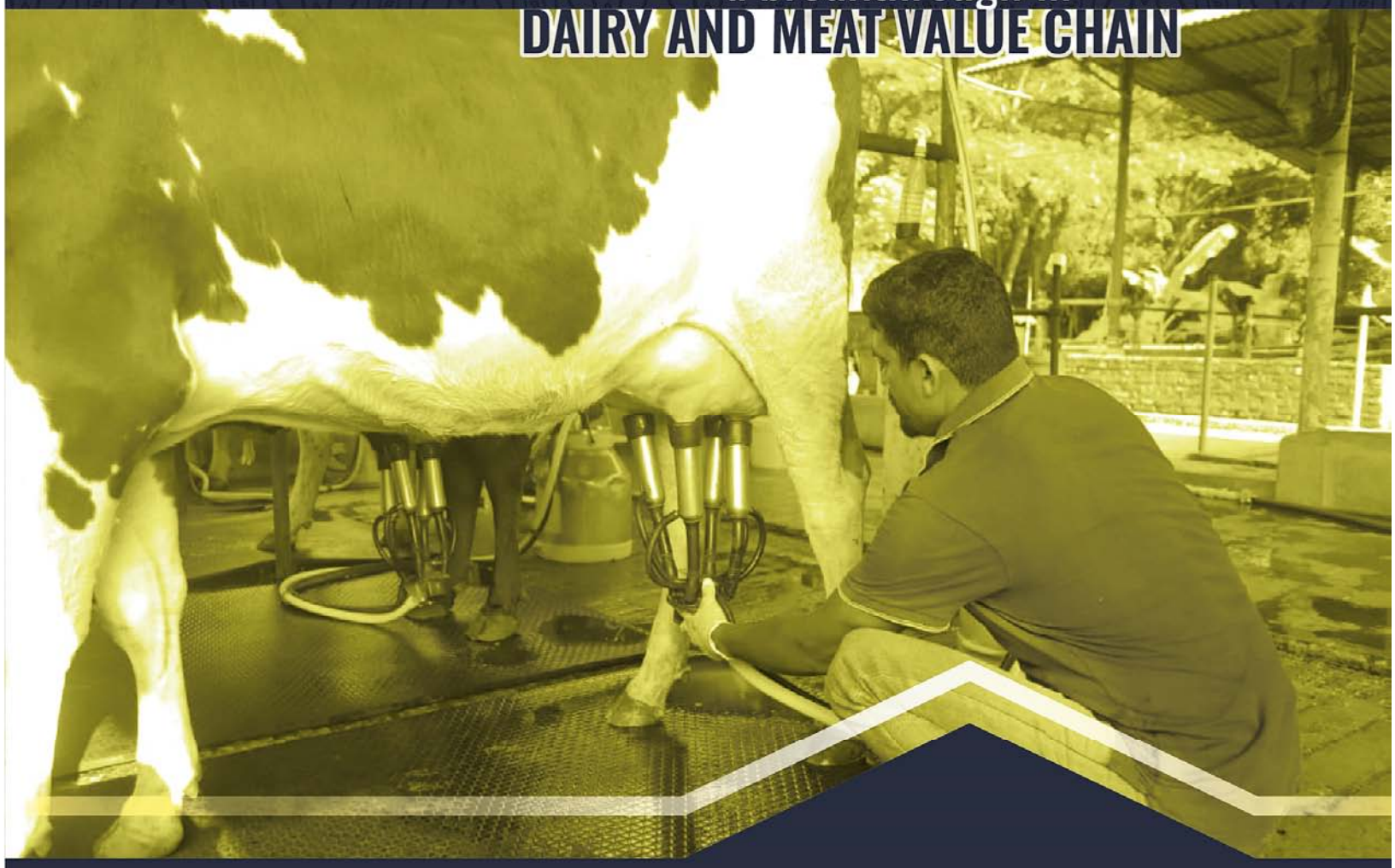
Rmtp

MECHANIZATION

a breakthrough in DAIRY AND MEAT VALUE CHAIN



পল্লী কর্ম-সহায়ক ফাউন্ডেশন

IFAD
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DAIRY AND MEAT VALUE CHAIN MECHANIZATION A BREAKTHROUGH IN

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ABBREVIATIONS

ABBREVIATIONS

	SHORT FORM	ELABORATED FORM
1	YPSA	Young Power in Social Action
2	PKSF	Palli Karma-Sahayak Foundation
3	DLS	Department of Livestock Services
4	GDP	Gross Domestic Product
5	RMTP	Rural Microenterprise Transformation Project
6	FGD	Focus Group Discussion
7	DANIDA	Danish International Development Agency
8	GAP	Good Agricultural Practice
9	HACCP	Hazard Analysis and Critical Control Point
10	AI	Artificial Intelligence
11	NGO	Non-Government Organization
12	ME	Micro Enterprise
13	IFAD	International Fund for Agricultural Development
14	DTW	Deep Tubewell
15	STW	Shallow Tube Well
16	LLP	Low Lift Pump
17	FY	Fiscal Year
18	FDA	Poribar Unnayon Songstha
19	GJUS	Grameen Jano Unnayan Sangstha
20	GUK	Gram Unnayan Karma
21	ESDO	Eco-Social Development Organization
22	SDG	Sustainable Development Goals
22	NDP	National Development Programme
24	TGL	Trade Global Limited
25	TMR	Total Mixed Ration

EXECUTIVE SUMMARY

The comprehensive report on the Impact Analysis of the "Market Expansion of Safe Meat & Dairy Product" Sub-project supported by IFAD and Palli Karma-Sahayak Foundation (PKSF) provides detailed insights into the efforts and accomplishments of the project in enhancing sustainable micro-enterprises within the meat and dairy industry. Throughout the sub-project implementation, the core focus has been on uplifting farmers and entrepreneurs by increasing income opportunities, ensuring food security, and enhancing nutrition through a series of value-chain activities.

Farm mechanization intervention has been carried out through the project areas of 12 districts. 8 partner organizations (YPSA, ESDO, DABI, GJUS, GUK, Wave Foundation, NDP and FDA) have implemented the intervention over the 12 districts (Chattogram, Bogura, Sirajgonj, Pabna, Thakurgaon, Bhola, Patuakhali, Barishal, Chuadanga, Naogaon, Jhenaidah, Meherpur) of the country.

Bangladesh produced 8.71 million metric tons of meat and 14.07 million metric tons of milk in 2022-2023, fulfilling 114% and 88.6% of its total meat and milk consumption, respectively. The growth rate of livestock in Bangladesh is 3.47%, according to the Department of Livestock Services (DLS) (2020).

Farm Mechanization intervention activities are mostly categorized into four broad parts: a) Training and Awareness Building on the Benefits of Farm Mechanization, b) Grants for Purchasing Farm machinery, c) Entrepreneurship development in cattle base industry, d) Access to Finance for Farm Owners/ Entrepreneurs.

Key observations from the report focuses on the inception and goals of the "Market Expansion of Safe Meat and Dairy Products" initiative, which receives support from various funding sources. The primary objectives of the project encompass the establishment of dealers/service providers in targeted areas, adoption of mechanization practices, and fostering demand for machinery to drive down production costs and increase efficiency. 4857 beneficiaries including farmers, small and medium dairy farms, farm machinery dealers, manufacturers and small entrepreneurs have benefitted from this program.

Total of 169 batches of Training conducted and 3,946 persons have improved knowledge of farm mechanization and other related issues. A total of 972 mechanization tools have been provided under the grants scheme for purchasing for small and large cattle farms and entrepreneurs. The grants are provided on cost-sharing basis where the entrepreneurs or farms have financial contributions on top of the grant amount. A total of 35 Types of farmers machineries have been provided to farm entrepreneurs under Intervention 03.

The report into the study overview outlining the project's significance, the rationale driving its implementation, the detailed scopes of work, the methodologies employed, and the robust data collection techniques and quality control measures in place. Furthermore, the report express a vivid picture of the project's impact on farm levels, manufacturers, and dealers of farm machinery, featuring inspiring success stories of individuals who have reaped the benefits of the interventions introduced.

Unveiling the challenges and constraints encountered by the project activities, including factors such as limited technology access, financial obstacles, knowledge gaps among stakeholders, and infrastructure deficiencies, the report aims to provide a transparent view towards liveseock farm mechanization. Through an in-depth analysis, the report then offers recommendations outlined to direct the way for future activities, encompassing initiatives such as capacity-building programs, financial aid strategies, technology awareness campaigns, and infrastructure.

Grossly manufacturers have reported a 15-20% increase in income in the last 2 years partly due to the involvement of this project activity.

Incorporating lessons learned from the project's endeavors, the report underscores the positive impacts of farm mechanization, emphasizing its role in boosting income levels, streamlining production processes, saving time, and

elevating overall efficiency within the meat and dairy sector. It also emphasizes the importance of addressing existing challenges to unlock the full potential of mechanization initiatives, ultimately ensuring sustainable growth and development within the livestock sector.

1.0 BACKGROUND

The sub-project "Market Expansion of Safe Meat & Dairy Product" is jointly organized and financed by the Palli Karma-Sahayak Foundation (PKSF), IFAD and DANIDA under Rural Microenterprise Transformation Project. The Rural Microenterprise Transformation Project (RMTP) is being implemented by PKSF with the objective of extending financial services for microenterprises as well as for improving income, food security, and nutrition status of small and marginal farmers, entrepreneurs, and other market actors involved in the value chains of selected high-value agricultural products.

The project makes value chain development interventions to expand markets for comparative advantage, market demand, and growth of agro-based products. There are provisions for product processing, certification, and marketing by brand image creation at home and abroad through this project. Also, there are provisions for introducing various new technologies, and methods such as Artificial Intelligence (AI), Internet of Things (IoT), Block Chain, Crowd funding Platform under this project for poverty alleviation. ***(https://pksf.org.bd/projects/rural-microenterprise-transformation-project-rmtp)***

The sub-project will enable rural producers to expand sustainable micro-enterprises through efficient production methods and strong market connectivity, implemented for the overall business development of small entrepreneurs. The project is providing support to produce and distribute safe dairy and meat products following the Global GAP and HACCP protocols. Traceability and certification of those products will be introduced for the branding of dairy/meat products and help equip the participants with a valuable business tool for compliance of product quality. The objective of the sub-project is to increase the income, food security and nutrition situation of marginal, small farmers and small entrepreneurs in the project area through value chain activities.

Project Objective :

To make the livestock sector profitable through increasing sales and service center and thus availing supply of necessary farm equipment by reducing labor, time and cost by extending the farm mechanization activities of the entrepreneur.

Project Goal :

a) At least one dealer/sub-dealer/agent/service providers will be developed at every union of project areas.

b) At least 6000 producers or rearers will practice at least 01 (One) machinery from the sub-dealers/dealers.

Project Outcome :

a) Demand of light and heavy livestock machineries will be created.

b) 25% of farm will be under mechanization coverage and thus production cost of dairy and meat products and bi-products will be reduced by 10%

Study OVERVIEW

The farm mechanization and Modernization of Dairy and Meat Value Chain sub-project constitute a vital intervention aimed at enhancing the efficiency and sustainability of agricultural practices in the designated area. This comprehensive study focuses on Intervention-3 under the broader RMTP initiative. The project aims to assess the impact and immediate results of farm mechanization and modernization activities focusing on critical gaps and findings in both backward and forward market ends. A key fact of the study involves the influence of micro entrepreneurs engaged in farm mechanization within the dairy and meat sectors. Furthermore a detailed examination of the profitability of production process before and after mechanization offers valuable insights. By providing a through overview and lessons learned from the implementation of farm mechanization, this study contributes to the collective knowledge base ,offering guidance to similar projects, NGOs, policy makers and stakeholders committed to promoting sustainable agricultural practices. RMTP is Rural Microenterprise Transformation Project financed by Pally Karma Sahayok Foundation (PKSF) in accordance with IFAD (International Fund for Agricultural Development) and DANIDA (Danish International Development Agency).

The project is being implemented in 12 districts of Bangladesh with a view to work with 6 (six) interventions. One of them is Farm Mechanization under Intervention-3. Therefore, assessment of the mechanization status of the project at field of whole RMTP project area is a need of the time. Thus, these activities are designed to analyse and evaluate the mechanization status of the RMTP "Market Expansion of Safe Meat & Dairy Product" project at field level of 8 partner NGOs mentioned above.

2.0 RATIONALE OF THE PROJECT :

The project with its Intervention-3 of farm mechanization is working to organize training for mechanization, implementing and promoting Silage and Grass baler machine, crusher machine, chopper machine, TMR machine, single and double milking machine, central milk collection system, dewatering machine, compost strainer and many more tools in accordance with provider companies. However some specific works to be agreed to accomplish the project activities by the service provider. These as follows-

a) The supplier farm/company will establish sales and service center in every upazilla of the project.

b) The sales and service center will also be used for displaying of different tools and machineries.

c) A trained and authorized mechanic/technician will provide various after sale services (if necessary) will be operated by the sales center.

d) The supplier farm will also arrange some field orientation training for the sold machineries to ensure smooth operation by the consumer.

e) The supplier company will also arrange promotional activities among the farmers. Exposure visit, cross visit, day long campaign etc may be some choices.

f) In every farm day, campaign a representative from Supplier Company will present their activities.

g) The supplier must ensure safety protocol for every machineries/tools provided to the farmer and must not supply any illegal machinery that is not authorized by Government of Bangladesh (GoB).

3.0 SCOPES OF THE WORK :

The scope of the study for the farm mechanization and modernization of value Chain sub project encompasses a comprehensive examination of various essentials crucial to the success and sustainability of the initiative. The study will describe a detailed analysis of the physical construction involved in implementing farm mechanization and modernization activities within the designated project area.

- This includes assessing the infrastructure developed such as machinery, processing units and storage facilities.
- The study will delve into the environmental impact of the construction, considering factors like land use, resource utilization and waste management.
- Additionally the scope extends to evaluating the social impact, considering aspects such as community engagement, employment generation, and changes in local livelihoods.

- The study will also assess the economic implications of the implementation phase, analyzing costs, benefits and the overall financial feasibility of the project.
- By comprehensively exploring these dimensions, the impact study aims to provide a holistic understanding of the implications and outcomes associated with the physical implementation of the farm mechanization and modernization of Dairy and Meat Value chain project.

4.0 METHODOLOGY :

The consultant/consultancy firm developed and appropriate methodology (most preferably, a mixed method) to meet the objectives of the assignment. The methodology includes statistically reliable and acceptable sampling method and its estimation, appropriate study method and so on. Appropriate triangulation in data collection method is anticipated in the proposed methodology as per need. The field study was done in the project area of 08 partner NGOS of 12 district. The following methodology has been employed during the study :

Sl	Survey Tools	Total
1	Literature compilation and desk review (for secondary data collection)	N/A
2	MEs interviews/survey in the targeted stakeholders	240
3	Focus Group Discussions in targeted cluster	16
4	Interviews with key stakeholders and	24
5	Case Study / Impact Study	8
6	In-depth interview with the respective line agencies.	15
	Total	**303**

Study area

Sl	RMTP Partner Organization Name	Location of the study
1	Young Power in Social Action (YPSA)	Chattogram
2	Gram Unnayan Karma (GUK)	Bogura
3	Eco Social Development Organization (ESDO)	Thakurgaon
4	Dabi Moulik Unnayan Sanstha (DABI)	Naogaon
5	Grameen Jano Unnayan Sanghstha (GJUS)	Bhola,Patuakhali
6	Wave Foundation (WF)	Chuadanga, Jhenaidah, Meherpur
7	National Development Programme (NDP)	Sirajganj, Pabna
8	Poribar Unnayon Songstha (FDA)	Barishal
Total	**08 Partners**	**12 Districts**

ওয়েভ ফাউন্ডেশন
WAVE FOUNDATION

ECO-SOCIAL
DEVELOPMENT
ORGANIZATION

Duration of the study and schedule of the reports : The study was commenced by 20th December, 2023. A draft report has been produced for review to YPSA and PKSF team by 25th February, 2024. Final Report is done by 5th March, 2024.

Data Collection methods and tools development :

Data Collection Method	Data Collection Tools
Focus Group Discussion (FGD)	Checklist
In-depth Interview (II)	Semi-structured Questionnaire
Key Interview	Structured Questioner
Key Informant Interview (KII)	Semi-structured Questionnaire
Observation	Checklist

Field Data collection : The data are collected by designing a set of questionnaire against each established set out indicator substantiated by the study objective and project outcome. The Individual Interviews set out to assess the demographic status. Key Informant Interviews Focus Group discussion, Field Observation, used extensively in retrieving other relevant information and qualitative data are used. Finally the received data both qualitative and quantitative have processed and analyzed by using appropriate software applications.

Data consistency and quality control : The Consultant committed to maintain approach in capturing consistent and quality data for conducting the survey aims to produce accurate reliable and valid result. Team implemented systematic quality assurance procedures under a set strategy to prevent unacceptable practices and to minimize errors in data collection. Measure has been taken in recruiting people of data collecting team. Furthermore, a training covering application of survey materials explanation of the rational and survey protocol technique of successful interviews was provided before initiating the data collection process.

5.0 FINDINGS

Farm Mechanization in Bangladesh : Bangladesh has made significant progress in mechanizing various aspects of agricultural production since the 1980s, a time when manual labor and animal power were predominantly used. Following the loss of a large number of draught animals in the 1988 flood, the government took steps to facilitate the import of agricultural machinery by lifting brand and testing restrictions and allowing duty-free import of irrigation engines, power tillers, and spare parts. Consequently, a considerable number of low-cost power tillers and irrigation engines were brought into the country, leading to the widespread mechanization of primary tillage, irrigation, and threshing.

With rising labor costs and shortages, especially during the rice harvest season, there is now a growing demand for mechanized rice transplanting and harvesting services. The private sector has been proactive in promoting and selling rice transplanters and mini combine harvesters to meet this demand, while the government has offered subsidies on the sale of various machines, including combine harvesters and rice transplanters. However, the adoption of these modern agricultural tools has been slower than anticipated, with many crop production activities still being carried out manually.

Historical Perspective of Farm Mechanization in Bangladesh : Mechanization may be defined as the process of injecting power and machinery between man and materials in a production system. Agricultural mechanization is an application of agricultural machinery, tool, equipment and process for increasing farm productivity. Farm machineries can combat human labour with their efficiency. Machines save time, cost and labour. Mechanization also helped to reduce time needed to complete a certain process of work i.e. seed sowing/ transplantation, irrigation, and so on. Farm mechanization introduced in Bangladesh with large-scale canal systems and Deep Tube Wells (DTW). Bangladesh increasingly focused on the use of shallow tube wells (STWs) and less energy requiring Low Lift Pumps (LLPs) for irrigation after the independence.

Mechanization in Meat and Dairy Industry in Bangladesh : Bangladesh produced 8.71 million metric tons of meat and 14.07 million metric tons of milk in 2022-2023, fulfilling 114% and 88.6% of its total meat and milk consumption, respectively. The share of livestock in Bangladesh GDP is 3.47%, according to Department of Livestock Services (DLS) (2020). There's huge demand of dairy products - like pasteurized and powdered milk, yogurt, cheese and butter in Bangladesh. Due to low-production, supply constraints and lack of optimal quality enhancement the country has to import powdered milk. It spent US$ 365 million for milk-powder import in 2020, in a cumulative increase from $250 million in 2015.

Demand and Supply of Milk and Meat Products in Bangladesh : Bangladesh requires adequate protein for its large population (169.4 million). A significant source of this protein comes from livestock. According to the DLS, Bangladesh's annual demand was 156.68 lakh metric tons of milk and 75.20 lakh metric tons of meat in FY 2022 (Table 2)

Particulars	Demand	Supply Production (FY 2021-22)	In %
Milk	156.68	130.74	83.44%
Meat	75.2	92.65	123.20%

Source : Department of Livestock (DLS), Bangladesh

Growing scarcity of fodder, maintenance of farm animals for providing draught power became costly. This development promoted Mechanization of tillage operations and reduced dependence on animals for providing draught power.

6.0 STAKEHOLDERS ANALYSIS AROUND DAIRY AND MEAT PROCESSING FARM MECHANISATION

Intervention 3 has targeted several stakeholders and followed the value chain development approach. Working at multiple level stakeholders provided a significant positive impact on the dairy and meat processing market.

Smallholder farmers : Smallholder farmers are the key stakeholders and main recipient of benefits from this intervention. These farmers have different characteristics and production profile. Many of them are smallholder dairy farmers having 1 to 10 units of cattle either for milk production or fattening. Few farmers are engaged in fodder production and selling to smallholder dairy and meat farm.

Small Entrepreneurs : We can call them agro-entrepreneurs who are young and energetic individuals involved in solving problems around dairy and meat processing farm. Among these entrepreneurs there are dairy farm, dairy processing farm that makes cheese, yogurt, sweets, etc. Also there are other entrepreneurs who are using cattle waste- cow dung and urines to make vermin compost and sell to other farmers or home gardeners.

Traders : Traders plays important role along the value chain, creating mobility and transferring the product from the seller to user end. Traders are connecting dots and missing parts without them the value chain might not work properly. Goala/ Milk Collectors, Fodder traders, machinery traders, dairy product traders or wholesalers are few examples of the stakeholders that project has targeted with. Feed traders are very important stakeholders for this intervention.

Farm Machineries Manufacturers/Importers : Whole interventions primary target is to mechanizing the dairy and meat processing sector at different level of value chain. In order to doing so, machineries and equipment are necessary elements and farm machinery manufacturer, traders and importers played the key role here.

7.0 SHORT DESCRIPTION OF IMPLEMENTING PARTNER ORGANIZATIONS

A. Young Power in Social Action (YPSA) : Being inspired by spirit of the 'International Youth Year : Participation, Development, Peace,' the Founder General Secretary and Chief Executive Md. Arifur Rahman encouraged and organized the local youth community with the aim of establishing a youth development organization in Sitakund under Chattogram district of Bangladesh. In this way, on May 20, 1985, the youth organization 'Young Power' was established which later transformed as social development organization 'Young Power in Social Action (YPSA)' and began its course of participation in the development process. Currently, as an organization for sustainable development, YPSA is continuously moving forward with its vision, mission, and values as per its constitution and strategic plan. YPSA is working with its six theme- Health, Economic Empowerment, Human Rights and Good Governance, Education, Environment and Climate Change, Disaster Risk Reduction and Humanitarian Response passing its 40th year of founding.

B. Dabi Moulik Unnayan Sanstha (DABI) : Dabi Moulik Unnayan Sanstha is a non-government non profitable voluntary developmental organization. It located at kataltoli, Santahar road of Naogaon sadar upazila in Naogaon District. Dabi Moulik Unna yan Sanstha was formed in 1986 for overall development of the backward, unsupported people of the society by active effort of local freedom fighter, retired solder, educationist, and humanist through leading of honourable former volunteer of United Nations MR. M.M Akram Hossain. In the beginning this organization started to train up the poor and unemployed women on jute derived product to decrease their unemployment and to smooth their income generating activities. The scope of working and abilities of this organization is increasing day by day by rightful leading of privileged daughter of late M.M Akram Hossain M and honourable executive director of this organization Asrafun Nahar. As a result, besides poverty alleviation Dabi Moulik Unnayan Sanstha doing developmental and income generating activities. Besides microcredit programme it running 12 projects at a time.

C. Poribar Unnayon Songstha (FDA) : PoribarUnnayonSongstha (FDA) is a socio-economic organization founded in 1987 in Charfassion Upazila of Bhola district. The late Principal Nazrul Islam initiated the institution with a group of educated philanthropists, progressive-minded energetic youth, and members of civil society. Over the years, the organization has earned recognition as a well-established, trustworthy, and welfare-oriented institution catering to people from impoverished backgrounds to all strata of society through its socio-economic initiatives.

FDA is actively engaged in various social and economic development activities in collaboration with government, private, and international entities. Currently, the organization is managing around 20 developmental projects, extending its operations not only throughout Bhola district but also in neighboring Barisal and Patuakhali districts.

D. Grameen Jano Unnayan Sanghstha (GJUS) : Grameen Jano Unnayan Sangstha (GJUS) started its activities in Bhola district since 1997 as a development and voluntary organization. The aim of the Organization is to improve the overall quality of life of the underprivileged and ultra-poor communities. To achieve its goals, the organization has been working as a subsidiary of Palli Karmo-Sahayak Foundation (PKSF) since 2002 and is currently conducting its activities through 72 branch and 21 projects in Bhola, Barisal, Patuakhali, Barguna and Noakhali districts of Barisal and Chittagong divisions. GJUS employs 700 staff to implement microfinance, agriculture including livestock development, Legal & advocacy, Health & Nutrition, Education, Water & Sanitation Program, Community awareness, social development and poverty eradication programs. GJUS gives high priority to increase development the life style of poor people.

E. GRAM UNNAYAN KARMA (GUK) : Gram Unnayan Karma (GUK) acts as a social activist to create opportunities for the under privileged people by providing multi-dimensional support services for their sustainable socio-economic growth and development. It was established in the year 1993. The organization create employment opportunities to alleviate poverty by implementing agriculture, livestock and fisheries, small trade and business and microenterprise through microfinance program. The Organization is planning to expand the activities in uncovered remote areas for inclusion of poor people in the mainstream of development with the financial and technical assistance of government and international donor agencies. As part of the strengthening the dairy value chain in Bogura, GUK commissioned a value chain analysis or sub-sector assessment on dairy to identify the root causes of constraints and major opportunities for the value chain development. The dairy sector in Bogura is characterized by small-scale, widely dispersed and unorganized dairy cattle keepers, low productivity, lack of assured year-round remunerative producer prices for milk, an inadequate basic infrastructure for the provision of production inputs and services for the procurement, transportation and processing of milk, and a lack of professional management.

F. WAVE FOUNDATION (WF) : WAVE Foundation (WF) emerged as a Civil Society Organization in 1990. Since its establishment, the organization has been implementing multifaceted activities for the socio economic development of the poor and marginalized as well as the establishment

of universal human rights and good governance. Besides, the organization is conducting issue based policy advocacy and campaigns. WAVE is driven by its motto "Together for Better Life" towards the vision of establishing "A just and Prosperous society". WAVE has organized it's all activities under 6 major programs: 1) Poverty Eradication and Livelihood Development; 2) Community Financing and Entrepreneurship Development; 3) Agri Food System Transformation; 4) Governance, Rights and Justice; 5) Social Development and Youth Empowerment; and 6) Climate Justice and Renewable Energy Promotion. It is now working directly with more than 17.5 million people all over the country and making significant contributions to the realization of the country's development plan and the achievement of the sustainable development goals. The global coronavirus pandemic (COVID -19) forces many sectors of activity to slow down and adapt their functioning. Unlike the past, WAVE is responding through its actions and programs throughout Bangladesh to combat the coronavirus and its resulting crisis.

G. Eco Social Development Organization (ESDO) : Eco-Social Development Organization (ESDO) has started its journey in 1988 with a noble vision to stand in solidarity with the poor and marginalized people. Being a peoples' centered organization, we envisioned for a society which will be free from inequality and injustice, a society where no child will cry from hunger and no life will be ruined by poverty. Over the last thirty years of relentless efforts to make this happen, ESDO embraced new grounds and opened up new horizons to facilitate the disadvantaged and vulnerable people to bring meaningful and lasting changes in their lives. During this long span, we have adapted with the changing situation and provided the most time-bound effective services especially to the poor and disadvantaged people. Considering the government development policies, ESDO currently implementing a considerable number of projects and programs including micro-finance program through a community focused and people centered approach to accomplish government's development agenda and Sustainable Development Goals (SDGs) of the UN as a whole. ESDO is one of the most dynamic organizations expanding its development interventions across 381 upazila under 52 districts of Bangladesh covering over 12 million poor and vulnerable people.

H. National Development Programme (NDP) : National Development Programme (NDP) is a non-governmental organization, called an NGO. By virtue of the constitution, it is a non-profit, non-political voluntary development organization. The key objective of NDP is to strengthen capacity of the targeted project participants (beneficiaries) and create opportunities to bring them into the mainstream of development.

Now, NDP has been launching 48 (forty-eight) different programs/projects and its operational area covers twenty districts across the country. NDP always places an emphasis on human rights, good governance, and gender equality. Through its dedicated efforts for about thirty two years, NDP has become the symbol of hope for the poor people it serves and likes to continue the work for as long as it is needed.

NDP works with the communities in order to improve the socio-economic status, promote gender equality and bring positive changes in the poor, disadvantaged and vulnerable people in the society through close collaboration with government line departments, local government and administration, civil societies, NGOs, private sectors, development partners and other stakeholders.

8.0 WORKING AREA OF FARM MECHANIZATION INTERVENTION

Farm mechanization intervention has been carried out through the project areas of in 12 districts. 8 partner organizations (YPSA, ESDO, DABI, GJUS, Wave Foundation, NDP,

Implementing Organization	Districts	Sub districts	Union
YPSA	Chattogram	Sitakunda	Sayedpur, Baroydhala, Sitakundo Pourasova, Muradpur, Barobkundo Bashbaria, Kumira
		Mirsarai	Mirsarai, Mithanala, Durgapur khoiyachara, Owahedpur Saherkhali, Hayetkandi, Ichakhali
		Hathazari	Hathazari Sadar
		Chattogram city	9, 10, 11, 12, 13 no ward
DABI	Bogura	Adamdigi	Satiangram, Adamdighi, Nasrotpur
		Dupchancia	Talora, Dupchancia, Zianagar
	Naogaon	Naogaon Sadar	Boalia, Soilgasi, Tilokpur
		Raninagar	Gona , Mirat, Kasimpur
		Atrai	Shahgola, Kalikapur, Hatkalupara
FDA	Bhola	Charfassion	17 Unions
		Lalmohon	6 Unions
		Monpura	4 Unions
GJUS	Bhola	Bhola Sadar	4 Unions
		Borhanuddin	4 Unions
	Barisal	Bakerganj	4 Unions
	Patuakhali	Bauphal	5 Unions
		Dashmina	4 Unions

GUK	Bogura	Bogura Sadar Shahjahanpur Sherpur, Gabtoli Sariyakandi, Shibganj	18 Unions
WAVE Foundation	Chuadanga	Chuadanga Sadar	19 Unions
		Damurhuda	
	Meherpur	Meherpur Sadar	
		Mujibnagor	
	Jhenaidah	Jhenaidah Sadar	
		Gangni	
NDP	Sirajganj	Sirajganj Sadar Kamarkhanda Belkuchi, Ullapara,	18 Unions
	Pabna	Bera, Sathia	10 Unions
ESDO	Thakurgaon	Sadar, Pirganj Ranishainkail Baliadangi	42 Unions

GUK and FDA) are implementing the intervention activities.

9.0 TOTAL TARGETED BENEFICIARIES

The targeted beneficiaries include farm owner who is rearing cattle for fattening and milking purpose and want to reduce production cost by mechanization. The intervention also provided support towards entrepreneurs like sweet maker, ghee maker, meat possessor, slaughter house, compost producer etc. All of the beneficiaries are economically solvent to purchase or receive the technology and socially acceptable person.

Partner	Districts	RMTP	Farm Mechanization
YPSA	Chattogram	25,000	513
DABI	Naogaon, Bogura	25,000	773
FDA	Bhola	25000	437
GJUS	Bhola, Barishal, Patuakhali	25000	1103
GUK	Bogura	25000	527
WAVE FOUNDATION	Chuadanga, Jheniadah, Meherpur	25000	612
NDP	Six Upazilas of two District Sirajganj & Pabna	25000	612
ESDO	Four upazilas of District Thakurgaon District (Thakurgaon Sadar, Pirganj Ranishangkail, Baliadangi)	25000	280
Total	**12 District**	**2,00,000**	**4857**

RMTP project has direct 200,000 beneficiaries under its umbrella, however, Intervention 3 as a new technology promotion have reached fewer entrepreneurs.

This intervention is exceptional in terms of selecting direct beneficiaries and rightfully. It has been trying to showcase successful case of farm mechanization for scaling up later towards other direct and indirect beneficiaries.

One of the beneficiary selection criteria was target entrepreneurs/ beneficiaries must be member of micro-credit program of the implementing organization. These interested farm must have willingness to improve their farming technology also willing to pay 75% of the machineries cost. In other words, farm machineries provided by these organizations are on cost sharing basis which increased the ownership of the farm leading towards sustainability.

10.0 ACTIVITIES

Intervention- 3 (Farm Mechanization) is one of the most valuable interventions among six other interventions under the RMTP 'Market Expansion of Safe Dairy and Meat Products project.' The aim and objective of this intervention is to mechanize 25 percent of local farms by creating demand for light and heavy machinery in the project area. As a result, production cost of milk and meat will decrease by 10 percent.

In project areas dairy and meat farms practice primitive method. As a result, labor cost and working hour is increasing day by day. That's why all the farms are getting poor benefits. Farm mechanization intervention is working to reduce labor cost and increase profit by reducing working hour. Basically, this intervention works for farm mechanization at a glance. In abroad sense this sub project helps dairy and meat farmers to give their farm a modern process through farm mechanization by giving grant to purchase machineries. The project also provides awareness training, workshop, campaign helped to established different plant to use farm waste.

Farm Mechanization intervention activities are mostly categorized in four broad parts.

a) Training and Awareness Building on Benefits of Farm Mechanization
b) Grants for Purchasing Farm Machineries
c) Entrepreneurship development in cattle base industry
d) Access to Finance for Farm Owners/ Entrepreneurs

Figure-1 : Farm Mechanization Campaign

A) Farm Mechanization Training :

Training and Orientations are very crucial for introduction and scaling of any intervention. This intervention is very much about technology introduction and transfer among the entrepreneurs who are new to this system.

Farm owners are oriented about reducing the production cost through adoption of modern technology and mechanization in the farm informing farmers/entrepreneurs about quality production and creating demand in this regard.

Total **169 batches of Training** has been conducted under Farm Mechanisation Intervention and **3,946 persons have improved knowledge** on farm mechanization.

Training session has introduced new technology and machineries so that farm management can be more efficient and profitable. Creating demand for farm machineries is crucial for the sustainability of the intervention. Those sessions are conducted in association with farm machinery manufacturers and they exchanged their views with the farm owners & entrepreneurs. During the training sessions, they introduced different types of machineries, how to use them and what are the benefits of each machines.

Figure-2 : Farm Mechanization Training

There are also training and workshops on vermin compost manufacturing and plant establishment which have benefitted the entrepreneurs.

B) Grants for Purchasing Farm Machineries :

Total 972 machineries have been provided under grants scheme for purchasing machineries for small and large cattle farms and entrepreneurs. The grants are provided with cost sharing basis, where the entrepreneurs or farm have financial contribution on top of the grant amount.

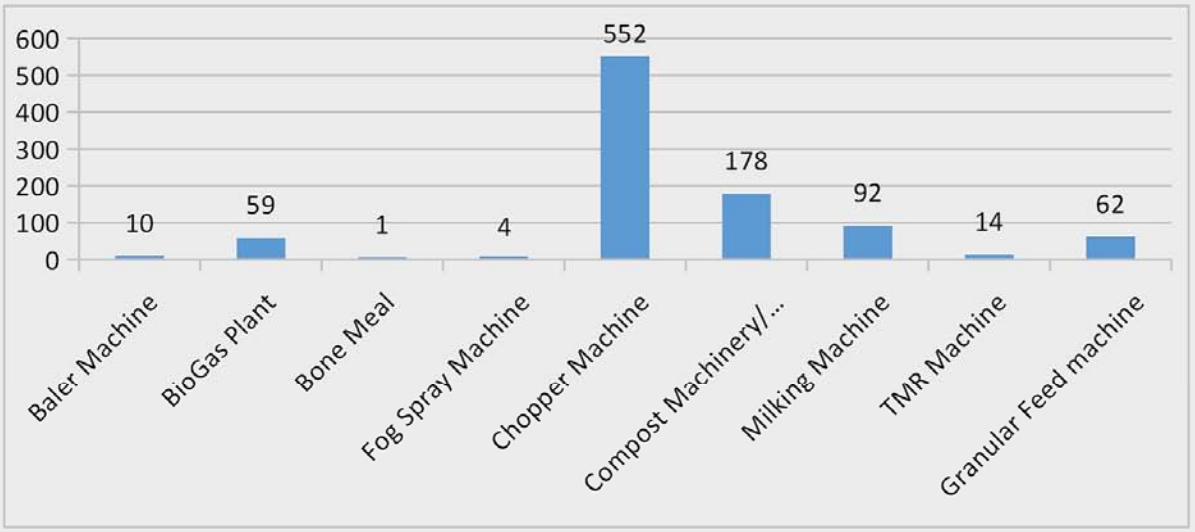


Figure-2 : Machineries Purchased under Grants

Grass and Fodder Chopper machines are of highest demanded and also highest distributed machineries among them. Compost machinery or plants came as second with 178 units distributed. Single and Double milking machine has been provided at 92 units as per demand. Feed machines and bio-gas plants are among other demanded mechanization tools.

Figure-3 : Milk Tanker Van

Silage Baler Machine :
Silage Baler Machine gather grass, hay ensuring supply of fibrous animal feed year round. The commercialization of silage will thus be within the reach of the local population.

Figure-4 : Silage Baler Machine

Figure-5 : Compost Separator Machine

Granular Feed Crusher Machine :
An important machine promoted by this project. Cattle feed production cost has been reduced by this tool. Farm owners also use this machine for better efficiency of cattle feed and increase in production.

Figure-6 : Feed Crusher Machine

MODEL
C4
MODEL
C4
MODEL
C4

Grass Chopper Machine :

Chopper Machine or grass cutter machine has been highly popular amongst the user. It has reduced the time of operation thus increase efficiency and saved cost of farm owners. Ultimately chopper machine is a very functional and important element for livestock production business impacting the profitability in a positive way. 552 livestock farm owners have availed chopper machine under this intervention and many of them has ordered more number of machine on their own interest.

Figure-7 :
Grass Chopper
Machine

Compost Separador

Vermi Compost or Trico Compost are biodegradable material against chemical fertilizer. It's natural and organic very much helpful to restore soil health. Compost Separador helping farmer by ruducing time and increasing production with saving labor cost.

Figure-8 : Compost Strainer/Separator (Electrical and Manual)

C) Entrepreneurship development in cattle base industry :

Intervention has created new entrepreneurs who will be involved in the business of production and selling of silage, grass, ready feed. New entrepreneurs also created for production and selling of different machineries like chopper machine, crusher machine, TMR, etc.

TMR Machine :

TMR Machine lowers down operating costs and safer quality through mechanization of farms and processing plants increasing profitability in livestock production business. Demand for light and heavy machinery has been created in the project area. It is expected to reduce 10 percent production cost by using TMR machine in production cost of meat, meat products, milk and dairy products. TMR machine helps to produce quality and balanced animal ration.

Figure-9 : TMR Machine

Figure-10 : Milking Machine

Animal Weight Scale

Figure-11 : Animal Weight Scale

Milking Machine :

Manual milking often does not provide optimum output, hence total production hampers. Milking machine either single or double as per capacity of the farm owners, reduce production cost (in terms of labor payment) and increase income through increased production. Milking through mechanized process is also more hygiene and safe for cow and farm owner.

Milk Chillling Plant

Figure-12 : Milk Chiller

As part of the entrepreneurship development process, implementing partner organizations has signed Memorandum of Understanding with Trade Global Limited. Under the agreement, TGL has conducted multiple activities that paved the way for

- Creating more entrepreneurs
- Created Awareness among farm owners and other stakeholders

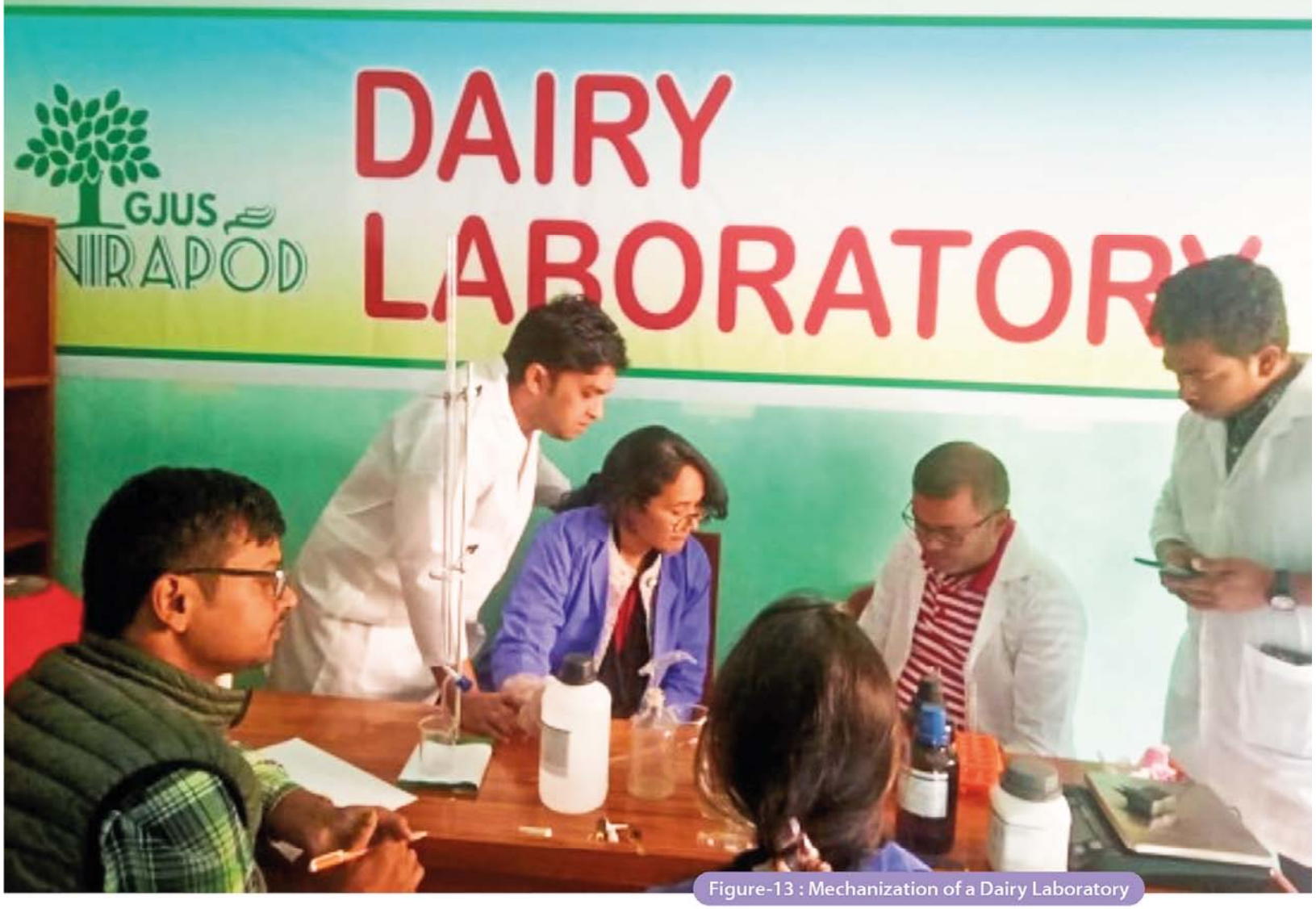


Figure-13 : Mechanization of a Dairy Laboratory

- Created a backward supply chain for machinery supply
- Created a market for repairing and after sales service of farm machineries
- Created a mutual winning relationship between machinery sellers and buyers (farm owners)

TGL has implemented following activities under the initiative-

Trade Global Limited :

1. **Establishment of Sales and Service Centre :** TGL has established sales and service center with its own cost. Implementing partner organization has supported this initiative by providing non-financial and technical knowledge and expertise. It helped local entrepreneurs to achieve after sales service and information on different machineries.
2. **Display of Machineries :** Private Machinery Companies have ensured display of all sorts of machineries at their sales and service center. It has good impact over the local entrepreneurs as they could see their own eyes and can ask different questions to satisfy their information need.
3. **Mechanic :** TGL has established at least one mechanic by providing training and capacity building at each union to support the local dairy and meat farm.
4. **Training and After Sales Service :** Each entrepreneur received training and 1 year free after sales service from TGL as part of the commitment for purchasing machineries from them.
5. **Demonstration of Machineries :** Private Company has arranged demonstration of machineries in different areas, as a result there were more awareness about machineries and more entrepreneurs were interested to use the machineries.
6. **Meeting and Seminar :** Arranged Seminar and Discussion Meeting with different stakeholders to create demand for using machineries and how to purchase.
7. **Visit :** TGL arranged exposure visit, promotional campaigns, crosses visits with the farm owners.
8. **Trade Fair :** Trade Global Limited has participated at livestock fair at own cost and displayed machineries at upazilla level. This has brought interest about benefits of using farm mechanization among dairy farm owners.

D) Access to Finance for Farm Owners/Entrepreneurs :

All the direct beneficiaries can have access to finance if they are willing to purchase farm machineries. The project has supported 25% of the machinery cost as a grant money, rest 75% has to be contributed by the farm owner. Sometimes, if they do not have the enough source of money, they can avail micro credit to make up the financial shortage. This unique approach has enabled to spread mechanization.

11.0 LISTS OF MACHINERIES BEING PROVIDED :

Total 35 Types of Farm Machineries have been provided to farm entrepreneurs under Intervention 03- Farm Mechanization.

Sl	Name of the Machineries/Equipment	Functions of the Machineries
1	Automatic milk packaging machine	Milk packaging easily in hygienic way in short time
2	Grass Baler Machine	To bale grass for storage.
3	Silage Baler Machine	To bale silage for storage.
4	Bone Meal production Machine.	For crushing livestock bone.
5	Bone saw machine	To maintain the selected different cut of meat according to customer demand
6	Bottle Filling & capping machine	Automatic filling for liquid milk product.
7	Central Milk Collection System	For milking multiple cows at a time.
8	Chiller Machine	Preservation of milk for 2 to 3 days
9	Grass Chopper Machine	Cutting of straw, different type of grass and maize plant
10	Compost Separator/Strainer machine	Crushing and netting of Tricho-compost and netting of vermi compost
11	Cream separator machine	For Cream Separating.
12	Double decker Track	To transport more animals for reducing transportation cost.
13	Feed Grinder/Crusher Machine	Crushing of Wheat, Maize and other granular feed
14	Milking Machine(Single/Double)	Collection of milk from the cow in a dairy farm
15	TMR machine	Mixing of granular feed with straw, grass and silage according to the recommended ratio to prepare balanced ration
16	Yogurt incubator machine	Making automated yogurt
17	Vacuum Sealer	Reduce air
18	Tanker Van	Transport milk with Cool chain Maintain.
19	Pasteurization Machine	To produce safe milk and to ensure longevity of milk product.
20	Mixer Machine	To mix material of milk products

Sl	Name of the Machineries/Equipment	Functions of the Machineries
21	Freezing Display	To Conserve food
22	Pellet Machine	Produces granular feed
23	Dairy Lab Equipment	For testing milk.
24	Travis Stand	Control the animals (Treatment, AI)
25	Ultra sound machine	Detection animal disease
26	Live Animal weight scale machine	To measure weight of animals and determine meat quantity
27	Keema Machine	For chopping meat
28	Milk can	Easy transport and storage of milk
29	Automatic Sweet machine	To produce Sweet with less cost and labor
30.	Lactometer	To test milk quality
31.	Milk Analyser	To test milk contents
32.	Automatic Ghee Machine	To produce Ghee
33.	Butter Churner	To produce Butter
34.	Cooling Van	To carry milk and meat
35.	POS (Point of Sale) Machine	To make payment easy

Different machineries have different functionalities and based on different technologies, however, all of them almost serve two major functions to the farm :

a) Reduce the Production cost by minimizing labor hour requirement

b) Increasing production thus also increasing profit

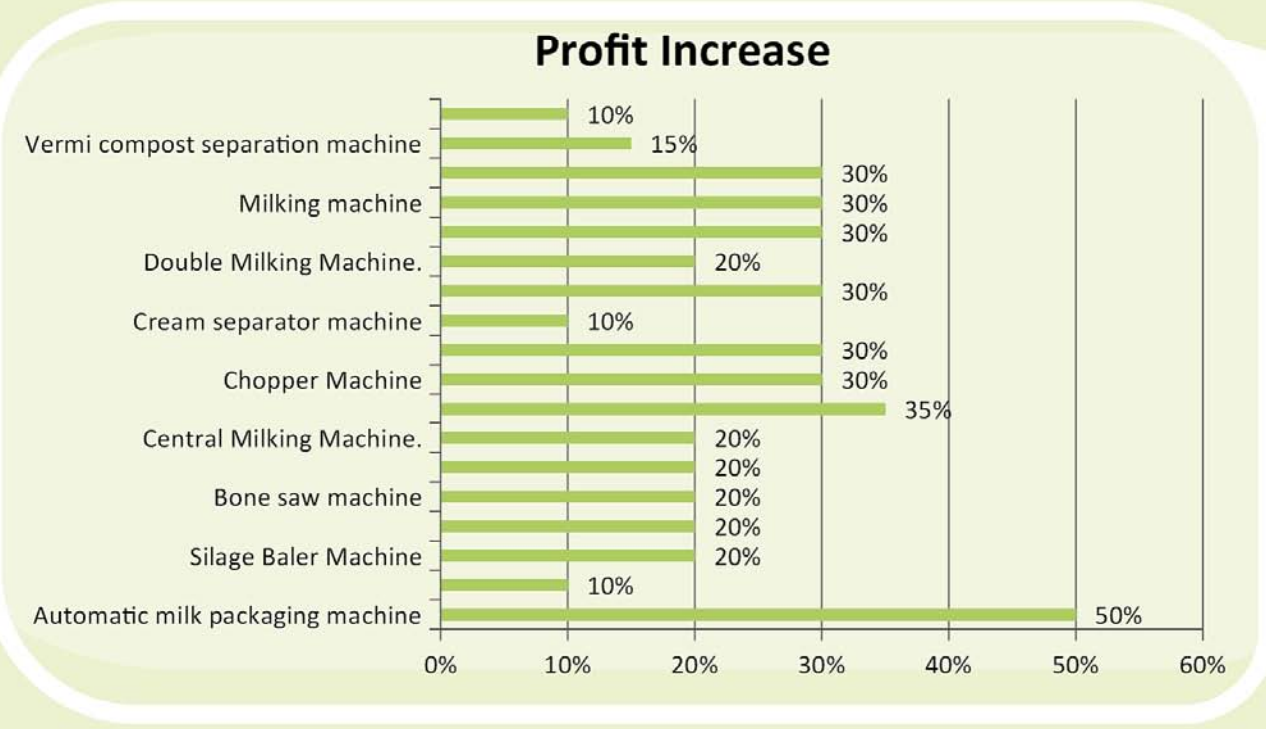
a) Reduce the Production cost by minimizing labor hour requirement :

Beneficiaries have reported 40-50% of reduction of production cost by mechanization of their farm.

Baler machine, Bone Meal machine, bone saw cutter, bottle filling and capping, milking machine, double milking machines all provided 50% of cost reduction than doing the work manually. This huge cost reduction has been attributed by the project activities specially farm mechanization. At processing level the cost reduction still almost 15-20% which is huge considering the profitability it might bring. In a nutshell it can be said that farm mechanization can help dairy and cattle industry to reduce their operating cost and thus will contribute to the profitability as well.

b) Profitability Increase :

Profitability from farming cattle or by dairy industry has increased by using mechanization as reported by farms. Average 20-30% profit increase has been reported by using different sorts of machineries by the farm and entrepreneurs.



Profitability Change using mechanization

Automatic milk packaging machine has increased the profitability most by 50%. Milking machine both single and double, cream separator machine, chopper machine all contributed to 30% increase in profit. By increasing productivity in lesser time they can now produce more with lesser cost involvement has triggered for the improved profitability. Also the quality of the product has increased after using the machineries in the farm.

12.0 IMPACT ON MANUFACTURERS AND DEALERS OF FARM MACHINERIES

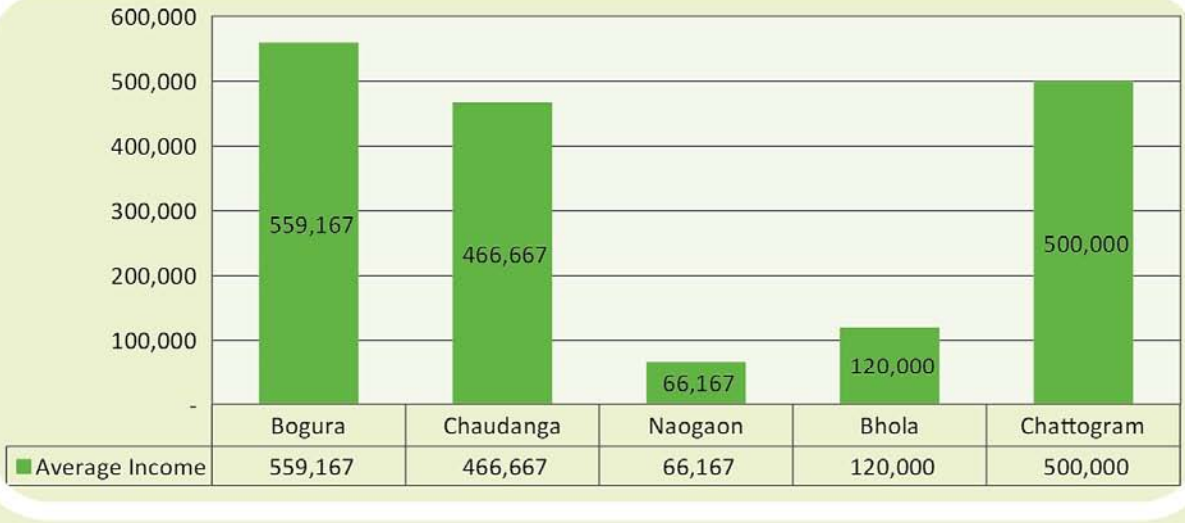
Farm machineries are mostly produced in 4 districts, Bogura, Naogaon, Bhola and Chuadanga where

Bogura ranked at number 01 position followed by Naogaon. There is very few manufacturers in Chattogram and Bhola Districts. On the other hand, there is no manufacturer in Patuakhali and Barishal.

The project has collaborated and supported at least 16 manufacturers of farm machineries at different districts. Manufacturers have been coached, introduced to new customer segments, have established dealership closer to the customer hubs and importantly they have been able to create awareness about the benefits and outcome of using farm machineries.

Changes in Income :

Grossly manufacturers have reported 15-20% increase in income in last 2 years partly due to the involvement of this project activity.



Monthly Income Level of Machineries Manufacturers

There are approximately 1500 workshops in Bogura engaged in automobile, agriculture, dairy, poultry and other light engineering sectors. This project has collaborated with 07 workshops. On an average a workshop in Bogura earns monthly revenue of BDT 559,167 which is good. A workshop at Chuadanga earns BDT 466,667 per month, least in Naogaon earning at BDT 66,167 per month.

Changes in Number of Customer :

There is a huge growth in customer numbers of the farm machineries manufacturers. In most cases customer numbers tripled than before due to the interventions. Some of the manufacturers have seen 5 times growth in customers number that impacted their revenue income positively.

Product Portfolio and Industry Portfolio Diversified :

Farm machinery manufacturers are locally called engineering workshops and they mostly manufacture

Chopper machine, Feed crusher Machine, Anti kick bar, grinding machine. Feeder bottle, automatic water bowl plastic, fogger machine, weight scale machine, Compost Separator machine, etc.

With the project inclusion, demand for certain products specially chopper machine, grinding machine, and food crusher machines have increased multifold. Manufacturers are thinking to introduce machines with different capacities suitable for different farm size. Farms with small number of cattle herd require a low capacity machine at a lower price, whereas large farms requires more capacity and they are willing to pay more for increased capacity. Besides farms are demanding new technology based machineries for betterment of the farm efficiency and manufacturers are positively responding to the queries.

However, sophisticated machineries and instruments like Milking machine, Pellet machine, Cream separator, Vacuum machines, Pasteurization plant, and Ultra sound machines are still imported and distributed by the same manufacturers or dealers/ importers of machineries. The costs are high due to different excises and duties. The dollar crisis and global inflation also caused the price higher for these items. It takes normally 1 to 2 months to get the machines after providing advance by the dairy or meat farm. Ukraine is the maximum source/ exporter of quality machines and they are impacted severely by the war.

With the development of the dairy and meat processing industries, workshops are also contributing to other industries as well. Poultry industry, irrigation, agriculture, transport and automobile sectors are also benefitting with the growth of this industry as they follow similar pattern and technologies.

13.0 CASE STUDIES

I) CASE STUDY : "Transforming income through farm mechanization" :

Abdul Mannan, a leading dairy farmer from central Naogaon, operates his farm in Malson, Raninagar, Naogaon. He currently rears over 60 cows, with more than 30 being milking cows, producing an average of about 100 liters of milk per day. Initially, he sold his milk to local traders (goalas) under the condition that they would milk the cows themselves and handle the sales in the local market. However, this traditional method led to several challenges, such as delayed payments, underpayments, and frequent outbreaks of mastitis due to hand milking. Other contagious diseases like skin problems and tick infestations also occurred frequently. Additionally, hand milking demanded significant time and labor, resulting in poor profits despite his efforts.

Frustrated by these issues, Abdul Mannan considered shutting down his farm. However, he was introduced to the RMTP Project and learned about the benefits of a central milking

system. Intrigued by the potential improvements, he decided to invest in a central milking system from Trade Global Ltd, with support from RMTP.

With this new system, he can now milk more than five cows simultaneously without manual labor, reducing both time and costs. Since adopting the central milking system, incidents of mastitis and other skin problems have significantly decreased. As a result, his profits have doubled, and he is deeply grateful to DABI and RMTP for their support in transforming his dairy farming business

II) CASE STUDY : N.R Dairy Farm raised 60% income by using farm mechanization :

Nasir Uddin, a teacher turned successful entrepreneur from Dakshin Rahmat Nagar area of Sitakunda Upazilla in Chattogram, ventured into dairy farming and established NR Dairy Farm, which has now become a well-known place in the region. Starting with only two cows in 2020, Nasir faced initial challenges and setbacks, including the loss of four cows due to lack of knowledge and management issues. However, with perseverance and guidance from YPSA, Nasir turned things around. Presently, his farm has grown to 32 cows, with 24 producing milk.

Using modern techniques like milking machines and cultivating high-quality grass for feed, Nasir has significantly increased milk production and reduced costs associated with cattle management. The farm's focus on hygiene, with disinfectants, proper water supply, and waste management, sets it apart from others. Nasir also utilizes biogas from farm dung for cooking and employs other sustainable practices like processing manure for compost production.

Pakchong grass from Thailand has been cultivated on seven to eight bigha land next to the farm to provide enough feed. Apart from this, he provides various types of grain food such as wheat husk, broken saffron, oil cake and all the necessary feed but feed mostly raw grass. In this context, he said, milk production is relatively high as a result of feeding a large amount of raw grass. At the same time diseases are reduced and the rate of conception increases. However diseases of farm cows are relatively less, which is one of the reasons for its profitability.

NR Dairy Farm has disinfectants at its entrance, which prevents outside germs from entering. All cow mangers (feeding areas) have water taps to provide adequate fresh water. Under each manger there is another tap through which unnecessary water and liquids are drained. Such arrangements are not commonly seen in dairy farms in Bangladesh. A carpet is arranged below where waste material accumulates. Then it is cleaned by washing with water. Biogas plant has been constructed with farm dung. This gas is used for home cooking. Besides, he is producing more crops by using dung manure on the land.

NR Dairy Farm is known for its integration of modern technology, including milking machines, grass cutters, and CCTV for security. Nasir's success story has

inspired others and contributed to meeting the demand for milk while creating employment opportunities. Through his association with YPSA-RMTP, Nasir has witnessed a substantial increase in farm profitability, reduced labor costs, and higher milk production, thanks to farm mechanization and support from the project. His dedication and application of best practices make NR Dairy Farm a model for aspiring farmers.

Nasir Uddin has estimated 60% increase in farm profit. Increased profitability has been contributed by 20% reduction of labor cost, 30% increase of milk production.

Figure 10: Milk Can being used by Producer

III) Rabbi's Journey to Success with Grass Cutter Mechanization :

In the heart of Uttor Aicha, amidst the lush fields of Rosulpur in Charfession, Md. Rabbi's farm stood as a testament to his dedication to rural life. With a herd of 27 cows grazing under the sun, Rabbi knew that efficient management was crucial for their well-being. However, as time went on, he realized that traditional methods were no longer sufficient for his growing herd.

One crisp November morning in 2023, a solution arrived in the form of a Grass Cutter Machine from TGL. With hopeful anticipation, Rabbi welcomed the whirring machine onto his farm, marking the beginning of a new chapter in his agricultural journey.

As the seasons changed, so did the landscape of Rabbi's farm. The Grass Cutter Machine worked tirelessly, efficiently harvesting and storing grass, ensuring a steady supply of fodder for his cattle year-round. Gone were the days of scarcity and reliance on external sources; now, Rabbi could rest assured knowing his livestock would always be well-fed.

The benefits extended beyond just quantity—there was a noticeable improvement in the quality of the grass. With access to fresh, nutrient-rich fodder, Rabbi's cows thrived, their health and nutrition boosted by the abundant supply. This led to a significant increase in milk production, much to Rabbi's delight.

Perhaps the most impactful change was the reduction in labor costs. The Grass Cutter Machine automated the tedious tasks of grass cutting and fodder preparation, freeing up time and resources. No longer burdened by manual labor, Rabbi and his workforce could focus on other aspects of farm management, enhancing overall efficiency and productivity.

Additionally, Rabbi observed a significant reduction in metabolic diseases like tympani and bloat among his cattle. The consistent and balanced diet provided by mechanized fodder management safeguarded the health and well-being of his livestock, a realization that brought Rabbi immense relief and gratitude.

As weeks and months passed, Rabbi watched with pride as his farm flourished under the influence of the Grass Cutter Machine. His experience became a beacon of hope for farmers everywhere, demonstrating the transformative potential of mechanized solutions in rural agricultural settings.

In the annals of Uttor Aicha, Md. Rabbi's farm stood as a testament to the enduring spirit of innovation and resilience. Through his adoption of the Grass Cutter Machine, Rabbi not only optimized his livestock

management practices but also paved the way for a brighter, more sustainable future for himself and his community.

14.0 INTERVENTION BENEFITTING OTHER INTERVENTIONS

The Livestock Feed Market Development (intervention 2), especially in grass cutting and silage making, has brought about significant positive changes, benefiting both its own goals and other parts of the project.

By focusing on improving access to quality livestock feed, this intervention has helped farmers ensure their animals receive nutritious food year-round. Grass-cutting and silage-making techniques have allowed farmers to harvest and store fodder efficiently, resulting in increased milk production and healthier animals.

Additionally, the improved quality of livestock feed has had a positive impact on other interventions, such as Safe Milk and Dairy Product Market Development and Safe Meat Production. Better nutrition for animals has led to higher-quality milk and meat products, benefiting farmers and consumers alike.

The Livestock Feed Market Development intervention, with its focus on grass cutting and silage making, has not only helped farmers directly but has also contributed to the success of other project components. Through these combined efforts, the project is making a meaningful difference in improving livestock practices and farmer livelihoods.

Mechanization of livestock enterprises covers all levels of farming and processing technology, from simple and basic hand tools to more sophisticated and motorized equipment during livestock production practices such as maintenance, feeding, milking and cleaning. The activities being implemented under Intervention 1, 2, 4 and 5 such as ultra-sound machine for pregnancy diagnosis of cow, silage baler machine for production of silage, milking machine, cooling van, chiller for milk preservation in a safe and healthy way, pasteurization machine, sweet making machine, cream separator machine, yogurt incubator machine, packaging machine etc. are being implemented under farm mechanization.

By the implementation of Intervention -3 most of the farm owner are aware about using mechineries for more benefit. Now, about 50% income increase by using machineries in farm level using the technology farmer are benefited in several ways such as increase income, decrease production cost, time saves, labor cost decrease instant of other intervention.

Using of different kind of machinery such as chopping machine, milking machine, TMR machine, granular feed crusher machine resulting the reduction of production cost, saves time which ultimately increase the production of meat and milk. As a result, intervention 4 & 5 are also benefited. Another important point is the waste

management. In intervention 3, commercial compost plants have developed. The main raw material for compost production is cow dung and cow urine. So proper waste management channel in the farm has developed as a result, farm environment remains in good condition for animal through proper waste management as a result reduced different animal disease which significantly focuses on intervention 1. Chopping and vacuum machine directly involved to silage making which is related to intervention 2. On the other hands, different types of machinery such as cream separator machine, yougurt incubator, sweet maker, ghee maker machine benefited to intervention 4 and bone cutting machine, chiller and freezer used in the intervention 5.

15.0 CHALLENGES AND CONSTRAINTS OF THE PROJECT

As a dynamic and visionary project, Intervention 3 also has faced challenges that needs to be critically evaluated and shall be useful in designing next phase of interventions and activities.

1. **Limited Technology Access :** Across remote rural areas, many farmers lack exposure to modern farming machinery. The absence of awareness and access impedes their ability to embrace mechanized practices effectively.

2. **Financial Hurdles :** The journey towards mechanization is often hindered by financial

barriers. Small-scale farmers, already grappling with limited resources, find it challenging to afford the high costs associated with purchasing machinery. Additionally, the lack of access to credit makes their financial constraints, making it difficult to invest in mechanization.

3. **Knowledge Gap :** Transitioning to mechanized farming requires technical expertise. However, many farmers lack the necessary knowledge how to operate and maintain farm machinery. This knowledge gap undermines the potential of mechanization, leading to underutilization and inefficiency.

4. **Infrastructure Issues :** The infrastructure landscape poses its own set of challenges. Poor road connectivity and inadequate storage facilities hinder the transportation and maintenance of machinery. Such limitations affect the availability and condition of machinery, hampering its effectiveness on the field.

5. **Resistance to Change :** Tradition often clashes with innovation. Convincing farmers entrenched in traditional practices to adopt mechanized approaches requires patience and persuasion. Overcoming deep-rooted habits and beliefs is a significant hurdle in our journey towards mechanization.

6. **Sustainability Concerns :** Farmers express legitimate concerns about the long-term impact of mechanization on soil health and the environment. These concerns highlight the need for sustainable farming practices that prioritize environmental stewardship alongside productivity.

7. **Operational Challenges :** Even with access to machinery, operational challenges persist. Difficulty in finding skilled technicians, accessing spare parts, and securing timely repair services hinder the effective use of farm machinery, leading to operational disruptions and productivity losses.

8. **Inadequacy of Service Center (After Sales Service) :** Most of the farm Machineries/ Manufacturer or Suppliers of Machineries are not available in this reason. (Bhola, Patuakhali). In other areas also, service center or after sales service are inadequate.

9. **In adequate supply of grass leads to low penetration of mechanization :** There is a shortage of grass in many areas due to lack of space for commercial grass production and inadequate availability of grass based on the number of grazing animals in Bangladesh. So currently there is no demand for grass baler machines at the agricultural level.

Navigating these challenges demands a comprehensive strategy that encompasses capacity building, financial support mechanisms, infrastructure development, awareness campaigns, and sustainable farming practices. By addressing these hurdles

head-on, we can pave the way for a successful transition towards mechanization, empowering small-scale farmers to enhance their agricultural productivity and improve their livelihoods.

Farmers are not interested in buying double milking machine (single milking machine is being implemented as an alternative to double milking machine under the project), as the milk productivity of cattle in Bangladesh is low compared to other countries. Also, they are not aware of the benefits of mechanization.

16.0 RECOMMENDATIONS

As we look to the future, it's imperative to outline recommendations that will guide our endeavors towards further enhancing livestock productivity and promoting sustainable farming practices. Here are key recommendations for future activities:

1. **Capacity Building Programs :** Implement comprehensive capacity building programs aimed at equipping farmers with the necessary skills and knowledge to embrace mechanized farming practices effectively. These programs should focus on technical training in machinery operation, maintenance, and repair, empowering farmers to leverage modern technology for enhanced productivity.
2. **Local Entrepreneurship Development :** SMEs particularly at local entrepreneurs, youth shall be motivated and capacitate with finance and business skills to promote this sector. Large companies often miss out the local level opportunities and its hard to reach for them. However, local entrepreneurs can act as their agent, dealer. Else they can simply innovate and create their own business model of mechanisation as we have seen in compost sector.
3. **Financial Assistance Initiatives :** Introduce targeted financial assistance initiatives to alleviate the financial burden associated with mechanization. Explore options for subsidized machinery loans, grants, and incentives to enable small-scale farmers to invest in modern farming equipment without undue financial strain.
4. **Technology Awareness Campaigns :** Launch extensive awareness campaigns to promote the benefits of mechanized farming and dispel misconceptions surrounding technology adoption. Utilize various communication channels, including workshops, demonstrations, and digital platforms, to reach farmers across diverse geographical areas and cultural backgrounds.
5. **Promotion of Local Machineries using local raw materials :** Local machineries have multiple benefits like less costly, have less lead time, can operate easily, repair and

maintenance less costly and easy. However, these machines need more improvement in design and diversification. Project can focus on providing technical, financial and innovation support to local engineering factories to manufacture diverse categories of machineries.

6. **Infrastructure Development :** Prioritize infrastructure development initiatives aimed at improving access to rural areas and enhancing storage and transportation facilities for farm machinery. Invest in road networks, storage sheds, and repair workshops to facilitate the efficient distribution, maintenance, and utilization of agricultural equipment.
7. **Research and Innovation :** Foster research and innovation in agricultural mechanization to develop tailored solutions that address the specific needs and challenges faced by small-scale farmers. Collaborate with research institutions, academia, and technology providers to develop cost-effective and sustainable machinery designs suited to local farming contexts.
8. **Eco-Friendly Packaging :** Diversified milk product needs improve packaging what we are seeing. Most often PPP are common raw material for the packaging. Eco-friendly packaging should be promoted and innovation can be done here.
9. **Community Engagement Programs :** Engage local communities and stakeholders in participatory decision-making processes to ensure the relevance and sustainability of mechanization interventions. Foster partnerships between farmers, government agencies, NGOs, and private sector actors to co-create solutions that meet the diverse needs of rural communities.
10. **Promoting more machineries :** Implementing new technology like water line shower
11. **Monitoring and Evaluation Mechanisms :** Establish robust monitoring and evaluation mechanisms to assess the impact and effectiveness of mechanization interventions systematically. Collect and analyse data on key performance indicators, including adoption rates, productivity gains, and socio-economic outcomes, to inform evidence-based decision-making and program refinement.
12. **More service Center and after sales service :** Expansion of machine supply points by expanding linkages with the private sector (creation of dealer points) is necessary. This will increase the confidence and longevity of machineries.

Annexure-01:
List of Dealers and Manufacturers of different project areas

Sl.	Working Upazillas	Name of Dealer-Entrepreneurs	Types of Machineries	Customers before project	Customers after project	Monthly Revenue
1.	Santahar naogaon	Bismillah Engineering & Machineries Md. Mohor Ali (Mohon)	Chopper machine, Food crusher Machine, Anti kick bar, Glandes machine. Feeder bottle, automatic water bowl plastic, fogger machine, weight scale machine, Compost Separator machine etc	7	32	80,000
2.	Santahar naogaon	Sumaya Engineering and Machineries Md. Ferdus Rahaman	Chopper machine, Food crusher Machine,	5	25	65,000
3.	Raninagaor, naogaon	Joyma Electronic & Machineries, Ranjit Kumar Mohonto	Chopper machine, Food crusher Machine,	-	12	32,000
4.	Adomdighi, bogra	M/S Shiraj Electronic Workshop Md. Shirajul Islam	Chopper machine, Food crusher Machine	-	15	45,000

Sl.	Working Upazillas	Name of Dealer-Entrepreneurs	Types of Machineries	Customers before project	Customers after project	Monthly Revenue
5.	Santahar naogaon.	Farid Engineering Workshop Md. Forid	Chopper machine, Food crusher Machine	8	25	75,000
6	Naogaon Branch	Modern Agro Machineries Md. Hashem Ali	Chopper machine Food crusher Machine Milking Machine Anti kick bar Glander machine gumboot weight scale machine Compost Separator machine	-	32	85,000
7.	Santahar naogaon	Chatty Machineries Nironjin Shaah	Chopper machine Food crusher Machine	5	18	60,000
8.	Bhola Sadar	Md. Amir Hossain	All type of Farm Machineries	45	125	120,000
9.	Bhola Sadar	Md. Amir Hossain	All type of Farm Machineries	45	125	120,000
10.	Bogura sadar	TGL	Dairy & Poultry	10,000	12,000	2,000,000
11.	Shahjahanpur	Unique machinery	Dairy & Poultry	18,000	7,000	150,000
12.	Sherpur	Habib engineering	Dairy, poultry & acessories	9,000	10,000	1,100,000

Sl.	Working Upazillas	Name of Dealer-Entrepreneurs	Types of Machineries	Customers before project	Customers after project	Monthly Revenue
13.	Sariyakandi	Unique machinery	Dairy & Poultry	1,800	7,000	150,000
14.	Gabtali	Sarkar Workshop	Dairy & Poultry	70,000	9,000	900,000
15.	Chuadanga Sadar And Damurhuda	Janata Engineering	Agricultural and Livestock Machineries	800	15,000	800,000
16.	Damurhuda And Mujibnagar	Angqure Agro Machineries	Agricultural and Livestock Machineries	500	9,000	400,000
17.	Mujibnagar	Mujibnagar Machineries	Agricultural and Livestock Machineries	300	5,000	200,000
18.	Chittagong city	Kazi shawon	Agriculture and livestock based machineries	260	480	160,000
19.	Sitakundo	Md. Ajij	Same	122	214	80,000
20	Mirsarai	Md. Fahad Hossen	Same	146	262	120,000
21	Sirajganj Sodor	Amirul Islam (Fosol Agro-01873288800)	Chopping, milking, power tiller, Feed crushing machine	500	11,000	500,000
22	Ullapara	Roton (Roton mil and mechinaries store. 01711-116274)	Chopping machine, Milking machine	700	10,000	450,000
23	Raiganj	Sheikh Traders, Brohmmogacha, Raiganj, 01773833425	Chopping machine, Milking machine	400	5,000	250,000
24	Ullapara	Yasin-(01740906422)	Chopping machine, Milking machine	450	4,500	200,000

Annexure-02 : Name and Contact Number of Implementing Organization Officer

Sl	NGO Name	Project Manager	Intervention-3 Officer
1	YPSA	Dr. Imam Md. Abu Hena (Sajib) 01955551370 imamdvm@gmail.com	Dr. Md. Mozammal Hasan Chowdhury 01771103627
2	ESDO	Dr. Babul Chandro 01717892918 babulbarmon2016@gmail.com	Md. Abu Tareque 01723375643
3	NDP	Masud Mondol 01716655427 masudmondolbau2021@gmail.com	Md. Ranju Ahmed 01789552105
4	GUK	Dr. Md. Ziaur Rahman 01718295097 dmzrahman7@gmail.com	Dr. Abdur Rahman 01717351669
5	FDA	Dr. Md. Saddam Hossain 01767707247 sajeb.cvasuvet@gmail.com	Dr. Kazi Nazmus Sakib 01718867229
6	GJUS	Dr. Khalilur Rahman 01774600830 khalildvmpstu@gmail.com	Dr. Hadimul Islam 01730480269
7	DABI	Md. Mahmud Kabir 01772251939 dabirmtppm@gmail.com	Md. Rabiul Islam 01793363668
8	WAVE Foundation	Dr. Abu Saleh Shahid 01710823803 abusaleh@wavefoundationbd.org	Md Ashraful Haque 01722604405

Some mechanization activities

Vacuum Sealer

Bone Saw

Sweet Machine

SOME MECHANIZATION ACTIVITIES

Compost Separator

Freezing Display

Feed Crusher

SOME MECHANIZATION

Cream Separator

Grass Chopper

Milking Machine

PKSF Partner YPSA Chief Exucutive Md. Arifur Rahman distributing grant to the project participant

A Mechanization tools distribution ceremony

IFAD Mission team leader Mr. Dewan Alamgir observiting mechanization activites

PKSF Deputy Managing Director Mr. Dr. Akond Md. Rafiqul Islam checking milk with Lactometer in a project field


Pasteurization Plant
Milking Machine
Microscope in a Veterinary Lab
Cream Separator
Automatic Ghee Machine

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A Breakthrough in Dairy and Meat Value Chain