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Socioeconomic Impact of Dairy cum Fodder Farming in some selected Areas of Bangladesh

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***Abstract* :** *Dairy farming along with fodder production is a highly profitable enterprise in the milk pocket areas like Sirajgonj and Pabna. The study is conducted to determine the socioeconomic profile of the dairy cum fodder farmers and to assess the contribution of fodder cum dairy farming to farmers' livelihood change. For the study, two UpazilasnamelySathia under Pabna district and Shahjadpur under Sirajgonj districtwere selected purposively on the basis of concentration of dairy farming with fodder production. Simple random sampling technique was followed to collect data from the respondent farmers. A total of 60 dairy cum fodder farmers taking 30 from Sathia and 30 from Shahjadpur Upazila were studied. The study revealed that the highest percentage of farmers belonged to age group 31 to 50 years indicating that they were in active stage and physically strong enough to give more labour to farm operations. In case of literacy status, 47 per cent farmers had primary level education. It is also found that about 64 per cent fodder farmers had single occupation and agriculture was the main followed by business and service. Farmers had long experience of fodder cultivation. In Sathia, farmers had 19 years and in Shahjadpur 20 years of experience of fodder production for feeding their livestock. The average family size was found 6.8 in the study areas. Majority of the farmers (67%) were belonged to small farm group having 0.5.-2.49 acares of land. Although the agricultural land is decreasing and converting to crop land, but in the study areas farmers used 31.69 per cent of agricultural land for fodder production. Farmers cultivated both Jumbo and Kheshari (LathyrusSativus) more in Sathia and Napier in Shahjadpur compare to other fodder cultivers. The farm household of Shahjadpur area reared more cross-bred cattle compare to local breed. In Sathia, per household cross-bred cattle was 5.1 and in Shahjadpur 7.4 cattle. Livestock sub-sector contributed more compared to other sub-sectors into household gross income. In Sathia, the contribution of livestock sector to household income was BDT 209,853 and in Shahjadpur BDT 243,035. Everyday all farm household got a handsome amount of income from dairy cattle by selling milk. Moreover, they got a big return at a time in a year by selling their live cattle. For addressing the impact on livelihood status of the dairy farmers with fodder production, it was found improved human capital component over time acquiring knowledge and education, better health condition, easy and more entrance to information, etc. Cultivable land, using open water resources and forests were indicated to determine the changes situation in the natural capital aspects. In case of financial capital, cash in hand, savings and liquid assets had increased notably over the periods. Physical assets had also observed positive trends in the study regions. Thus, dairy owner cum fodder farmers' overall livelihood status had shown a positive trend.*

Key words: *Fodder, dairy,livelihood, impact and income*

I. Introduction

Fodder is a newly emerged crop that added in the farming system of Bangladesh. It became popular in many parts of the country for livestock production especially for dairy production. Its important role is to self-employment of the rural young youth through dairy enterprise development and beef fattening program. In the country 20 per cent people are directly and 50 per cent are indirectly involved and depend on livestock production. Current milk deficiency is 75.11 lakh metric tons and meat is 10.91 lakh metric tons (DLS, 2015). To minimize the gap between demand and supply, fodder might help to boost up the dairy production. A farmer in Palashbari Upazila under Gaibandha district become crorer through fodder production was a glaring example (Alokito Bangladesh, 7th December 2014). A study showed that annual net return from fodder production was estimated the highest BDT 212,272/ha for producer cum seller in Jessore district and the lowest in Kurigram district that was BDT 129,806/ha (Islam, *et al.* 2014). Fodder production led to increase in cross-bred cows that led to increase in milk production. In the same study the author stated that fodder farmers reared cross-bred cattle than the local cattle and it was 22.95 headper farm in Dinajpur district. High quality and nutrient enriched fodder production is inevitable for rearing improved cattle breeds. The fodder produced in the country as quality

fodder for the cattle were Napier, German, Black gram, Jumbo, Maize and Kheshari(*LathyrusSativus*) etc. Fodder plays an important role in economizing the cost of production of livestock products especially of milk. Feeds and fodder cost constitute about 60-70 % of cost of milk production (Grover, *et al*. 2012). As the fallow and pasture land is decreasing gradually and turns into cereal crop production. It is a matter of rigorous concern that nutritious and high yielding variety quality fodder is a demand of time. Introduction of cross-bred and pure breed dairy cattle in the country for increasing the milk production and minimize the gap, the fodder production is a prime condition. The demand for fodder for livestock rearing is increasing day by day. Besides, huge numbers of rural youth become self-employment through dairy farming and cattle fattening. For a healthy nation, animal protein in the form of milk, meat is part and parcel. Furthermore, the increasing population has given an extra pressure on animal protein. Fodder has made an impetus in the path way of animal production system. Now-a-days, quality fodder is a challenge for the development of livestock sub-sector. Adequate and timely supply of nutritious fodder could ensure the better livestock production performance. In FY2014-15, the total number of livestock was 53.972 million (DLS, 15). This is an increasing trend of livestock population. This trend is a good indicator of livestock development. Therefore, the present study was undertaken to determine the socioeconomic profile of the farmer and to estimate the contribution and impact of fodder cultivation on their livelihood change.

II. Methodology

Different villages ofSanthiaupazila of Pabna District; Shahjadpurupazila of Sirajgonj District; were selected purposively for this study based on concentration of dairy farming. The simple random sampling technique was followed to select different dairy farmers who were produced fodder for their dairy cattle.A total of 60 dairy cum fodderfarmers taking 30 from Sathia and 30 from Shahjadpurwere interviewed for collecting necessary data for the research. Farmers'categories were defined on the basis of land holdings such as: marginal= 0.05-0.49; small= 0.50-2.49; and medium= 2.50-7.49 acares of land.Field survey method was followed to collect primary data and information. Questionnairewas developed and pre-tested for necessary modifications before starting data collection. Moreover, focus group discussions (FGD) and key informant interview (KII) was also conducted with related stakeholders. Besides, secondary data and information from different published and unpublished documents, reports, and journals. The primary data were collected during the months of September to December 2014. The data and information collected from field surveys, interviews, communications and discussions were coded, processing and analysis. Data and information were analyzed by using descriptive statistics (i.e. sum, average, percentages, ratios, etc.), mathematical techniques, livelihood framework analysis, SWOT analysis to achieve the objectives and to get the meaningful results.

III. Results and Discussion

Socioeconomic Status of the Dairy cum Fodder Farmers

Socioeconomic variables of the farmers such as age, literacy level, occupation, experience, family size and dependency ratio were determined to seek the farmer status in the society where they belong. These variables influence the persons much in the time of decision making.

Age: Age of farmers plays a significant role in farm production and better management practices of the farming activities. The age of fodder farmers was determined by classifying the farmers into three groups: (i) up to 30 years; (ii) 31 to 50 years; and (iii) above 50 years. In Sathia, 63 per cent farmers were belonged to age group 31 to 50 years and in Shahjadpur 53 per cent. On an average, the highest percentage of farmers belonged to age group 31 to 50 years followed by above 50 years indicating that most of the farmers were in active stage and performed better in their farming activities. The remaining 18 per cent were under age group up to 30 years (Table 1).

Literacy level: Education assists a person in many facets to develop latent views and flourish the mind to become conscious about the environment where belong to. Education broadens the mind and accelerates to cope up the changing situation of the globe. The top most benefits of the education is, it makes humanbecome rational. Education makes farmers more capable to manage scarce resources efficiently so that they can earn higher profit. On the basis of education level, the literacy status of the fodder farmers has been categorized into five classes viz. (i) illiterate; (ii) primary; (iii)secondary; (iv) higher secondary; and (v) degree and above. Data and information on literacy level of fodder farmers were presented in table 1. In Sathia, 37 per cent farmers had primary education followed by 30 per cent secondary education. In Shahjadpur, 57 per cent farmers had primary education followed by 27 per cent illiterate. On an average, 47 per cent farmers were belonged to primary level, 18 per cent secondary level, 8 per cent higher secondary and 3 per cent degree and above. The remaining 25 per cent had no formal education (Table 1).

Occupation:The fodder farmers were involved in several types of occupations such as agriculture, business, service and others. Table 1 depicts occupational status of fodder farmers. It is cleared from the table that in Sathia, 80 per cent farmers had taken agriculture as principal occupation followed by business 20 per cent. In Shahjadpur, 47 per cent farmers' principal occupation was agriculture and other 47 per cent had business. About 64 per cent of the fodder farmers had single occupation and agriculture was the main followed by business and service. The study also found that the few farmers had secondary occupation beside their principal occupation.

Experience: Study shown that in Sathia, farmers had 19 years of experience on fodder production for their dairy cattle. In Shahjadpur, farmers had 20 years of experience for fodder production. On an average, farmers had 19.5 years of experiences (Table 1).

Family Size: The family size was also investigated in the study. In Sathia, family size was found 6.7 and in Shahjadpur, it was 6.93. The average family size was 6.8 which slightly higher than the national average. Dependent member per family in sathia was 3.46 and in Shahjadpurwas 3.10. Working member in Sathia 3.3 person per family and in Shahjadpur was 3.83. Dependency ratio was found in Sathia 1.61 and in Shahjadpur 2.31. The average dependency ratio was found2.0 (Table 1).

Table 1: Socioeconomic characteristics of the sample respondents

Characteristics	Sathia	Shahjadpur	All
1. Age (%)			
Up to 30 yrs	5 (17)	6 (20)	5.5 (18)
31 to 50 yrs	19 (63)	16 (53)	17.5 (58)
Above 50 yrs	6 (20)	8 (27)	7 (23)
2. Literacy Level (%)			
Illiterate	7 (23)	8 (27)	7.5 (25)
Primary	11 (37)	17 (57)	14 (47)
SSC	9 (30)	2 (7)	5.5 (18)
HSC	2 (7)	3 (10)	2.5 (8)
Degree & up	1 (3)	-	1 (3)
3. Occupation (%)			
Principal occupation			
Agriculture	24 (80)	14 (47)	19 (64)
Business	6 (20)	14 (47)	10 (34)
Service	-	2 (7)	2 (7)
Secondary occupation			
Agriculture	4	10	7
Business	13	3	8
Service	5	-	5
4. Experience on fodder cultivation (year)	19	20	19.5
5. Family size (No/Household)	6.7	6.93	6.8
Dependent member (No/Household)	3.46	3.10	3.3
Working member(No/Household)	3.3	3.83	3.6
Dependency Ratio	1.61	2.31	2.0

Source: Field survey, 2014. (Figure in the parentheses indicates percentage)

Category of fodder farmer

All categories of farmers cultivated fodder for their livestock. The study found that in Sathia, small category of farmers was the highest (57%) for fodder production followed by marginal 37 per cent. In Shahjadpur, 77 per cent small farmers were engaged in fodder production followed by medium 17 per cent. On an average, 67 per cent small farmers were engaged in fodder production for keeping their livestock (Table 2).

Table 2: Farmers' category according to land holdings

Farmer's category	Sathia	Shahjadpur	All
Marginal	11 (37)	2 (7)	6.5 (27)
Small	17 (57)	23 (77)	20 (67)
Medium	2 (7)	5 (17)	3.5 (12)

Source:Field survey, 2014. (Figure in the parentheses indicates percentage)

Land utilization under fodder crop production

Farmers utilize their agricultural land in various ways. In the study, it was found that in Sathia, 33.64 per cent agricultural land were under fodder production whereas in Shahjadpur, 29.74 per cent. On an average, 31.69 per cent agricultural land was used as fodder production in the study areas (Table 3).

Table 3: Land under fodder crop

Land use	Sathia	Shahjadpur	All
Cultivated land	74.2	125.86	100.03
Fodder land	24.96	37.43	31.20
Percentage (%)	33.64	29.74	31.69

Source: Field survey, 2014.

Fodder species cultivation

Farmers in the country cultivate a wide variety of fodder for their livestock feeding viz: napier, jumbo, black gram, maize, kheshari and german etc. In Sathia, the highest (30%) number of farmers cultivated both jumbo and kheshari fodder followed by jumbo and napier (16.67%). In Shahjadpur, 36.67 per cent farmers cultivated napier fodder followed by 20 per cent jumbo and the rest of others (Table 4).

Table 4: Fodder species cultivation in Sathia and Shahjadpur

Upazila	Fodder Name	Number	Percentage (%)
Sathia	Jumbo	5	16.67
	Black Gram &Kheshari	2	6.67
	Black Gram & Napier	2	6.67
	Kheshari	3	10.00
	Kheshari& Jumbo	9	30.00
	Napier	5	16.67
	Napier & Jumbo	4	13.33
Shahjadpur	Jumbo	6	20.00
	Napier	11	36.67
	Kheshari	4	13.33
	Black Gram &Kheshari	4	13.33
	Black Gram	5	16.67

Source: Field survey, 2014.

Cattle population scenario

Both local and cross-bred cattle are observed in the study areas. Compare to local cattle cross-bred cattle are more. In Sathia, per family the cross-bred cattle were 5.1 and local 3.3. In Shahjadpur, per family on an average cross-bred cattle were 7.4 whereas local cattle were 0.47 (Table 5).

Table 5: Cattle population scenario in the study areas

Species	Sathia		Shahjadpur	
	Local	Cross	Local	Cross
Bull	1 (1)	1.33 (4)	-	1 (4)
Castrated Bull	1 (2)	1.5 (3)	3 (9)	2 (4)
Milking Cow	2.47 (47)	2.68 (67)	-	3.31 (106)
Dry Cow	1.17 (7)	1.75 (14)	-	1.7 (12)
Pregnant Cow	1.25 (5)	1 (4)	1 (5)	1 (4)
Heifer	1.6 (8)	1.75 (7)	-	1.5 (9)
Calf	1.9 (29)	2.25 (54)	-	2.59 (83)
Total cattle	99	153	14	222
Average cattle	**3.3**	**5.1**	**0.47**	**7.4**

Source: Field survey, 2014. (Figure in the parentheses indicates percentage)

Family income and livestock sector

The farmers had a wide range of income sources to support their livelihood. The study found several main streaming income sources such as: agriculture, fisheries, business, service and livestock. In Sathia, livestock sector was the highest (BDT 209,853) income source followed by service sector (BDT 112,857). In Shahjadpur, livestock sector was the highest (BDT 243,035) income source followed by business sector (BDT 140,000). The average household income from livestock sector was BDT 226,444/year (Table 6).

Table 6: Sources of family income

(BDT)

Particulars	Sathia	Percentage	Shahjadpur	Percentage	All
Crop sector	72655	15.14	68571	11.56	70613
Fisheries Sector	-	-	4000	0.67	4000
Service Sector	112857	23.52	137333	23.16	125095
Business Sector	84474	17.60	140000	23.61	112237
Livestock Sector	**209853**	**43.73**	**243035**	**40.99**	**226444**

Source: Field survey, 2014.

Sole livestock sector income to household

It was found from the study result that income from cattle sold was higher in SathiaBDT 43,567 compare to Shahjadpur BDT 36,166 and the average was BDT 39,866. The study also revealed that income from milk sold was higher in Shahjadpur that was BDT 206,868 whereas in Sathia it was BDT 166,286. On an average, the income from milk sold was BDT 1,866,577 (Table 7).

Table 7: Sole income from livestock sector
(In BDT)

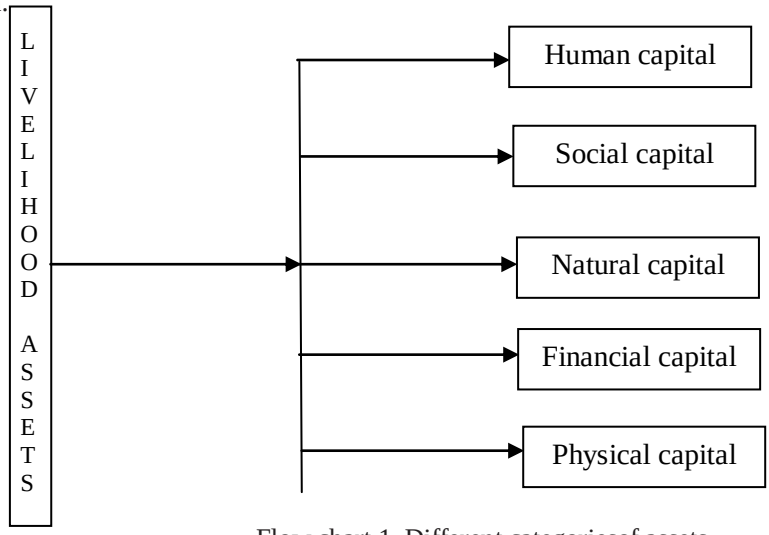
Particulars	Sathia	Percentage	Shahjadpur	Percentage	All
Cattle sale	43567	20.76	36166	14.88	39866.5
Milk sale	166286	79.24	206868	85.12	186577

Source: Field survey, 2014.

Livelihood Framework Analysis

Livelihood includes the capabilities, assets (both material and social) and activities needed for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets and provide sustainable livelihood opportunities for the next generation and which contributes net benefits to other livelihoods at the global and local levels in the long and short term (Chambers and Conway, 1992). Recently, with the increased use of livelihood approaches in development, considerable attention has been given to develop methods for monitoring changes in all aspects of peoples' life which considered not only financial improvement but also socioeconomic impact on livelihoods and social well-being of the target group of people (CARE, 2002). The purpose of the study is to determine the impacts of fodder cultivation along with dairy farming on farmers' income and livelihood pattern.

The livelihood framework identifies five core assets categories or types of capital upon which livelihoods are built. Increasing access which can take the form of ownership or the right to use to these assets is a primary concern for Department for International Development (DFID) in its support of livelihoods and poverty elimination.



Flow chart 1. Different categoriesof assets

Source: DFID, 2000.

The sustainable livelihood framework includes the assets pentagon which is composed of five types of capital viz: human capital, social capital, natural capital, physical capital and financial capital (DFID, 2000). A sustainable livelihood is the outcome of inter and intra relationship between the components of the capitals. Changes in the asset position during one year are discussed as the transformation and improvement of the livelihood of the farmers.

Human capital: Human capitaldevelopment is an important tool for successful achievement of other sorts of assets. It means health, education, training, knowledge and access to nation that all together enables the farmers to pursue different livelihood strategies and achieve their livelihood objectives. Table8represents the changing nature of different components of human capital in farmers' livelihood. Majority of the farmers reported that quality of the components of human capital has increased over the periods of intervention through gaining education and knowledge, improving health condition, more access to nation, better training and development of skill in all the selected areas. In some cases, quality of human capital was decreased but this rate was very small which was mainly due to productivity.

Table 8:Changes in human capital of fodder along with dairy farmers

(% of farm household reported)

Asset category	Sathia	Shahjadpur
	Increase	Increase
Health	92	95
Education	83	79
Training	55	63
Access to information	71	67
Average	75	76

Source: Field survey, 2014**.**

Social capital: In the study, involvement in social group, self-managerial capability and social access were considered as components of social capital. Table9showed almost all farmers' involved in different social groups, their managerial capacity were increased due to participate in various social programs.

Table 9: Changes in social capital of fodder along with dairy farmers

(% of farm household reported)

Asset category	Sathia	Shahjadpur
	Increase	Increase
Involved in social group	64	72
Self- managerial capability	51	49
Social access	71	83
Average	62	68

Source: Field survey, 2014**.**

Natural capital: Cultivable land, usage of open water resources and forests were defined to examine the capital aspect that was represented intable10. Cultivable land amassing amount increased with a small percentage in both of the areas and maximum farms remain constant. A large percentage of farmers remain constant in case of all components of natural capital.

Table 10: Changes in natural capital of fodder along with dairy farmers

(% of farm household reported)

Asset category	Sathia	Shahjadpur
	Increase	Increase
Cultivable land	9	10
Use of open water	7	11
Forests	2	1
Average	6	7.33

Source: Field survey, 2014**.**

Financial capital: Table11focused the changing trend of financial capital of the dairy farmers. Cash in hand, savings and liquid assets had increased considerably over the years due to dairy farming along with fodder cultivation.

Table 11: Changes in financial capital of dairy farmers along with fodder

(% of farm household reported)

Asset category	Sathia	Shahjadpur
	Increase	Increase
Cash in hand	42	35
Cash at bank	21	46
Donation	13	18
Average	25.33	33

Source: Field survey, 2014**.**

Physical capital: Physical assets change in the livelihoods of farmers was presented in table12. Housing condition of all dairy farmers has become better before fodder cultivation. A good number of farmers utilize modern tools and techniques for increasing the livestock yield and overall productivity. Uses of radio, television and mobile have been increased tremendously for better understanding and information in the study areas.

Table 12: Changes in physical capital of dairy farmers along with fodder
(% of farm household reported)

Asset category	Sathia	Shahjadpur
	Increase	Increase
Building	10	12
Radio/TV	75	90
Mobile phone	95	93
Tube well	96	98
Sanitation	76	82
Average	70.4	75

Source: Field survey, 2014

Dairy farmer along with fodder, were improved their overallcondition because of more income which was derived from fodder cultivation and dairy farming. They spent more for the improvement of their livelihood status.

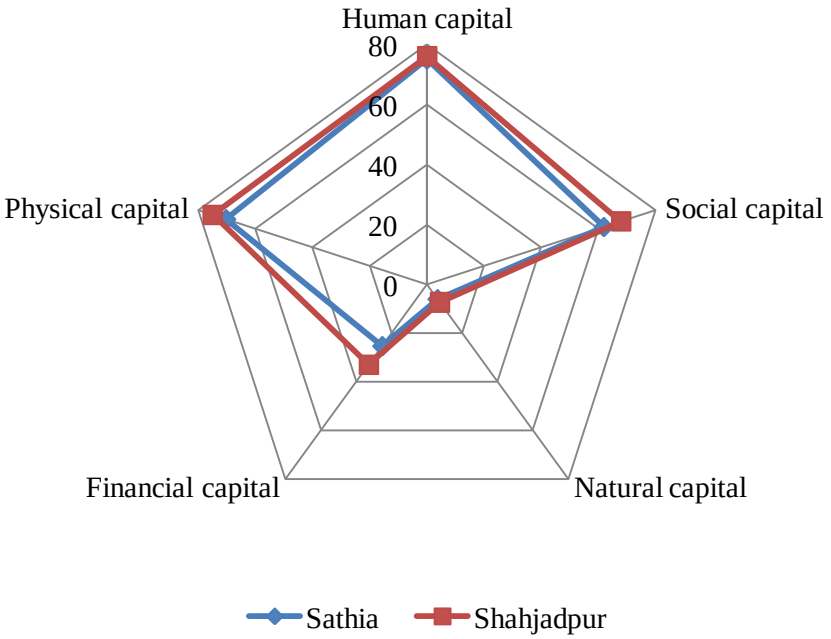


Fig 1. Livelihood Status of Dairy cum Fodder farmers

The asset pentagon approach showed noteworthy improvement on different capitals (human capital, social capital, natural capital, physical capital and financial capital) of farm households in Sathia and Shahjadpur(Table13).

Table 13:Livelihood status of respondent dairy farmers along with fodder
(% of farm household reported)

Asset category	Sathia	Shahjadpur
	(Increased)	(Increased)
Human capital	75	76
Social capital	62	68
Natural capital	6	7.33
Financial capital	25.33	33
Physical capital	70.4	75

Source: Authors' estimation, 2014.

Dairy farming with fodder cultivation and farmers' responses

Farmers' responses on dairy farming with fodder production are shown in table14.Cen per cent farmers of the study areas opined that cattle rearing increasing dramatically due to fodder production. As green grass are more conducive to milk production. Almost all the farmers give positive consent in case of more milk production, increasing family income, more milk consumption by the family members and development cost increased (such as education, health, sanitation, housing, clothing and nutrition etc.) due to gain more family income in household.

Table 14:Farmers' responses on fodder cultivation and dairying

Sl. No.	Particulars	Percentage
1.	Cattle rearing increasing	100 %
2.	Milk yield increasing	100 %
3.	Family income increasing	100 %
4.	Milk consumption increasing by family members	100 %
5.	Development cost increasing	100 %

Source: Field survey, 2014.

SWOT Analysis on Dairy Farming along with Fodder Production

Table15 shows the strengths, weaknesses, opportunities and threats of dairy farming along with fodder cultivation. Majority of the farmers (93%) opined that dairy farming is ahidden source of income and employment. Almost 75% sample farmerreported that lack of good quality fodder is a major weakness of this sector. Importation of adulterated powder milk, various virus and bacterial diseases pushed in through border and dependency are the major threats towards developing and reviving the dairy farming in the country. Despite of all these threats and constraints, the dairy farming along with fodder production has an ample scope for its improvement.

Table 15: SWOT analysis on dairy farming along with fodder cultivation

Strengths	% of responses	**Weaknesses**	% of responses
i) A large number of energetic rural youth for income generating activities (IGAs) and employment	93	i) Low genetic potentiality of native cattle breed	61
ii) Demand for milk and meat is very high to minimize the deficiency for animal protein in the country	84	ii) Milk marketing system and its price is unstable and volatile	58
iii) Women can rear dairy cattle easily and empower gaining financial solvency	77	iii) Lack of good quality fodder iv) Lack of knowledge for scientific preservation of fodder	75 63
iv) Demand for HYV and quality fodder and concentrate is also very high due to decrease of pasture land for cattle grazing	89	v) Cultivable land is reducing gradually	66
Opportunities		**Threats**	
i) Number of dairy farming increased along with cattle population	90	i) Importation of adulterated powder milk that caused ill health and child mortality	57
ii) Gap between demand and supply of milk and meat could be minimized	87	ii) Various virus and bacterial diseases pushed in and out break through importation of Indian disease infected cattle	40
iii) For healthy soil legume fodder play vital role	42	iii) Dependency destroy potentiality	
iv) It might be a potential source of			

	export of milk, meat, leather and bone instead of import	61		51
v)	Potential source of employment creation and income generation	67		

Source: Field survey, 2014.

IV. Conclusion

Dairy farming is no doubt a profitable enterprise. Dairy farming along with fodder production brought more income in the household of the respondent farmers. Dairy cattle population, milk productionand consumption increased tremendously in the study areas. Moreover, self-employment attitude was observed among the rural unemployed and educated youth. The study also revealed that small and marginal farmers reared dairy cattle as a means of their livelihood support. Farmers led an improved livelihood through fulfillment of their basic need. So, government or non-government organization should come forward to boost up the efforts of the small and marginal farmers.

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