AWD), perching, solar trap, soil test, agri mechanization etc. In 2018, he demonstrates aromatic rice of BRRI 34 through the project support. It was quite profitable compared to ordinary rice. As a result, he decided to cultivate aromatic rice in 04 acres of land in consultation with his family. At present her net income per acre is BDT 39,360 taka and it was BDT 27,776 taka per acre during the baseline period. As a result, they now earn a total of  $39360 \times 4 = 157,440$  per season from aromatic rice production. He sells his aromatic rice to the designated dealers of the project to ensure a fair price. As a result, there is no difficulty in getting the right price of rice. Ataur said, 'Currently, I cultivate aromatic rice in both Boro and Aman seasons to get more benefit'. In this way, he gets success step by step. Now days, Ataur is having a good day with her family.

Source: GKB Project team

### 3.5 Good agricultural practices (GAP) of aromatic rice production

#### Knowledge and idea about GAP

As a result of project intervention, approximately 23% farmers have little knowledge about good agricultural practices and they received from the training. 22% have idea and followed single hill methods for transplantation, which learned from training and consultation with GBK project staff. During baseline farmers/participants, had now knowledge on GAP and single hill methods. This is an achievement for the sustainability and lessons learn for the project.



#### Access to extension services and inputs

The beneficiary aromatic farmers receive extension services from different sources mainly from inputs retailers 84%, DAE/SAAO 45%, neighbor farmers 80% for their farming as and when necessary. During FGDs participants mentioned that extension services are not adequate as they demanded. They also stated that service has improved than few years back. Farmers also followed AWD methods for irrigation and use Urea Super Granule (USG).

Eighty-six per cent respondents stated that they procure inputs (seed, fertilizer, pesticides, organic manure etc.) from relevant retailers, followed by BADC, dealer and lead farmers (neighbor farmer). BADC only provide seed. During the baseline farmers were collected inputs from other farmers 3%, 57% from a retail shop, 28% from BADC and 28% from company dealer 28% (Table 12). Most the respondent collected from multiple sources. All purchases in cash. From FGD and KII also received similar information but sometime they purchase partial credit from the retailers. Half of the respondents use vermi-compost or organic manure for the aromatic rice cultivation.

**Table 12: Sources of inputs**

Sources of inputs	Final Evaluation	Baseline	Change
Lead farmers	5%	3%	2%
Retailer	86%	57%	29%
Dealer	12%	28%	-14%
BADC	25%	28%	-3%
Others	2%	0%	2%

### Site Selection:

All of the farmers consider some criteria during selection of sites i.e. land for aromatic rice cultivation; 80% consider source of water, 60% land fertility, 50% access to road location, and suitable for aromatic rice production 75% considered the location of the land. Details shown in the Figure 5.

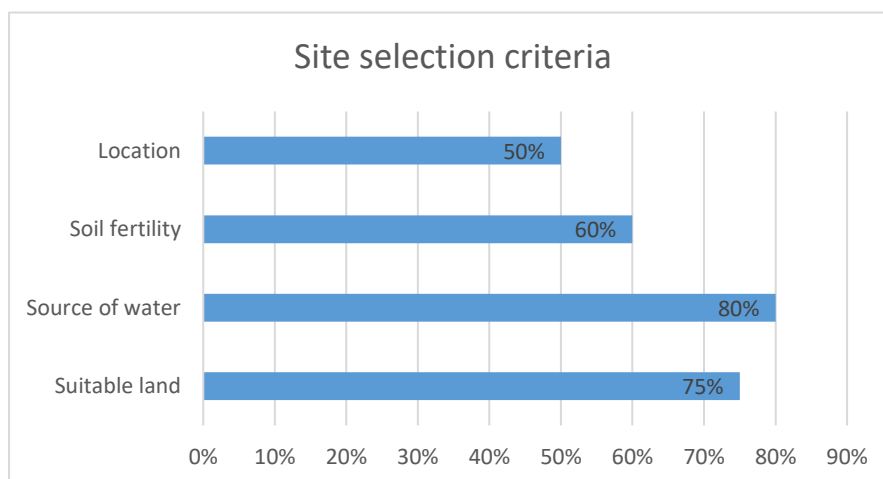


Figure 5: Site selection for aromatic rice farming

### Case study 2: Md. Mohsin Ali

#### Case study 2:

**Md. Mohsin Ali (35)**, his economic condition was very weak before he engaged with the project. He had no idea about the high yielding aromatic rice varieties, modern agronomic practices and technologies. As a result of cultivating coarse paddy in the traditional way in all the lands, both production and market price were relatively low. He always a shortage of money to run the family. He got ideas from GBK about modern agricultural technology through training, technical assistance, counselling, and exchange of experience sharing, later he started to cultivating aromatic paddy using modern agricultural technologies learnt from the project. In last Boro season, he produced BRR1 Dhan-50 on 200 decimals of the land and again in the Aman season of the same year and he produces BRR1 dhan-34 on 200 decimals of the land, his total profit excluding expenses was Tk.130,600. After meeting the needs of the family with the money from the dividend, he has purchased 15 decimals land this year.



Mohsin said “We make the ideal size seedbed by making each bed exactly 3 feet wide. Before sowing the seeds in the seedbed, we purify the seeds and the soil in the seedbed. We take necessary care of the seedlings in the seedbed, it produces healthy and disease-free seedlings. Before planting seedlings in the main land, we test the soil from SRDI and determine the amount of fertilizer and apply the approved and balanced amount of fertilizer accordingly so that the health of the soil is good and reduce of Chemical fertilizer than before. Apply adequate amount of organic manure and vermi compost to the soil so that the aroma of paddy increases. We plant one sapling in a row in each cluster so that each sapling gets equal amount of light, air and food. The use of logo method facilitates crop intercultural operation”.

AWD pipes are used to Alternate Wet & drying the crop land, increasing soil fertility and reducing irrigation costs.

Mohsin arranged birds perching on the land through perching system, so that harmful insects can be controlled without harming the environment and the use and cost of pesticides is reduced. Applying urea fertilizer considering the color of the leaves of the rice plant through LCC method prevents wastage of urea fertilizer and reduces production cost. Proper seed production and storage reduces market dependence on seeds, resulting in quality seed production as well as lower production costs.

Mohsin and his neighbor farmers are being encouraged to use modern agricultural technology in aromatic paddy cultivation to increase production and reduce production costs. As a result, on the one hand, farmers are being

motivated to cultivate aromatic paddy and on the other hand, the cost of production is being reduced by increasing production through the use of modern technologies in agriculture. According to the commentary of Md. Mohsin Ali, his total expenditure on production of aromatic BRRI dhan-50 in 200 decimals of the land was Tk. 64425. Due to the use of technology in aromatic paddy cultivation, the production cost in the following sectors has been reduced by tk. for seeds: 1080 tk, for chemical fertilizer: 1630 tk, for Pesticide / Pesticide Spray: 2850 tk, Combine harvester for harvesting and threshing purpose: 11500 tk.

The total production in 200 decimals of the land is 6450 kg which is 1080 kg more than before. In raw condition its selling price is tk. 212850 and net profit amount (excluding straw) = Tk. 148425.

Next year, Boro and Aman will cultivate high yielding aromatic varieties BRRI dhan-50 and BRRI dhan-90 using fully modern technology on 300 decimals of their own and contract land in both seasons using modern technology and motivate other farmer brothers to cultivate.

The kind of advice being given to the farmers about the production of aromatic paddy through the PACE project of the Gram Bikash Kendra is very important for the farmers. If such activities continue in the future and if such activities are extended to a few more upazila based unions, the farmers will be aware and will be able to increase both their production and income through aromatic paddy cultivation.

Source: GBK

### Knowledge on good nursery:

Project established demonstration plots on ideal nursery, farmers' gained results and methods from the demo consequences of these few of the farmers established commercial nursery (aromatic rice seedling) as an entrepreneurship.



Figure 6: Nursery demonstration plot



### Mechanization

85% farmers use mechanical techniques for land preparation and only 15% use traditional techniques.

### Sources of Water (irrigation)

35% respondents mentioned shallow tube well as source of water 65.0% deep tube well and during Amon season mostly rely on rain fed water. Numbers of farmers use AWD for irrigation and use USG for rice cultivation.

### Soil and water test:

During FGD some farmers mentioned they knew about soil testing is required for good soil fertility management. 10% of the respondents stated that they do the soil test for aromatic rice farming. None did any water test. They do not test the pesticides and fertilizers.



### Use of PPE

Most of the respondents understand about personal protective equipment during use of any chemicals especially during pesticides application. But only 23% farmers use PPE during application of pesticides (mask).

### Use of solar trap:

Most of the farmers use solar trap in their aromatic rice field and some them provided by the project. During FGDs and KII participants stated it has good impact on less use of chemicals and effective for pest and insect control.



Figure 7: Use of PPE during pesticides application



Figure 8: Use Solar trap

### Application of vermi compost:

Half of the respondents use vermi-compost or organic manure for the aromatic rice cultivation.



Figure 9 : Vermi-Compost demonstration



Figure 10: Vermi-Compost demonstration

### Leaf color chart:

During FGDs and KII it was noted that farmers'(participants) were used leaf color chart for determine the nutritional status of the rice plant growth



Figure 10: Leaf color chart

### Farm Records:

Some of the farmers (50%) records their expenses especially for purchasing inputs and costs.

## 3.6 Post-harvest management of high value fruits

All of the respondents do the primary level of threshing, drying, sorting, separation of good quality grains (paddy) and bagging for sales after harvesting. All of them stored temporarily at their home.

## 3.7 Training related information

Project has provided numbers of training to the aromatic cultivators, organized workshops for inputs retailers, traders and relevant stakeholders. All respondents mentioned they attended two main training (Table below), and they learned about i) HYV Aromatic rice cultivation, pest management and marketing ii) HYV Aromatic rice seed production and storage. During FGDs with the farmers all the participants stated they have applied the gained knowledge and skill to the farming practices, post-harvest management, storing and sales.



Figure 11: Training session

Table 13: List of training provided by the project

Name of trainings	Actively participated
Training on HYV Aromatic rice cultivation, pest management and marketing	100%
Training on HYV Aromatic rice seed production and storage	100%

### 3.8 Demonstration plots:

Project demonstrated numbers of demo plots for disseminating aromatic rice farming related results, methods, technologies, information and share lessons learning in the project areas. The project team (GBK) also organized field days. 100% of the survey respondents mentioned that they have visited demonstration plots and/or actively participated in the events. During FGDs and KII with the local traders, SAAO and market traders they also voiced about the demonstrations activities/ plots and stated that it has created huge awareness and learning for the community people and farming families many of them also stated that “**seeing is believing**”. Demonstration plots inspired local farmers to grow more aromatic rice and get more profit than traditional rice or other crops. They also learned about seed multiplication storing and post-harvest managements. Farmers also learned about vermi-compost production and sales, as such few of the local entrepreneurs started new business and improved their income, as well as availability of compost in the locality. Some of FGD participants also mentioned that nursery demonstration also encouraged to get good quality of the seedlings and its management. However, all those activities result to increase farm productivity, sales, and availability it also created sustainability of the aromatic rice farming and its business.

**Table 14: Demonstrations plots and related activities**

Demonstration related activities	Actively participated	Visit / know only	Listen
Attend field days	20%	70%	10%
Demonstrations plots on BRRIdhan-34	20%	80%	
Demonstrations plots on BRRIdhan-50	20%	80%	
Nursery demonstration	20%	80%	
Seed production and storage demonstration	20%	80%	
Vermi compost production and usages demonstration	10%	65%	25%
Demonstrations plots on aromatic rice seedling production	20%	80%	





### 3.9 Visibility and branding of the project:

Project has installed bill boards for the visibility of the project and disseminate key information's on aromatic rice which has created good remark by the local communities as stated by the FGD participants and the survey respondents. There were spot signage and signboards at the demonstration plots also good branding and showing project activities. Some of the branding and visibility samples are shown in Annexure III.



Figure 12: Field Day event and communication mass gathering

Table 15: Project branding and visibility

Visibility and branding activities	Actively participated	Visit / know only	Listen	not at all
Attend field days	20%	70%	10%	
Bill board		80%	20%	
Visit agri-fairs		50%		50%
Leaflets and posters		50%		50%

### 3.10 Access to market

As the beneficiary farmer are from the farming families so that they have good knowledge on agricultural farming. They have good relationship with neighbors, input retailer in the local market. When asked about the place of collecting inputs, they mentioned the main source of input is local



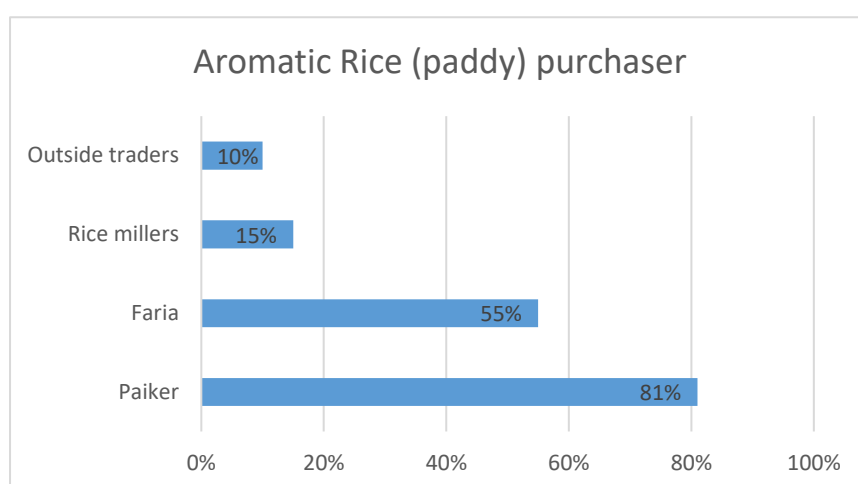
Figure 13: Market promotion materials

market, eighty-six per cent respondents stated that they procure inputs (seed, fertilizer, pesticides, organic manure etc.) from relevant retailers, followed by BADC, dealer and lead farmers (neighbor farmer). BADC only provide seed. During the baseline farmers were collected inputs from other farmers 3%, 57% from a retail shop, 28% from BADC and 28% from company dealer 28%. Most the respondent collected from multiple sources. All purchases in cash. From FGD and KII also received similar information but sometime they purchase partial credit from the retailers.

**Table 16: Sources of inputs**

Sources of inputs	Final Evaluation	Baseline	Change
Lead farmers	5%	3%	2%
Retailer	86%	57%	29%
Dealer	12%	28%	-14%
BADC	25%	28%	-3%
Others	2%	0%	2%

Farmers sold their paddy to the multiple sources, depending on price offered and necessity of the cash to maintain their families and pay credits. As such the survey calculated that 81% sold to the Paikers, 10-15% to the open market 15% to the rice miller (husking mill), and large paiker like aratder 15%. Sometime they sold multiple places. All are sole as cash and price determined as spot bargaining. As per feedback of FGD and KII with market actors (Paikers, Aratders) they also stated similar trend and they purchase in cash, local faria is their main suppliers foria has good relation with the farmers, synonymously Paiker and Foria act as same. Because of the transportation cost none of the farmers go to any big city markets for selling their goods. As a result of market linkage and workshops with the market traders by the project staff farmers are getting good price and traders are available in the locality then earlier stated by the FGD participants, survey respondents and KII with the DAE, market actors.



**Figure 14: Aromatic rice purchaser**

**Table 17: Place of paddy sales**

Place of sales	Final evaluation	Baseline
Open Market	10%	1%
Paikers	100%	97%
Aratder	4%	2%
Rice mill	5%	

**Table 18: Price determination**

Type of price determination	Number	%
Prefixed	0	0%
Spot bargaining	300	100%

None of the respondents mentioned that they perform processing and do not receive certificate for processing. None of them perform market promotional activities to increase sells and acceptability of their product. Only 11% respondents mentioned that they keep the selling record in a formal way.

	Number	%
Yes	31	11.0%
No	279	94.0%
Total	300	105.0%

#### Market promotion:

None of the producers get market promotion and advertisement however they do the personal communication (100%), market visit (35%), and over phone call.

**Table 20: Production cost analysis of the aromatic rice**

Production cost (Per bigha – 33 decimal)	Final				Baseline	Change over baseline
	BRRRI dhan-34	BRRRI dhan-50	Average	%		
Land lease (one season)	2500	2750	2625	24	1,019	145%
Ploughing and land preparation	1635	1799	1716.75	15	5,097	-68%
Seed and seedlings	560	616	588	5	728	-23%
Fertilizers	710	781	745.5	7	728	-2%
Irrigation	0	800	400	4	728	-100%
Pesticides	250	275	262.5	2		
Harvesting	1100	1210	1155	10		
Labour	3000	3300	3150	28	4,514	-34%
Others	500	550	525	5	1,747	-71%
Total cost of production	10255	12081	11,168	100	14,562	-30.39%

**Table 21: Income analysis of the aromatic rice**

HH Income (Total) annual	Final			Actual land	Baseline	Change
	Per bigha					
	BRRRI dhan-34	BRRRI dhan-50	Average			
Income from Aromatic rice						
Total Production (per bigha)	462	726	594	2,394.00	322	84%
Use for own consumption	23.10	36	30	119.70		
Use as seed	18.48	29.04	23.76	95.76		
Net sold to the market	420	661	541	2,178.54	317	70.5%
Rate/price per unit (kg)	48	42	45	45		
Total income from Aromatic rice	20,180	27,748	47,928	98,034		
Cost of production	10255	12080.5	11168	45,009	14562	(30.39%)
Profit	9,925	15,667	36,760	53,025	34,156	55.2%

**Table 22: Value additions of aromatic rice**

Actions/ Value additions	Quantity (1mound=40kg)	Rate (Tk.)	Amount (Tk.)
Paddy – BRRRI dhan-34	100	Tk.1920	Tk.192,000
Drying and husking	100	Tk.50	Tk.5,000
Milled rice (output)	100	Tk.23%	2,300 kg
Packaging	2300kg	Tk.2.5	Tk.5,750
Others			Tk.500
Total cost for processing			Tk.203,250

Actions/ Value additions	Quantity (1mound=40kg)	Rate (Tk.)	Amount (Tk.)
Wholesale price	2300kg	100	Tk.230,000
By-products (husk, bran, etc)	300kg	100	Tk.30,000
Total sales			Tk.260,000
Net Profit from 100 mond paddy			Tk.57,000
Retailer Price			Tk.100/Kg
Value addition, transportation, utilities, sales cost			Tk.5/kg
Cost for the retailer			Tk.105/kg
Retail price at the market (Dhaka)			Tk. 125-130/kg

The buying price of the paddy was compiled from sample survey and KII of the study with market actors in the value chain. All the VC actors under survey bought the products from the farmers. Raw paddy purchased from Tk.40 to Tk.55 depending on season, during the season less price off season high price, however average price we recorded as Tk.45 per kg (BRRIdhan-34 Tk.48 and BRRIdhan-50 Tk.42). In the value chain farmers do the value addition approximately 36%, rice miller value addition 47% (value gain 70% and value reduction 23%= 47%), retailer / Paiker 20%.

### Existing Value Chain of Aromatic rice in the project area in Bangladesh

A value chain is defined as organized linkages among groups of producers, traders, processors and service providers who join together to improve productivity and the value of their products. By joining together, the actors in the value chain increase competitiveness and are better able to maintain competitiveness through innovation. The limitations of each single actor are overcome by establishing synergies and governance rules aimed at producing higher value.

A large number of people are involved in the production and marketing of the aromatic rice. The imbalance in the supply-demand in aromatic rice is increasing every year due to low production coupled with an increased population. Realizing the increasing importance of aromatic rice as smelted rice, it was a timely intervention for diversify aromatic rice cultivation and expand its seasonality during the year round, simultaneously to carry this opportunity it is also important access to market for farmers, access to finance for cultivation and inclusion in the mainstreaming of VC in the market and market channels. However, during the FGDs and few secondary reports found that the process of aromatic rice marketing the intermediaries are involved in a chain are Faria, Bepari, Aratdars, Wholesalers and retailers. In the study area Faria (Local trader) purchased 55% percent from producer, local paiker 81%, and outside traders 10%, multiple options were reported by the respondents. In all upazila has shown similar results i.e. most sold to the local paiker. Farmers are yet to implement good agricultural practices, dealing with un-predicted quality inputs and application knowledge, limited access to market, causing wastages and poor quality of the produces and sold at a lower price to the market

Farmers are the producer of aromatic rice. They produce and bring their product to sell in their local market nearby their village areas or sometimes sold direct from home.

Local faria or local wholesalers purchases their product from the farmer. Basically, they fixed the price paid to the farmer at spot bargaining. They deal with the paiker or outside wholesaler. Local wholesaler sends their product lot to the different division mainly to Dhaka, according to the market demand and market price.

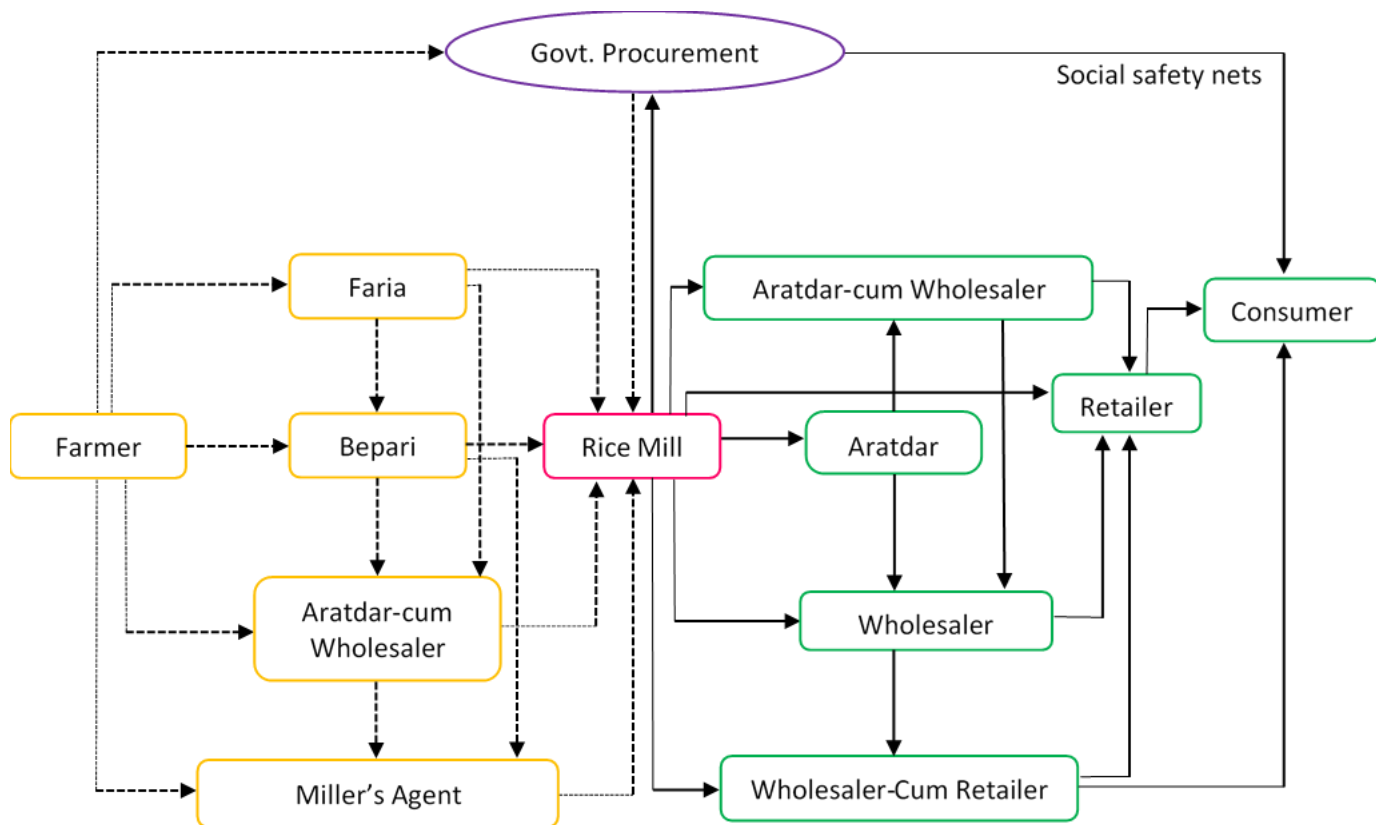


Figure 15: Value chain of the aromatic rice

Farmers are sold their product at home 100% sometime they also sold to the local market 10-15%, sometimes both.

Fifteen percent of the respondents sold their aromatic paddy direct to the millers or processors. 98% respondents were sold their products individually and only 5% sold in bulk to the large buyers.

Therefore, it is found that the aromatic rice has high market potential interns of price, income meet demand gap, high price if it ensures financial support to the producers, VC actors, along with necessary training on production, post-harvest, market linkage, and business management support services.

### Storing of Aromatic Rice:

**Rice storage** Keeping harvested paddy or threshed, dried rice in appropriate places, bins, warehouse or containers for future use and also to prevent deterioration of quality of the grain. The purposes of rice storage are: to provide constant supply of food grain throughout year; to retain viability of the grain for planting in the following season; to take advantages of higher prices offered by traders; and to serve as reserve during times of food scarcity.

Significant losses in quantity and quality of stored rice occur through the activities of microorganisms, insects, mites, and rodents. Deterioration of stored rice arises from a variety of causes. Since freshly harvested rice has moisture content of 20% or more, the grain must be dried before storage. Below 14%, rice can be stored safely for two to three months. For longer storage, the rice should be dried to moisture content of about 12%.



### 3.11 Access to finance – Financial inclusion

Aromatic rice farmers sometimes take the loan for purchasing inputs, paying labours and harvesting the paddy. Simultaneously trader took loan for purchasing paddy from farmers, milling, and sales in the market. The evaluation team found there were multiple sources of loan mostly from NGOs 95% mainly GBK, 5% formal bank, 2% relatives. Ranges of loan varies from Tk.10,000 to Tk. 250,000/-

**Table 23: Financial inclusion of the aromatic rice production**

Financial inclusion			Amount of loan	
Sources of Finance	Final	Baseline		
Own	0%		Up to 10000	14%
Relatives	2%		10001-20000	35%
NGO	95%	95%	200001-30000	40%
Bank	5%	5%	300000 plus	11%

### 3.12 Covid-19 Scenario

As per FGD and KII it was noted that pandemic Covid-19 affected Aromatic rice market severely, as the aromatic rice consumed more during special occasions, events (social, marriage, religious, family gathering), it has tremendous negative impact of sales. But price was not dropped but to demand slower and supply also less. 50% respondents stated that farmer could not get labour on-time and little costly, insufficient inputs in the market (70% respondents stated) and many retailers closed the shops. However, in the production areas were no effect to cultivate nor production. Farmers utilized mechanized land preparation. Farmers also face problems in selling aromatic rice during the Covid-19.

### 3.13 Employment creation due to project intervention:

Rice is not a labour intensive cultivation process, but aromatic rice has different it requires to have more labour since seedling, nursery, land preparation, transplantation, mechanization, harvesting special care during post-harvest and transportation. Those are the traditional, however 4,174 (total 7105) new employment were created by the 3,000 aromatic rice producers as a result of project intervention within the supply chain and production/ farming system. This number is much higher than that of baseline 2,931, therefore project activity has achieved little less than target 5,000.

**Table 24: Employment generation by the project beneficiaries**

New employment creation	Final Evaluation	Baseline
Land preparation	1150	2931
Transplantation	1580	
Intercultural operation	1230	
Harvesting	1355	
Post-harvest management	1200	
Transportation	350	
Farm mechanization	240	
Total	7105	

## 4 Chapter Four: Findings of the Final Evaluation

### 4.1 Relevance, appropriateness, effectiveness, efficiency, impact, sustainability of the project

High value aromatic rice production and income increasing of entrepreneurs through processing” Value chain Project interventions was highly relevant and appropriate for the smallholder farmers. Bangladesh has ranked third globally in rice production for the fourth consecutive year with a projected output of 38.4 million tonnes. The demand for aromatic rice is on the rise in accordance with prices are rising in line with demand. Traders say that although the prices of all types of thick and thin rice fluctuate, the price of aromatic rice is always on the rise. Traditionally, Dinajpur is the rice growing district feeding others. As such plenty of farmers are engaged in aromatic rice since long, but they are producing poor yield varieties, less productivity and produced in only one season. In Bangladesh, most of the land is cultivated under the traditional technology of Course Rice, so every year a large quantity of aromatic rice is imported from abroad. Among the Districts in which aromatic rice is cultivated, Dinajpur districts are called one of the best aromatic rice cultivation areas in Bangladesh. The cultivated land in this area is very fertile. In Dinajpur district, 80 percent of the households are involved in farming. Due to the lack of knowledge about the improved varieties of aromatic rice in the project area, the cost of production is increasing and the production per hector is decreasing. Farmers do not show interest because the production per hector of aromatic rice relatively less than the conventional varieties and more prone to diseases. BRRI 50, which is known as Banglamati, was developed by Bangladesh Rice Research institute. The production of this high yield aromatic rice is 6 ton per hector and has no diseases. The average yield per hector of rice cultivated on a limited scale in the project area is 3.6 ton. On the other hand, they use less advanced technology. Instead of traditional farming system for technological development SRI (System of Rice Intensification), single hill method, LCC (Leaf color chart), AWD (Alternate wetting and drying), Solar trap used for the production farming system. In addition, if the various activities of the project are successfully implemented, the acceptance of crop production in the project area at the consumer level will increase as well as the creation of good market system. The GDP will increase in the national economy. Income of entrepreneurs increase by more than 50% than baseline and created new employment opportunities for many people. Therefore, the evaluation team found the project initiative is relevance and appropriate in that location.

The project team, farmers themselves, market traders, value chain actors and service providers contributed remarkably for modern agronomic practices, market linkage and effectively operate to enhance crop yield, productivity, and access to financial inclusion. Such initiatives created remarkable multiplier impact to the farming community in the project areas e.g. income increased, yield per acreage increased, production increased, production cost reduced established farmers’ centres, financial inclusion. The project found to be highly relevant for its importance for expanded economic opportunities in the locality and its appropriateness to the needs of intended beneficiaries, corporate partners and socio-cultural setting. The project staff encountered considerable challenges in managing the business aspect of the project, namely to ensure quality control (e.g. good quality seeds and seedlings, nursery management, GAP, demonstration plots, farmers field days), market the products, inclusion of financial supports and introduce Good Agricultural Practices as model.

#### 4.1.1 Relevance and appropriateness of the Project

The evaluation team carefully observed the relevance of project activities which are related to the project goal and objectives, targeted smallholder farming communities increasing household income by improved productivity, yield, fair price, good market linkage, demonstration plots, nursery management, vermi-compost during the implementing the project.

During the field visits, FGDs, KII, secondary review and consultation with project staffs, they have unanimously stated that before initiating the project, the beneficiaries were lack of business support services, traditional agronomic practices, lack of farming machineries, inadequate agricultural extension services, network with local government agencies, limited access to market, finance. Lacks of communication beneficiaries are remaining far from the market, lack of financial access due to no organized market system, no contractual production, and poor quality of inputs. Farmers were lack of good quality seeds and limits only one season.

All these evidences showed the relevance of undertaken project interventions which facilitated the process of capacity building in harnessing modern agricultural practices, inclusion of financial linkage for rice farming with NGO like GBK was very much relevant for daily life transactions and paying utility services.

The project took timely and innovative initiatives to address the issues and problems of the beneficiaries in Bangladesh. Systematic and participatory planning, implementation approach was undertaken to implement the project. Entire project activities have been in line with the improvements of economic empowerment, livelihoods, poverty reduction, modern agronomic practices.

#### **4.1.2 Effectiveness**

The evaluation team tried to assess the effectiveness of the project against the specific objectives of the project. The effectiveness of the project measured following the key achievements of project activities and findings as observed by the evaluation team noted below.

In order to make the effectiveness of project, appropriate need assessment, capacity building through training, counselling, establishment of demonstration projects, networking with government service providers (DAE), and relevant activities have been implemented. Among the activities, training, counselling, field days, financial inclusion, networking and linkages and mentoring are the key interventions to make the project effective.

##### **Modernization of the agronomic practices**

Average annual income (profit) of a farmer from aromatic rice Tk.53,025 which 55.2% higher than that of baseline Tk.34,156. Participants farmers had changed their aromatic rice farming season inclusive of Boro variety BRRIdhan -50 (Banglamati) and aman BRRIdhan-34 in last 4 years due to the project intervention. Linkage with DAE representatives, market actors, nursery owners, aromatic rice processors were established.

**Total land area of aromatic rice cultivation has increased in many folds from 287 acres and reached to 4063 acres** with 8000 famers and average land size calculated as 1.35 acres, which **3776 acres higher than baseline**.

Production cost reduced 30% from the baseline due to project intervention and optimum use of inputs, application of vermi-compost, judical use of irrigation water (AWD) methods, use of USG, single hill transplantation, and farm mechanization.

**Production has increased by 84%** than that of baseline due to good quality of seeds, application of modern production technology, appropriate use of fertilizers, optimum use of irrigation water and timely intercultural operation. Farmers were trained on aromatic rice production, harvesting and post-harvest technologies, preparation of quality seedlings through good nursery management, application of organic fertilizer (vermi compost) and regular field supervision.



approximately 23% farmers have little knowledge about good agricultural practices and they received from the training

Farmers were using modern machineries for land preparation. The project worked in collaborate with Govt. departments so that the impact of their work can sustain in the long run. The influence of SAAO or Sub Assistant Agriculture Officer in the changes of land preparation shows that project did good collaboration with the Govt. departments.

It was found that the farmers were using new variety of seed, and ensured improved seedlings or transplanting methods, single hill transplanted that reduced usage of inputs. Additionally, farmers are using recommended inputs, organic fertilizers and bio-pesticides. Farmers used light trap in rice farming for pest control as an IPM methods. Farmers used PPE during pesticide application. They were trained on inputs usage, and so were using appropriate amount of inputs, decreasing wastage and cost. They were choosing good seed and seedlings as a result their production increased.

#### **Agricultural extension services - DAE/ SAAO**

According to study it was found 45% of the farmers mentioned SAAO used to visit their field it has created good linkage with government officials.

#### **Training and Technical Knowledge**

Need assessment was conducted by the project staff accordingly training material were developed and booklets, demonstration plots, field days disseminated modern cultivation messages to the community. They learnt about modern agronomic techniques, using improved seed, line sowing, single hill methods, learnt about modern rice cultivation, production increased, appropriate application of input, pest control became easy, health conscious and quality of the produces and new techniques of aromatic rice cultivation. During FGDs and KII participants were stated that the project was very effective.

Due to project interventions like trainings, demonstration field, collaboration with Govt. departments, created many changes in agronomic practices of the farmers.

#### **Changes in Cost of Production**

Cent percent respondents stated that cost of production decreased, and calculated as 30% decreased than baseline (3 years back). However, it was found in the qualitative data collection that the price of the inputs such as fertilizers, seed, pesticides and labour has increased but as the farmers were using the inputs properly the amount of inputs usage decreased. After analysing the data, it was found that the total average cost of production for BRRIdhan-34 Tk. however total cost of production calculated as Tk.11,168 per one Bigha land of aromatic rice production and BRRIdhan-50 Tk.12081, however total cost of production calculated as Tk.11,168 per one Bigha land of aromatic rice production had decreased by 30%.

#### **Changes in Yield**

Because of the project interventions like trainings, awareness, quality inputs selection and many other reasons the production of aromatic rice had increased over the years. The project farmers achieved 84.5% overall increase in their production. During baseline average production per Bigha was 322 kg per bigha, but present data shows as per survey it is 594 kg per bigha (BRRIdhan-34 was 462kg and BRRIdhan-50 was 726 kg). Simultaneously sales volume of the aromatic rice was 541 kg per bigha after own consumption (5%) and retain as seed (4%). Therefore, **production has increased (84%)** than that of baseline due to good quality of seeds, application of modern production technology, appropriate use of fertilizers, optimum use of irrigation water and timely intercultural operation. Farmers were

trained on aromatic rice production, harvesting and post-harvest technologies, preparation of quality seedlings through good nursery management, application of organic fertilizer (vermi compost) and regular field supervision.

### Access to market

During the survey, it was found that before project intervention the farmers used to sell their products only to paiker and to market, but at present, they were selling their products to paikers, processors, outside buyers from their home.

### Linkage with Local Government Services and NGOs

Cent percent respondents mentioned that they have linkage with DAE and other NGOs in different ways.

#### 4.1.3 Value for Money:

During the field visits the assessment team found that all of the beneficiaries effectively used their inputs, supports, and added value to the resources. It has increased their overall income, family assets remarkably.

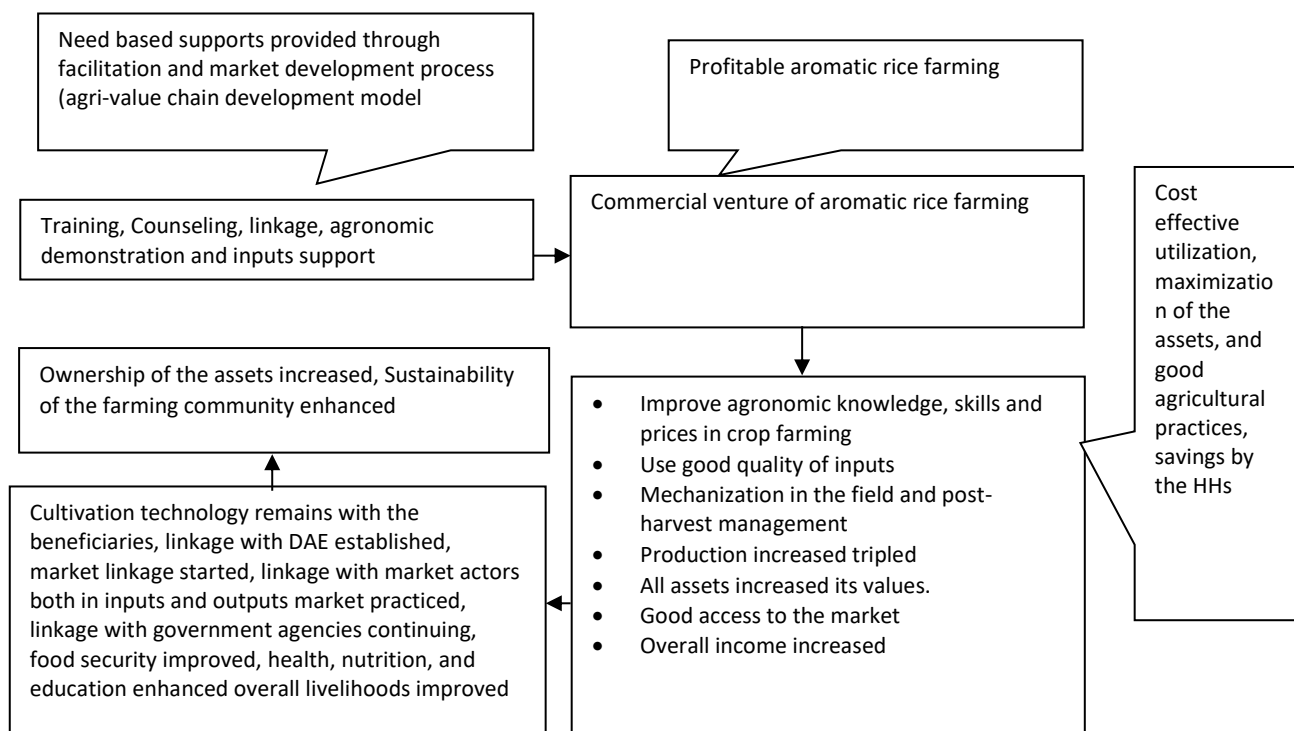


Figure 16: Value for Money

#### 4.1.4 Outcomes and Impact

It may be mentioned here that the project stimulates local farmers to use their land for more usable to increase cropping intensity. The farmers brought changes in their cropping practices due to the intervention of the project. The response showed 100% of the farmers had changed their cropping practices by bringing in new variety. Additionally, new inputs retail shops opened nearby the market that helped local farming communities for their improved agricultural practices. Hence the project created huge spill over effect to the other non-targeted farmers in the locality. 99.5% of the farmers had changed their cropping pattern in last 4 years due to the profitable aromatic rice farming business model intervention. The respondents replied that they were using modern machineries such as

tractor, power tiller etc.. It was found that 100% of the farmers were using new variety of seed, 77.5% were using high yielding seed. 25% had ensured improved seedlings or transplanting methods (single hill), 30% had reduced usage of inputs. All of the respondent stated they use recommended dosages of inputs (seed, pesticides, fertilizers) using bio-pesticides. Farmers are using light trap in rice field for pest control as an IPM methods, which introduced by the project. The learning gained from training by the project, were using PPE during pesticide application, 25% had ensured improved seedlings or transplanting methods, and reduced usage of inputs, results 30% reduction of the production cost and 84% increase in production, 55.5% stated increased in profit.

The participation of SAAO reflected the collaboration of project with the Govt. departments and extension service providers remarkably. One way or other, the suggestion from the neighbouring farmers also learn from either SAAO or trained farmers.

Due to project interventions like trainings, demonstration field, collaboration with Govt. departments, voluntary works and farmer centre many changes were found in agronomic practices of the farmers. Hundred per cent respondents said that their production had increased.

Overall project has excellent impact in production increase, cost of production reduced, productivity (income and profit) has increased and livelihoods improved.

**Table 25: Impact of the project intervention**

Impact categories	Extent of impact			
	Excellent	Very good	Good	Poor
Production increase	90%	10%		
Production cost reduced	90%	10%		
Income and profit from aromatic rice	80%	15%	5%	
HHs asset	30%	60%	10%	
Purchase and consumption of diversified food	35%	55%	10%	
Livelihoods improved (education, health, new house, savings, etc)	70%	25%	5%	
Financial inclusion	45%	40%	10%	5%
New Employment	71%	20%	5%	4%

#### 4.1.5 Sustainability

The project worked to collaborate with Govt. departments so that the impact of their work can sustain in the long run. The influence of Sub Assistant Agriculture Officer in the changes of land preparation, modern cultivation and post-harvest practices shows that the project did good collaboration with the Govt. departments, that shows sustainability of the project.

Beneficiaries already adopt the production, farming systems, access to market and market information, linkage with local public services, availability and awareness on nutritional and health issues etc; however, the knowledge and economic gain remain with them that indicate sustainability of the support services and outputs from the project intervention. A changing asset status is also an indication of sustainability of the HHs. Assurance of Food security, access to land, and other activities seems the project would be sustainable.

Considering above the evaluation team exercised a check list in every FGDs sample survey and to the field project staff to get opinion or perception about the project relevance, coherence, efficiency, effectiveness, impact, sustainability and some cross-cutting issues as per DAC criteria and five cross cutting issues to made an appraisal of how well the project has fared against each using the following grading scale:

**Table 26: Project intervention summary**

Particulars	Not at all=1 totally unacceptable performance or insufficient data to make an assessment	Poor=2 barely acceptable performance with some major shortcomings and reservations	Good=3 generally acceptable performance but with some clear, and documented, shortcomings	Very good=4 performance in line with what would be expected of a well-functioning organization	Excellent =5 outstanding performance
Relevance			4%	34%	62%
Coherence			5%	25%	70%
Effectiveness			15%	51%	35%
Efficiency		3%	5%	60%	35%
Impact			4%	70%	26%
Sustainability			9%	24%	67%

It was calculated that relevance, appropriateness and coherence of the project seemed outstanding performance; efficiency, effectiveness, and impact scored performance in line with what would be expected of a well-functioning (very good); sustainability also outstanding as farmers adopted the commercializing of the aromatic rice farming.

## 5 Chapter Five: Recommendation and conclusion

### 5.1 Recommendations

From the finding of the baseline study team comes up with the following recommendations:

- **Refresher Training to be provided:** The project should provide refresher training (production, GAP, harvest and post-harvest management, farm record keeping and GAP standards) to the farmers and relevant stakeholders.
- **Establishment of demonstration plots:** establish demonstration plots as such extension and dissemination of the technologies. Establish demonstration plots both for result and method demonstration and disseminate accordingly (through field days).
- **Disaster Risk Reduction initiative should be added:** Trainings to be provided on Disaster Risk Reduction (DRR) to cope with natural disaster as a common entity of the project geographic area.
- **Market Linkage to be strengthened:** To ensure good agricultural prices the project should emphasize on creating market linkage with market actors in the national, big city markets along with processors and large buyers. Linkage with good quality and accredited inputs suppliers to be strengthened.
- **Agri-machineries to be supported:** The farmers during the FGDs expressed dire need of agri-machineries like drip irrigation system, power tiller etc. for agronomic efficiency.
- **Financial inclusion:** The farmers should be provided with sufficient credit so that they can utilize efficiently and earn more money.
- **Collaboration with DAE and other Government departments:** Necessary linkage to be strengthen with DAE and department to enhance GAP on aromatic rice as a specialised product.
- Promote promotional activities to enhance aromatic rice production and marketing
- Arrange market sharing workshops, attend trade fairs to build awareness and market linkages
- Linkage building with trusted inputs supplier, retailers and market traders mainly direct to the millers and large-scale traders
- **Exit Plan:** The project should think of an appropriate and sustainable, safe and friendly exit plan way ahead the end of the project. It should create such collaborations and take necessary steps so that after the end of the project.

### 5.2 Conclusion

The project achievement and learnings would be the pathway for further implementation of the commercialization project. Improved production technology should be disseminated to the farmers. Refresher training on improved production of aromatic rice should be provided to the farmers and provision to expand and replicate to other areas.

The findings and information are only the sample basis not the census so there may be information gap therefore it is suggested to deeper research if required for long time impact assessment. Whatever facts and figure represented in this report simply a sample survey not a census, perception, knowledge and practices absolutely individual issues, it may be differed from one person to another person. Though number of samples are small one answer affects to statistical analysis remarkably, however entire facts would be remaining with GBK it is their property and responsibility to utilize as per project objectives, and logframe.

The evaluation team reviewed the project considering the sample survey and limited qualitative survey as per DAC criteria. It was found that the project has achieved all of its results indicators to the

expected extent at the time of evaluation. The findings of the evaluation of the project management cycle indicates that the project is has impacted to social and economic empowerment of the ultra-poor and very poor families as well as ensure better livelihoods.

Finally, the project was very relevant, appropriately identify and select beneficiaries, effectively intervene and implement the set activities, efficiently use of project resources, positively significantly impact on reaching commercialization of aromatic rice farming business model (value chain strengthening, financial inclusion, poverty reduction and social cohesion) sustainably.

Annexure I: Quantitative questionnaire

Annexure II: Qualitative questionnaire

Annexure III: Some of Case studies

Annexure IV: Project promotional, branding and visibility pictures

## ANNEX I: Quantitative Questionnaire

### Quantitative questionnaire

PACE প্রকল্পের আওতায় “সুগন্ধী ধানের উৎপাদন বৃদ্ধি ও উৎপাদন ব্যয় হ্রাসের মাধ্যমে উদ্যোক্তাদের আয় বৃদ্ধি ও জীবন যাত্রার মান উন্নয়ন” শীর্ষক ভ্যালু চেইন প্রকল্পের চূড়ান্ত মূল্যায়ন/প্রভাব মূল্যায়ন জরিপ ফরম

১	উত্তরদাতার নাম :		২. বয়স :	
৩	পিতা/স্বামীর নাম :		৪. লিঙ্গ : √ দিন	পুরুষ   মহিলা
৫	শিক্ষাগত যোগ্যতা:			
৬	বর্তমান ঠিকানা:	গ্রাম:	পোস্ট:	
		থানা:	জেলা:	
৭	পারিবারিক তথ্য:	পরিবারের সদস্য সংখ্যা:	উপার্জনক্ষম সদস্য সংখ্যা:	
৮	চাষকৃত জমির পরিমাণ (শতাংশ) :		৯. ধান চাষ উপযোগী জমির পরিমাণ (শতাংশ) :	
১০	ধান চাষ উপযোগী জমির মধ্যে বছরব্যাপী সুগন্ধী ধান চাষের পরিমাণ (শতাংশ) :			
১১	ব্রি-৩৪ জাতের ধান চাষের জমির পরিমাণ (শতাংশ)		১২. ব্রি-৫০ জাতের ধান চাষের জমির পরিমাণ (শতাংশ)	
১৩	ব্রি-৩৪ জাতের ধান উৎপাদনের পরিমাণ (মন=৪০ কেজি)		১৪. ব্রি-৫০ জাতের ধান উৎপাদনের পরিমাণ (মন=৪০ কেজি)	
১৫	ব্রি-৩৪ জাতের উৎপাদিত সুগন্ধী ধান বিক্রয়ের পরিমাণ (মন=৪০ কেজি)		১৬. ব্রি-৫০ জাতের উৎপাদিত সুগন্ধী ধান বিক্রয়ের পরিমাণ (মন=৪০ কেজি)	
১৭	ব্রি-৩৪ জাতের উৎপাদিত সুগন্ধী ধানের অবিক্রিত ধান কি করা হয়? (√ দিন)	ক) খাওয়ার জন্য ব্যবহৃত হয় (পরিমাণ, মন=৪০ কেজি)		
		খ) বীজ করা হয় (পরিমাণ, মন=৪০ কেজি)		
১৮	ব্রি-৫০ জাতের উৎপাদিত সুগন্ধী ধানের অবিক্রিত ধান কি করা হয়? (√ দিন)	ক) খাওয়ার জন্য ব্যবহৃত হয় (পরিমাণ, মন=৪০ কেজি)		
		খ) বীজ করা হয় (পরিমাণ, মন=৪০ কেজি)		
১৯	বিভিন্ন উৎস হতে (সুগন্ধী ধান সহ) পারিবারিক বাৎসরিক গড় আয় (টাকা) :			
২০	সুগন্ধী ধান হতে বাৎসরিক মোট আয় (টাকা) :			
২১	১ বিঘা জমিতে সুগন্ধী ধান চাষের গড় ব্যয় কত?	জমি চাষ (টাকা)		
		জমি লীজ (টাকা)		
		বীজ, চারা (মোট) (টাকা)		
		সার (টাকা)		
		সেচ (টাকা)		
		শ্রমিক (চারা বপন, ধান কাটা) (টাকা)		
		অন্যান্য (টাকা)		
২২	সুগন্ধী ধানের উপকরণের উৎস কোনটি?	ক) কৃষক	খ) খুচরা দোকান	
		গ) কোম্পানীর ডিলার	ঘ) BADC	
২৩	আপনি কিভাবে আপনার পণ্যের মূল্য নির্ধারণ করেন?	পূর্বনির্ধারিত =১, উপস্থিত দরকষাকষি =২, উৎপাদন খরচের পর কমিশন=৩, ক্রেতা কতক নির্ধারিত =৪, ফিল্ড রেন্ট =৫, সরকার/মার্কেট কমিটি কতক নির্ধারিত=৬, অন্যান্য (উল্লেখ করুন)=৭		
২৪	সুগন্ধী ধান চাষের উপর প্রকল্প হতে প্রশিক্ষণ পেয়েছেন কিনা? √ দিন		হ্যাঁ	না
২৫	১) উচ্চ মূল্যের বিভিন্ন জাতের সুগন্ধী ধান চাষ, রোগ-পোকামাকড় দমন ও বাজারজাতকরণের প্রশিক্ষণ			



	2) উচ্চ মূল্যের বিভিন্ন জাতের সুগন্ধি বীজধান উৎপাদন ও সংরক্ষণ বিষয়ক রিফারেন্স প্রশিক্ষণ					
	3					
২৭	সুগন্ধী ধান চাষে single hill পদ্ধতি অনুসরণ কিনা? $\sqrt$ দিন	হ্যাঁ	না			
২৮	সুগন্ধী ধান চাষের পূর্বে মাটি পরীক্ষা করেন কি?	হ্যাঁ/না				
২৯	সুগন্ধী ধান চাষে গুটি ইউরিয়া সার ব্যবহার করেন কিনা? $\sqrt$ দিন	হ্যাঁ	না			
৩০	দৈনিক বর্জ্যের পরিমাণ(কেজি):	বর্জ্য থেকে সার উৎপাদন করেন কিনা? হ্যাঁ/না				
৩১	বর্জ্য থেকে সার উৎপাদনের পরিমাণ(কেজি):	বর্জ্য ব্যবস্থাপনা সম্পর্কে ধারণা আছে কিনা? হ্যাঁ/না				
৩২	সুগন্ধী ধান চাষের ক্ষেত্রে জৈব সার ব্যবহার করেন কিনা?	হ্যাঁ/না				
৩৩	জৈব সার ব্যবহার নাকরার কারণ কি?	ধারণা নাই/পাওয়া যায়না/মানসম্পন্ন সারের অভাব				
৩৪	জৈব সার কোথা হতে পান?	নিজে তৈরি করেন/ক্রয় করেন				
35	Good <b>agricultural</b> practice ( <b>GAP</b> ) এর সম্পর্কে ধারণা আছে কিনা? হ্যাঁ/না					
৩৬	সুগন্ধী ধান চাষে দৈনিক ৮ ঘন্টা কাজ করে এমন শ্রমিকের সংখ্যা (জন)					
৩৭	সুগন্ধী ধান চাষে মানসম্পন্ন প্রয়োজনীয় উপকরণ (বীজ, সার, চারা) পাওয়া যায় কিনা?	হ্যাঁ	না			
৩৮	সুগন্ধী ধান কার নিকট বিক্রয় করেন? ( $\sqrt$ দিন)	খোলা বাজার	রাইসমিল	পাইকার	আড়ৎ	
৩৯	বিক্রয়ের পরিমাণ (মন=৪০ কেজি)					
৪০	বিক্রয়ের গড় মূল্য (প্রতি কেজি)/ বাজারদর					
৪১	সুগন্ধী ধান চাষের জন্য প্রয়োজনীয় অর্থের উৎস কি?	আত্মীয় স্বজন	এনজিও	ব্যাংক		
৪২	ঋণের পরিমাণ (টাকা)					
৪৩	সুগন্ধী ধান চাষে বর্তমানে চলমান ঋণের পরিমাণ কত টাকা?					
৪৪	সুগন্ধী ধান উৎপাদনে কি সমস্যার সম্মুখীন হচ্ছেন?	পোকার আক্রমণ		রোগে আক্রান্ত		
		ভাল জাতের বীজের অভাব		ভালমানের উপকরণ অভাব		
		বাজারজাত করণের সমস্যা		প্রাকৃতিক দুর্যোগ		
		সেচের সমস্যা		দক্ষশ্রমিকের অভাব		
		আর্থিক সঙ্কট		বাজারজাতকরণ		
		অন্যান্য				
৪৫	করোনা কালীন সময়ে সুগন্ধী ধান উৎপাদনের উপকরণের ঘাটতি (বীজ, সার, চারা) হয়েছে কিনা ?	হ্যাঁ	না			
৪৬	করোনা কালীন সময়ে সুগন্ধী ধান বিক্রয়ে সমস্যা হয়েছে কিনা ?	হ্যাঁ	না			
৪৭	করোনা কালীন সময়ে সুগন্ধী ধানের বিক্রয় মূল্য কমেছে কিনা ?	কমেছে	বেড়েছে			
৪৮	করোনা কালীন সময়ে সুগন্ধী ধান বিক্রয় এর পরিমাণ ?	কমেছে	বেড়েছে			
৪৯	করোনা পরিস্থিতির কারণে কি পরিমাণ জমিতে সুগন্ধী ধান কম চাষ করা হয়েছে? (শতাংশ)					
৫০	করোনা কালীন সময়ে সুগন্ধী ধান বিক্রয় করে আয় এর পরিমাণ	কমেছে	বেড়েছে			
৫১	করোনাকালীন সময়ে সুগন্ধী ধানের বিক্রয়মূল্য? (মন প্রতি টাকা)	ত্রি-৩৪		ত্রি-৫০		
		করোনার পূর্বে		করোনার পূর্বে		
		করোনাকালীন সময়ে		করোনাকালীন সময়ে		

#### A. Good Agricultural Practices (GAP) (উত্তম কৃষি পরিচর্যা)

#	প্রশ্ন বিবরণ	কোডঃ	উত্তরঃ
52	আপনি কিভাবে আপনার সাইট নির্বাচন করেছেন?	উঁচু জমির=১, পানির উৎস=২, জমির উর্বরতা=৩, লোকেশন=৪, অন্যান্য (উল্লেখ করুন) =৫	
53	আপনি কিভাবে আপনার জমি প্রস্তুত করেন?	যান্ত্রিক=১, প্রচলিত=২	
54	আপনি কি জমি লেআউট করেন?	হ্যাঁ=১, না=২	
55	আপনি কি সাইট নির্বাচনের আগে মাটি পরীক্ষা করেন?	হ্যাঁ=১, না=২	

#	প্রশ্ন বিবরণ	কোডঃ	উত্তরঃ
56	আপনার সেচের পানির উৎস কি?	পুকুরের পানি =১, নদীর পানি=২, খোলা কুপ=৩ নলকুপ=৪, অ-গভীর নলকুপ=৫, গভীর নলকুপ =৬, অন্যান্য =৭	
57	আপনি কি সাইট নির্বাচনের আগে পানি পরীক্ষা করে থাকেন?	হ্যাঁ=১, না=২	
58	রাসায়নিক দ্রব্য যেমন বালাইনাশক, সার পরীক্ষা করেন	হ্যাঁ=১, না=২	
	উৎপাদনের সময় আপনি কী ধরনের কীটনাশক ব্যবহার করেন?	রাসায়নিক কীটনাশক =১, বায়ো/জৈব কীটনাশক=২	
59	বালাইনাশক, ব্যবহারের সময় আপনি পিপিই ব্যবহার করেন কি?	হ্যাঁ=১, না=২	
60	আপনি কি চাষের বিভিন্ন ঝুঁকি মূল্যায়ন করেন?	হ্যাঁ=১, না=২	
61	আপনি কি চাষের সকল রেকর্ড সংক্ষন করেন?	হ্যাঁ=১, না=২	

## ৬২. নিম্নোক্ত বিষয় সমূহ সম্পর্কে কিছু জানা থাকলে বলুন?

বিবরণ	সক্রিয়ভাবে অংশগ্রহণ করেছি	ভিজিট করেছি	জেনেছি	জানিনা
উচ্চ মূল্যের বিভিন্ন জাতের সুগন্ধি ধান চাষ, রোগ-পোকামাকড় দমন ও বাজারজাতকরণের উপর প্রশিক্ষণ				
উচ্চ মূল্যের বিভিন্ন জাতের সুগন্ধি বীজধান উৎপাদন ও সংরক্ষণ বিষয়ক রিফ্রেসার্স প্রশিক্ষণ				
ব্রিধান ৩৪ এর প্রদর্শনী প্লট				
ব্রিধান ৫০ এর প্রদর্শনী প্লট				
চারা তৈরির প্রদর্শনী প্লট				
বীজ উৎপাদন ও সংরক্ষণ প্রদর্শনী				
ভার্মি কম্পোষ্ট তৈরি ও তার ব্যবহার প্রদর্শনী				
প্রকল্পের কর্মএলাকায় বিলবোর্ড				
উচ্চমূল্যের স্থানীয় ও ব্রি উদ্ভাবিত সুগন্ধী ধানের চারা তৈরির প্রদর্শনী প্লট স্থাপন				
উচ্চমূল্যের স্থানীয় ও ব্রি উদ্ভাবিত সুগন্ধী ধান চাষাবাদ কলাকৌশল প্রদর্শনী প্লট স্থাপন				
প্রদর্শনী মাঠ দিবস আয়োজন				
স্বাস্থ্য সুরক্ষার বিভিন্ন উপকরণ				
ধান চাষে সেচ কাজে পানির ব্যবহার হ্রাস				
মৃত্তিকা নমুনা পরীক্ষা				
সোলার ট্র্যাপ ক্রয়				
উপকরণ সরবরাহকারী/ ডিলারদের ওরিয়েন্টেশন				
বেপারী, পাইকার ও আড়ৎদারদের সুগন্ধী ধানের বাজার সম্পর্কিত ওরিয়েন্টেশন				
সুগন্ধী ধান চাষ পদ্ধতি সম্পর্কিত পুস্তিকা				
প্রকল্পের উপর তথ্য সহায়িকা				
প্রিন্ট মিডিয়া /ইলেকট্রনিক মিডিয়া ফিচার				
কৃষি মেলায় অংশগ্রহণ (উপজেলা পর্যায়ে)				
লিফলেট/পোস্টার (পুষ্টি, করোনা বিষয়ক স্বাস্থ্য সচেতনতা ইত্যাদি) তৈরি ও বিতরণ				
পণ্য প্রচারণামূলক বিবিধ কার্যক্রম				

What is your opinion about project implementation to achieved its results and indicators as per below table? (Please mark tick your any one opinion) প্রকল্প সম্পর্কে আপনার মতামত

Particulars		Not at all=1	Poor=2	Good=3	Very good=4	Excellent =5
Relevance (প্রাসঙ্গিকতা)						
Coherence (পারিপাশ্বিক সংহতি)						
Effectiveness (কার্যকারিতা)						
Efficiency (দক্ষতা)						
Impact (ইমপ্যাক্ট)						
Sustainability (টেকসই)						
Cross Cutting Issues	DRR (জলবায়ু পরিবর্তন)					
	Women empowerment নারীর ক্ষমতায়ন					
Income increase	Production increase					
	Price increase per Kg					
	Production cost reduced					
	Sales increase					
	Technology efficient					
	Livelihoods improved					
	New assets, new house, family education					
	New employment					
Income from aromatic rice has increased						

As per your experience, what is your opinion that project participants achieved or in what extent of achieved in terms of aromatic rice production and marketing

Types of participants	Production increase	Income from aromatic rice	HHS asset	diversified food	Livelihood diversified income	Savings	Financial inclusion	New Employment
%								
Excellent =5, Very Good=4, Good=3, Poorly=2, not at all=1								

সদস্যের স্বাক্ষর		তথ্য সংগ্রহকারীর স্বাক্ষর	
		তথ্য সংগ্রহকারীর নাম	
মোবাইল নং		মোবাইল নং	

## Annexure III: Qualitative guideline

FGD-Farmers		
Enumerator Name: সাক্ষাৎকার গ্রহনকারীর নাম	ঃ	
Mobile No. মোবাইল নাম্বার		
Date তারিখ	ঃ	
Location অবস্থান	ঃ	
Type/Category of participant অংশগ্রহণকারীর ধরন/বিভাগ	ঃ	

1. Which fruits do you usually cultivate at your area?
2. Do you know about HYV Aromatic rice varieties and their production? Give some example?
3. Are you interested to produce high value aromatic rice varieties? If yes why? If no Why?
4. What is the basic technical requirement for aromatic rice production?
5. From where do you collect the inputs, seedlings, fertilizers and pest management for aromatic rice production? How will you maintain/check the quality?
6. Do you think aromatic rice cultivation increased or decreased, please tell us details?
7. Do you think aromatic rice cultivation increased new employment, please tell us details?
8. Do you think aromatic rice cultivation improved livelihoods of the farmers? Please tell us details?
9. Please give major challenge of aromatic rice cultivation.
10. Please give major opportunity of aromatic rice cultivation

-----End of the Interview সাক্ষাৎকার সমাপ্ত-----

Signature of Enumerator

সাক্ষাৎকার গ্রহনকারীর নাম ও স্বাক্ষরঃ \_\_\_\_\_

## KII guideline (Market traders)

### I. Demographic Information

- Name:
- Address
- Age
- Mobile No.
- Name of shop/ company/ organization

### 2. Value Chain Information:

1	Which value chain do you represent?	Input retailer		Input wholesaler		Output Retailers	3
		Output Wholesaler		Trader (Faria)		Processor/ miller	6
		Others					
2	Years of business?						
3	How do you collect input?						
4	What type of input/aromatic rice do you collect?						
5	From where do you collect input/aromatic rice?						
6	Challenges in collection input/ aromatic rice						
7	How did you fix up price of your input?						
8	How do you overcome the challenges?						
9	Do you perform any value addition						
10	If yes, Describe the value addition						
11	Cost of value addition						
12	Where do you sell your product?						
13	Price						
14	How do you ensure quality of your product?						
15	Do you perform grading, sorting? If yes? describe						
16	Do you have any training on quality management? If yes, describe						
17	Do you have any training on processing? If yes describe.						
18	Do you provide any technical services to your customers?						
19	Do you receive any extension service? If yes, from where? Describe.						
20	Do you receive any market information service? If yes, from where? Describe.						
21	Do you receive any Finance service? If yes, from where? Describe.						
22	Overall challenges						
23	Suggestion about promotion of aromatic rice						

**Thanks for your Cooperation**

## Annexure III: Success stories

### A. Md. Mustafa Kamal

His socioeconomic status was very poor before joining the project. Because Mominpur union is a neglected union in Parbatipur upazila in production of aromatic rice. No farmer in the Union cultivates aromatic rice under modern methods. Because they are not aware of modern rice cultivation in modern methods. Md. Mostafa Kamal is one of them. His total land is 5 acres which he cultivates BRRI-28, 29,16 and local varieties. There was always a shortage in his family.



In July 2017, Assistant Value Chain Facilitator of PACE Project talked about aromatic rice cultivation with Md. Mostafa Kamal.

He said that Bangladesh is an agricultural country and 85% of people are dependent on agriculture. Modern method of paddy cultivation will reduce the production cost and the yield of aromatic rice will be higher and the profit will be much higher. The Assistant Value Chain Facilitator also told the farmers to increase the income of the entrepreneurs and improve the quality of life through increasing the production of aromatic rice and reducing the cost of production. By doing this, he is included in the project.

Planting single seedling in a row, Costs will decrease and yield will increase. Farmers are trained on this advanced technology to control disease pests on aromatic rice cultivation. Rice seedlings are planted in rows from north to south. Parching is done. Granular urea is used in paddy rows, AWD porous pipes are used for water saving. Seed preservation methods are used. Pest control of aromatic rice through solar traps. Vermi compost is used to increase soil fertility. Demonstration plots of aromatic rice are encouraged. Orientation of Bepari, wholesalers is done so that farmers can easily sell aromatic paddy. Linkages are given to farmers. Correct advice is given at different ages in aromatic rice. Timely application of fertilizers, use of fungicides and insecticides against diseases is recommended. In this way, socio-economic development of the farmers is done.

In 2022, Md. Mustafa Kamal cultivated BRRI-90 in 1acre land. Among them, 33 decimal of land demonstration plots were planted in a north-south row with single seedling each. The Assistant Value Chain Facilitator takes its advice from the first till the harvest. Parching done by each land. Chemical fertilizers are used after 15 to 21 days (first time). Second time 40 to 45 days after used fertilizer. After 50 to 65 days using fungicide for Blast. As soon as the flowers of fragrant paddy fall, the second time fungicide is used for neck blast. When Md. Mostafa Kamal was not covered under the PACE project, the cost of cultivating aromatic rice was 260 taka per decimal. Being a member of the PACE project, the cost of cultivating rice is 190 taka per decimal, reduce cost 70 taka per decimal. The present yield of aromatic rice is 17.6 kg per decimal. In the 33 decimal (one bigha) yield is 581 kg. According to the current market aromatic rice price is 56 taka/kg. Total selling price (581 \* 56) = 32536 taka. The total expenses is 6270 taka and net profit = 26,266 taka.

Do not cultivate any other type of rice except aromatic rice. Because the farmers did not know the benefits of aromatic rice before, Gram Bikash Kendra PACE project has change the misconceptions of the farmers. Farmers will save their rice as seeds using advanced technology. Financially he will benefit than more. Md. Mostafa Kamal says according to the rhyme, listen farmer brother, if you want to benefit financially, increase the cultivation of aromatic rice.

Gram Bikash Kendra PACE Project which provides advice training to the farmers by visiting the rice fields and giving proper advice so 100% of the farmers are benefited. Costs to the farmer are reduced, production is increased and diseases and pests are reduced. Farmers get higher market price due to high demand of aromatic rice in the market. He said that if the PACE project at Gram Bikash Kendra had extension for two years, Mominpur Union of Parbatipur Upazila would have been identified as a model union for aromatic rice cultivation.

## B. Cultivation of aromatic rice has brought success in Chiranjit's life!

Chiranjit Roy  
Father: Late-Birendra Roy.  
Village: Rajapur  
Post: Amarpur  
Union: Amarpur  
Upazila: Chirirbandar  
District: Dinajpur



Its economic condition was very weak before the inclusion of the project. Because although he had a large amount of land, he had no idea about aromatic high-yielding varieties and modern agricultural technology. Both the production and the market price were relatively low due to cultivation of local paddy in traditional method in all the lands. As a result, there was always scarcity in the family. Through training, technical assistance and exchange of experience from the value chain project "Increasing income of entrepreneurs through production and processing of high-value aromatic rice" implemented by Gram Bikash Kendra, they learned about advanced agricultural technologies and later started cultivating aromatic rice using agricultural technologies. During Aman season and he produces BRRI-34 on 100 decimal land, his total profit is 77669 taka excluding expenses. After meeting the needs of the family with the said dividend money and in the current year he purchased 1 Fresian breed cow. Technologies used in

By being associated with Gram Bikash Kendra's PACE project, we learned about the modern technologies of aromatic paddy production and later by using those technologies in our land, the production cost is much reduced along with the increase in production. We make ideal sized seedbeds by making each bed exactly 2-2.5 hand wide. Before sowing the seeds in the seed bed, we are treatment seeds and seed bed. We take necessary care of seedlings in the seed bed, it produces healthy and disease-free seedlings. Before planting saplings in the main land we test the soil and determine the amount of fertilizer and accordingly apply approved and balanced amount of fertilizer as a result of which soil health is good and fertilizer wastage is prevented. Sufficient amount of organic manure and vermin compost applied to the land results in increased aroma of rice.

Planting single seedling in each cluster in a row, in which each seedling receives light, air and food equally, as a result, the number of functional buds increases, the plant is healthy, the size of the grain is large, the grain is nourished, the infestation of pathogens, insects and rodents is reduced, resulting in increased production and lower production costs. Use of LOGO system facilitates crop inter-management. Crop land is alternately dried and wetted using AWD pipes thereby increasing soil fertility and reducing irrigation costs. Perching on the ground allows birds to sit, thereby controlling harmful insects without harming the environment and reducing the use and cost of pesticides. Through LCC method we apply urea fertilizer by considering the color of the leaves of rice plants, as a result, the wastage of urea fertilizer is prevented and the production cost is reduced.

Proper seed production and storage reduces dependence on market seed, resulting in quality seed production as well as reduction in production costs. Farmers are being encouraged about all the techniques to increase the production and reduce the cost of production through the use of modern agricultural technology in the cultivation of aromatic rice. As a result, on the one hand, as farmers are encouraged to cultivate aromatic rice, the production cost is reduced with the use of modern technologies in agriculture. According to Chiranjit, his total cost for production of aromatic rice BRRI-34 on 100 decimal land is 20218 taka. As a result of the use of technology in the cultivation of aromatic rice, the cost of production has decreased by 9420 taka in the following sectors as compared to earlier.

# Reduce cost calculation

- For seeds: 550 Tk.
- Regarding land cultivation: 3600 taka.
- Regarding chemical fertilizers: 2248 taka.
- For organic fertilizer: 1350 Taka.
- 1520 Tk for insecticide/pesticide spray.
- For irrigation: 450 Tk.
- Tk 10500 for harvesting and threshing by combine harvester.

Total production in 100 decimal land has been 1596 kg which is 298 kg more than earlier. In raw condition, the selling price of which is Tk 97887 and the net profit amount (excluding straw) = Tk 77669. In the next year Boro season will cultivate high-yielding aromatic varieties Bridhan-50 and Bridhan-90 on a total of 250 decimal of his own and contracted land using modern technology and encourage other farmer brothers to cultivate. The kind of advice given to farmers on aromatic rice production through the Gram Bikash Kendra's PACE project is very important for the farmers.



### C. The success story of Shefali Rani Roy, a dheki chata rice processing entrepreneur!

In the modern age of technology and modernity, making rice from paddy by using 'Dheki' is almost extinct. Then, to keep this ancient tradition, the rice is being prepared in a new form by using dheki. And all these have been made possible by the initiative of Shefali Rani Roy of Gokul village belonging to Aladipur union of Phulbari upazila under Dinajpur district. He is marketing successfully by making rice from paddy through dheki. His rice is very tasty and healthy and has spread all over the area. Shefali Rani Roy has a future plan to create employment for the poor and unemployed people of the area through this method.

Shefali Rani Roy's family with husband Bidhan chandra Roy, mother-in-law and two daughters. Elder daughter Snigdha Rani Roy is a 10th class student of Melabari Higher Secondary School and younger daughter Jayita Rani Roy is a 3rd class student of Gokul Government Primary School.



At the age of 16, she got married to husband Bidhan chandra Roy, a day labourer by profession. In the world, life is spent in the midst of hardships and hardships. In this situation, in 2017, he got involved with the value chain project "Increasing the income of entrepreneurs through the production and processing of high-value Aromatic rice" implemented by Gram Bikash Kendra, received training on modern methods of production, processing and marketing of aromatic rice and determined to become a successful entrepreneur. Later, with the financial and technical support of the project, he established himself as a Dheki chata rice processing entrepreneur.

He continued this work even though it was very difficult and time-consuming to remove the husk from the paddy by using dheki. Within a few days, it received a huge response from various categories of consumers. As a result, his family gradually began to feel the touch of development.



After collecting paddy from the farmer, they put the paddy in a big pot and cook it in the stove by burning it with chalk in the medieval method. Again, by drying that rice, he prepares dheki chata rice. As the fiber of this rice is not destroyed, it is nutritious and healthy. As a result, the demand for dheki chata rice has increased greatly among healthy and health conscious people. He threshes about 75-80 kg of paddy per day according to the demand of the consumers and delivers them to the consumers on time. And her husband

Bidhan Chandra Roy fully supported her in this work. Through this work he is earning around 14000-15000 taka per month. According to Shefali Rani Roy, the rice we eat in the market today contains many harmful chemicals. As a result, disease attacks are increasing. But we will avoid diseases to a large extent if we eat dheki chata rice. Just as we used to eat vitamin-rich dheki chata rice, there is still a demand for this rice. It is also eco-friendly and hygienic; Similarly, if this trend is continued, then we can eat nutritious rice.

#### D. Abu Taher's success story in Vermin Compost production:

Farmers have become self-sufficient by producing Vermin compost in Phulbari upazila of Dinajpur district. One of them is Md. Abu Taher. He turned the wheel of his own fortune by producing vermin compost. Additional income is added to the income of agricultural work. As a result, the pattern of his life has changed in a short time.

Seeing his initiative, other farmers have been encouraged to produce vermin compost. He is producing vermin compost in his homestead with training, technology and financial support under the overall supervision of Gram Bikash Kendra and with the support of Palli Karma-Sahayak Foundation (PKSF). By using this natural fertilizer on their own land, they are producing more vegetables and fruits, and also providing food for the family by producing and selling it commercially. Md. Abu Taher is a farmer by profession. A local resident of Maheshpur village under Shihnagar union of Phulbari upazila under Dinajpur district. His family consists of father, mother and wife with two daughters aged 12 and 08 years respectively. Wife is housewife by profession. Eldest daughter Tasnia Akhtar is a class Five student of Maheshpur Government Primary School and younger daughter Tabassum Akhtar is a second class student of the same school.



Abu Taher said that earlier he used to struggle to run the family. Today's vermin compost production has changed its fortunes. Recently, Deputy Director of Agriculture Extension Department of Dinajpur District and Upazila Agriculture Officer of Phulbari Upazila visited his commercial farm of vermin compost.

In the beginning of 2022 Gram Bikash Kendra implemented a value chain project titled "Enhancement of income of entrepreneurs through production and processing of high-value aromatic rice" by constructing a shed with 5 kg of earthworms with 14 rings and started commercial vermin compost production with financial support. Its primary stage vermin compost production started from the 1st week of last July/2022. So far the total amount of vermin compost produced by him is 4872kg.



Out of which 540kg of vermin compost was used by him for his own vegetables and field crops. 2482 kg of vermin compost was sold to a total of 14 local farmers and the remaining 1850 kg of vermin compost was sold to 02 retail agricultural inputs dealers namely M/s Sekender Traders, Shihnagar Bazar, Phulbari, Dinajpur and M/s Roman Traders, East Bajitpur (Abasan Mor) Phulbari, Dinajpur. Linkages have been established with vermin compost producers

through several rounds of contacts with the agricultural inputs dealer by the GBK-PACE project.

It should be noted that if 2000 earthworms are released in 120 kg of cow dung in 1 ring or chari made of cement, 50-55 kg of vermin compost are get available in about a month. At present, his number of earthworms is about 35000. He is producing vermin compost in 15 cement rings. From this, he produces about 800-850 kg of vermin compost every month, which he is selling at the rate of Tk 15 per kg. In this way, every month he is earning extra 12000-13000 taka. So far he has earned around 14000 taka by selling earthworms.

Apart from this, he keeps 4 cows, 3 goats and 12 chickens at home. As a successful farmer, Shahidul Islam participates in various trainings of Gram Bikash Kendra and gives ideas and suggestions to other farmers in the area about vermin compost fertilizer production. Inspired by this success of Abu Taher, now 6 farmers in his village have produced vermin compost fertilizer on their own initiative.

Instead of chemical fertilizers in the area, the use of earthworm fertilizers is increasing day by day in various crops, especially vegetables and fruits. As a result, on the one hand, crop production is increasing, on the other hand, soil fertility is increasing and the environment is protected from pollution. According to Abu Taher, vermin compost manure provides nutrients to the soil, increases organic matter content and prolongs fertility to help protect soil health while increasing soil water holding capacity and reducing water irrigation demand. By improving soil structure and increasing the activity of beneficial microorganisms, the use of vermin compost fertilizers reduces crop production costs, improves quality and increases yield.

In this regard, the upazila agriculture officer said, that if earthworm manure is used not only in crop fields but also as fish food in ponds, fish production increases. After production, this fertilizer can be stored for 2-3 years by drying it well and packing it. About 25 percent less vermin compost is used than other fertilizers to get almost the same yield.





গ্রাম বিকাশ কেন্দ্র এর আওতাধীন, পিকেএসএফ এর সহযোগিতায় “উচ্চমূল্যের সুগন্ধী ধান উৎপাদন এবং প্রক্রিয়াজাতকরণের মাধ্যমে উদ্ভোক্তাদের আয় বৃদ্ধিকরণ” শীর্ষক ভ্যালু চেইন প্রকল্প।

**সুগন্ধী চিনিওড়া চালের বৈশিষ্ট্য সমূহঃ**

- ▶ আকারে চিকন ও খাটো হয়।
- ▶ খেতে সুস্বাদু ও সম্পূর্ণ আতপ।
- ▶ সম্পূর্ণ খুদ ও পাথর মুক্ত।
- ▶ কেমিক্যাল ও পলিশ মুক্ত।
- ▶ অর্গানিক ও পুষ্টিগুণ সমৃদ্ধ।
- ▶ সরাসরি দিনাজপুরের কৃষকদের কাছ থেকে ধান সংগ্রহ করে হাসকিং মিলে চাল তৈরী করা হয়।



চাল অর্ডারের জন্য কল করুন মোবা: ০১৮৭৮-৯২৬৬০৫, ০১৯০৪-৪২৯৩৬৫



**সতেজতা থাকে অটুট  
আপনি পান আসল স্বাদ ও ঘ্রাণ**

সরাসরি চাষি ভাইদের কাছ থেকে সংগ্রহ করে হাসকিং মিলে প্রক্রিয়াজাতকরণের মাধ্যমে আপনার হাতে পৌঁছানো পর্যন্ত আস্তা চিনিওড়া চালে স্বাদ ও ঘ্রাণ থাকে পুরোপুরি অক্ষুন্ন।



**GBK গ্রাম বিকাশ কেন্দ্র  
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