

Study No. 127

Consolidated Report  
on  
EVALUATION OF INTEGRATED DAIRY DEVELOPMENT  
PROJECT (IDDP) IN NON-OPERATION FLOOD, HILLY  
AND BACKWARD AREAS IN NORTH EASTERN  
REGION (MEGHALAYA, ARUNACHAL  
PRADESH, MIZORAM AND SIKKIM)

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Agro-Economic Research Centre For North-East India  
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Jorhat - 785013, Assam  
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## P R E F A C E

The Consolidated Report on "Evaluation of Integrated Dairy Development Project (IDDP) in Non-Operation Flood, Hilly and Backward Areas in North Eastern Region (Meghalaya, Arunachal Pradesh, Mizoram and Sikkim)" was undertaken at the instance of the Directorate of Animal Husbandry and Dairying, Ministry of Agriculture, Government of India. The study was designed to review the working of IDDP in N.E. region. The concerned Division of the Ministry laid down the objectives and methodology of the study.

The livestock sector in India is an important sub-sector of agriculture which provided part time/whole time employment to about 19 million people i.e. 8.3 per cent of total working force in 2002-2003. The dairy sector in India derives its strength from 288 million cattle and buffaloes, which is about 52 per cent of Asia's bovine population. In respect of milk production, India now ranks Second in the World next to USA. The milk production in India has raised from 31.6 million tonnes in 1980-81 to 60.8 million tonnes in 1993-94 and further to 84.6 million tonnes in 2001-2002. The livestock sector as a whole contributed 25.5 per cent of national agricultural G.D.P. and 5.6 per cent of total National G.D.P. in 2001-2002. The policy adopted by the Government for the development of dairy sector believed to be the key factor for this impressive growth.

In order to increase milk production Intensive Cattle Development Programme, Key Village Scheme, O.F. programme were implemented in 262 districts. The remaining districts expected to be covered under the State Plan Scheme. Due to limited resources and lack of needed attention Hilly and Backward areas remain uncovered. Therefore, IDDP was sponsored as a Central Sector Scheme with 100 per cent grants in-aid and implemented in non-OF, hilly and backward areas in 8<sup>th</sup> Five Year Plan and continued during 9<sup>th</sup> and 10<sup>th</sup> Plan Periods also.

In the North-Eastern Region livestock is an important subsidiary occupation of the rural households. The animals are indigenous, less productive, poorly managed and the yield potentials are very low. The total production of milk in the region was 1095 thousand tonnes and per capita availability was 84 gms per head per day against the national average of 226 gms in 2001-2002. The people of N.E. Region reared livestock more for meat purposes and less for milk production.

Keeping in view the importance of dairy sector the Central Sector Scheme IDDP has been implemented in 4 (four) North-Eastern Hill States for the development of milch cattle through cross breeding to increase milk production by providing support services and thereby create employment potential and income.

It was found that after becoming members of Co-operative Society under IDDP the cross-breed cows have been newly inducted to make the dairy units viable. The sample 100 dairy farmers of Meghalaya possessed 689 cows comprising of 9.29 p.c. indigenous, 90.71 p.c. cross breed and 67.49 p.c. cows were in-milk at the time of field study. In Arunachal Pradesh 80 sample dairy farmers possessed 589 cows comprising of 79.63 p.c. indigenous, 20.37 p.c. cross-breed and 57.38 p.c. cows were in milk when field survey was conducted. In Mizoram 100 sample farmers possessed 985 cross-breed cows and 59.90 p.c. were in milk when field survey was conducted. In Sikkim 36 sample farmers possessed 75 milch animals comprising of 68.00 p.c. indigenous and 32.00 p.c. cross breed cows and 74.67 p.c. were in milk.

The investment in dairy farms varied from State to State. Per farm average investment was Rs. 61,834 in Meghalaya, Rs. 21,466 in Arunachal Pradesh ; Rs. 1,51,226 in Mizoram and Rs. 15,100 in Sikkim. The average milk yield per cross-breed cow was 7.21 liters in Meghalaya, 7.13 liters in Arunachal Pradesh, 7.28 liters in Mizoram and 9.65 liters in Mizoram. The milk yield of indigenous cows varied from 1.58 to 2.92 liters.

The cost of production of a liter of milk was found at Rs. 16.58 for local cows and Rs. 14.04 for cross-breed cows in Meghalaya, Rs. 16.75 for local cows and Rs. 12.93 for cross breed cows in Arunachal Pradesh ; Rs. 14.47 for cross breed

cows in Mizoram and in Sikkim it was Rs. 11.36 for local cows and Rs. 4.73 for cross-breed cows.

The generation of employment and income by the dairy farms are quite encouraging. Employment potential created by dairy farms to total mandays in all other activities found at 85.90 p.c. mandays in Meghalaya, 69.48 p.c. mandays in Arunachal Pradesh, 84.78 p.c. mandays in Mizoram and 58.00 p.c. mandays in Sikkim. About 90.0 p.c. of sample farmers treated dairying as their primary occupation, agriculture and other activities become secondary to them.

The generation of income by the dairy farms are also quite encouraging. The proportion of income of dairy farms to total family income is found at 88.26 p.c. in Meghalaya, 74.10 p.c. in Arunachal Pradesh, 93.68 p.c. in Mizoram and 51.47 p.c. in Sikkim. The critical analysis established that for accelerated development of hilly and backward areas dairy farming is identified as one of the priority areas in the North East.

We are thankful to the Directorate of Animal Husbandry and Veterinary Department, Governments of Mizoram, Arunachal Pradesh, Meghalaya and Sikkim and the Officers, IDDP districts of respective States for their help and co-operation. We are also thankful to the Co-operative office bearers and respondents for their help and co-operation.

Like all other studies, the present one is also a joint product of the Centre. The study team associated with this study has been listed elsewhere in the Report. I am thankful to Dr.(Mrs.) Bharati Gogoi, Mr. Jatin Bordoloi and Mrs. Runjun Savapandit for their help and suggestions for improvement. I offer my thanks to Dr. Gautam Kakaty who took all the pains for consolidation and finalization of this report under my guidance. I am also thankful to Sri Balin Bora for typing the report.

March,2007

Dr. T.N. Saikia  
AERC,Jorhat

## **Chapter – I**

### **INTRODUCTION**

#### **Historical Background of Dairy Farming :**

Animal husbandry in India is an integral and interwoven part of agriculture since time immemorial and plays an important role in the rural economy. It is closely inter linked with socio-economic fabrics of the rural society. The development of livestock sector more particularly dairy sector has been receiving significant priority in India in the last two decades. The milch cattle and dairy farming have been providing nutritive food to the people, bullocks provide draught power in agriculture and for transportation of agricultural commodity in areas where the mechanical transports are not operated. The livestock dung is an organic manure which is used to enrich the soil fertility and thus helps in increasing the production of crop. The sale of livestock and livestock products provide a considerable cash income to the rural families. In fact, next to agriculture, dairying has been proved to be a major source of income and employment for the rural masses. According to All-India Debt and Investment Survey of 1981 about 73 per cent of rural households reared livestock as a subsidiary source of employment and income, particularly by the small and marginal farmers, agricultural labourer and other weaker sections of the society. Besides income and employment small dairy farming provides nutritional security to the rural people. The livestock sector has a special significance in areas having low agricultural income and poor resource endowment. The dairy sector in particular provides alternative and stable income to the farmers especially to those who are below the poverty line. The livestock and their products provide cash income and livestock are the living assets for many farmers (FAO/ILRI,1995).

It is to be noted that of the total population living in the rural areas, nearly 70 per cent of them are poor, the livestock sector demonstrates a beneficial impact on them by providing employment, income, consumption standard and thereby acting as an important agent in alleviating rural poverty. Dairying in small scale is carried out mostly by the



disadvantaged and poorer section of population as this sector provides part-time/whole-time employment to nearly 19.00 million people i.e. about 8.0 per cent of total working population in 2001-2002. Livestock sector contributes about 9.33 per cent of Gross Domestic Product (GDP) of the country (Dairy India, 1997). The contribution of dairy sector to total GDP has been increasing at a faster rate as compared to agriculture proper. It contributes 8.4 per cent of GDP and 35.85 per cent of agricultural income at current prices in 1993-94. The Animal Husbandry besides being a source of meat, milk, hides, skin, organic manure etc., provides a great hope of booming the rural economy.

The growth of dairy sector in India particularly during the decade of 90s has been very impressive. What had been achieved in dairy sector is the breedable bovine population increased by 34 per cent in the last 30 years. The production of milk has been doubled during the period. This has become possible due to increase in percentage of animals in milk and increase in the yield of milk per animal, which is the outcome of cross breeding programme adopted by the government. Realising the low status of rural poor the government of India made a number of interventions for the socio-economic emancipation of rural poor. The Government policy adopted for the development of dairy sector believed to be the key factor for this impressive growth. With the objective of increasing milk production Intensive Cattle Development Project (ICDP), Key Village Scheme etc., received considerable attention. Under these programmes service facilities for artificial insemination for selected breeding and cross breeding technology in cattle based livestock farming followed by veterinary services and health care of livestock played a key role in the development of animal husbandry sector in general and dairy sector in particular. Dairy sector is considered helpful to provide employment, income and protective diet to people.

In recent decades the livestock sector in India occupied a significant share of World's livestock resources with nearly 57 per cent of buffaloes, 16.5 per cent of cattle population in the World (FAO,2004). As far dairying is concerned, its basic objectives are to increase the production of milk and milk products and to increase the draught capacity of bullocks through improved breeding, better feeding and management. The dairy sector alone accounts for two third of total animal husbandry output. The dairy sector in India derives its strength from 288 million of cattle and buffaloes (1992) which is about 52 per

cent of Asian bovine population. The livestock sector accounted for 25.5 per cent of national agricultural Gross Domestic Product (GDP) and about 5.6 per cent of total national GDP in 2001-02. The share of livestock in terms of gross value of agricultural output (at 1993-94 prices) has increased from 18.6 per cent in 1971-72 to 35.5 per cent in 2001-02 (CSO,2003). The development of livestock production has been receiving significant priority and in the wake of development programmes the milk production has raised from 31.6 million tonnes in 1980-81 to 60.8 million tonnes in 1993-94 (CMIE 1994) and further to 84.6 million tonnes in 2001-2002. The milk production and consumption at the macro level appears to be substantial, through it is less than the recommended dose for the country. The milk yield in the country is one of the lowest in the World, the marketable surplus constitutes to be in small proportion of the total production. Retention of milk for home consumption depends upon various parameters like food habit, requirement milk for home consumption, ceremonial issues, which are the basis of milk utilization pattern in rural India. At the national or State level no precise information regarding retention of milk for home consumption, share of marketable surplus and utilization pattern of milk at the producer's level are available. It is, therefore, essential to make comprehensive estimates on total production of milk, retention of milk for home consumption, marketable surplus and the sale proceeds through the sale of milk and milk products.

Considering the importance of dairy sector in developing the national rural economy the Government of India implemented some plan schemes on ad-hoc basis. The dairy development programme commonly known as "Operation Flood" ('OF') was launched in 1970 to develop a self-sustaining national dairy industry on Amul type co-operative basis. The dairy development in India owes much to the Anand Pattern of Dairy Co-operative. The 'OF' was launched to modernise the Indian dairy sector for replicating the Anand model of dairy co-operative in different States of the Country. Under 'OF' a sound infrastructure by providing technical input services has created a chain of modern milk processing plants which were set up in different parts of the country. Thus, the co-operative milk production and marketing infrastructure had been established to procure the surplus milk from the milk producers, to eliminate the middlemen and the intermediaries from the marketing of milk and milk products to ensure fair price to the milk producers (Vaidyanathan, 1992). The World Bank funded the last phase of 'OF'. The National Dairy

Development Board (NDDDB) programme was terminated in 1995-96, at the stage when there were 72,744 dairy Co-operative Societies, covering 250 districts in 22 States with a total membership of 93.94 lakh. An amount of Rs. 3,400 crores reported to had been paid annually to milk producers by the village level Co-operative Societies.

The Himalayan Region is vast, gigantic and characterised by rain-fed subsistence agriculture, low input-output production system, poor means of transport communication and with poor infrastructural support. With the application of local knowledge the hill people tried their best to sustain themselves in such a difficult fragile eco-system. The livestock farming and dairying in particular expected to provide a practical and stable means of livelihood by using natural grasslands, where crop production is not considered as a profitable proposition. It may be stated that dairy farming is not a traditional occupation of the tribal population living in the hills. The hill tribals however accepted the development programmes sponsored by the Government. It is therefore expected that the dairying may proved to be one of the viable alternative occupations for the hill people.

The fact is that land is the most limiting factor to increase the level of income and employment through crop cultivation for majority of the farmers. The livestock sector particularly the dairy sector may provide increased means of income, as it comparatively requires less land and more labour than the field crops. Dairy sector relatively provides a stable source of income to the farmers with little land base having abundant labour force. But, the dairy farming on commercial lines, more particularly in the rural areas has not been so encouraging mainly due to poor economic condition, lack of knowledge on commercial dairy farming, poor infrastructural support for the development of dairy sector.

The cross-breed cows are known for their yield potential of milk. But, the farmers maintaining local cows and buffaloes for milk production for a long time for many reasons. The types of animals reared for milk production actually determined by the resource endowments of the major sub-sector of agriculture, which provides employment, income and nutritional standard to the people. In this context dairying on commercial lines may be considered as a crushed to fight against poverty in the hilly and backward areas.

India possesses the highest number of dairy animals in the World and next to USA. India now number two milk producing country in the World. As per CSO estimates the

gross value of output of livestock sector (at 1993-94 prices) had increased from Rs. 20,856 crores in 1950-51 to Rs. 88,331 crores in 2001-2002 (CSO 2003). So far as output of dairy sector is concerned, it has increased by about four times. But, the estimated per capita availability of milk was 226 grams/person/day in 2001-2002, which is below the nutritional requirement of 250 grams/person/day. It may be stated that the dairy development in the country showed a wide disparity across the State. The per capita availability of milk in the States of Punjab, Haryana, Maharashtra, Karnataka was considerably higher than the national average. In the North-Eastern States it has been less than one-half of the country's average. This disparity persists depending on the cross-breed population of milch animals, feeding, breeding and marketing facilities of dairy products in the country. The increase of milk production in the backward region like the North-East is important not merely to improve per capita availability of milk in these States, but also to improve the status of livelihood of a bulk of the rural poor in these hilly backward States. It may be stated that the export earnings from the dairy sector registered an annual growth of about 10.8 per cent in the last couple of decades. With sound infrastructure and back-up support the Indian dairy industry may look for international market to reap the benefits of economic liberalisation. Due to the de-licensing of the Indian dairy industry in 1992 proved as an emerging sector. This sector is growing at a rate of 12 per cent to 15 per cent and the growth pattern is considered tremendous as compared to agriculture proper. In the international market Indian dairy industry products are limited to ghee, skimmed milk only. The world trade of dairy products was monopolised by European Union, New Zealand and USA and accounted for nearly 85 per cent of dairy product export in the World market.

The General Agreement on Trade and Tariff (GATT) held in Geneva in December, 1993 created an environment conducive to the developing countries for increasing export potential of agricultural and dairy products. This agreement is expected to help Indian dairy industry to flourish. However, the developing countries like India had only raw materials to export while the developed countries concentrated more to export of value added dairy products. The developed countries by putting tariff and non-tariff barriers on import from developing countries had also given a minimum export facilities. The GATT agreement envisaged elimination of export subsidies. The implications of

GATT agreement on Indian agriculture in general and dairy sector in particular proved that there exists a lot of confusion and lack of reliable information on GATT agreement. However, the preliminary analysis proved that the GATT agreement would benefit Indian dairy industry and expected to open up opportunities for export.

The changing international trade scenario following the GATT and the emergence of World Trade Organisation (WTO) in 1995 offers Indian dairy industry an opportunity to take its bow as an exporter. However, the developing countries including India apprehended that the livestock products would be vulnerable to trade liberalisation because of dominance of Small Scale Production Units (Sharma et.al, 2003). The export of milk and milk products from India have been picking up in a snails pace. Now, Gujarat Co-operative Federation Limited is India's largest exporter of dairy products.

The dairying in India is largely a subsistence activity. The dairy farmers usually keep indigenous milch animals according to the availability of labour, green fodder with little or no purchase of feed and feed supplements. So, the average milk yield per milch animal in the country remains one of the lowest in the World. However, as a result of Government policies towards dairy sector the growth of milk production since late 90's have been impressive with the adoption of cross-breeding technology in cattle-based livestock farming system. Despite so much of achievement in the dairy sector milk productivity remained less than one-fourth than in many developed countries. In this context, it may be said that there is sufficient scope for improvement of dairy sector in the Country. The emerging constraints of smallholders are poor access to market, lack of adoption of improved technologies, high prices of feed, fodder, feed supplements, veterinary services and medicine. In contrast, in developed countries commercial livestock production with significant advantages in all areas are in access to capital and new technologies.

#### **Dairy Development in the North-Eastern Region:**

The North-Eastern region of India comprised of Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland and Tripura, known as 'seven sisters'. Recently, the State of Sikkim came under the umbrella of this region owing to similar type of developmental and other problems. The North-Eastern region reflects some ecological and cultural adoptive contrast between the hills and the plains. The entire N.E. region occupies

a strategic geo-political situation due to its international boundaries with Bhutan, Bangladesh, China, Nepal and Myanmar. Livestock is an important subsidiary occupation of the farm households in the N.E. States. A large percentage of animals in this part of the country are of non-descriptor type; less productive and poorly managed. These poor breeds of animals are the source of meat, milk, curd, ghee and other milk products. The basic characteristics of livestock rearing in North-Eastern is that there is no mass production of livestock products, in fact, production is by the masses. However, it provides subsidiary source of income and employment and also the source of nutritional security to the people living in the rural areas. Nevertheless, there are certain breeds of animals, which are unique in N.E. Region. Livestock like cow, buffalo, goat, sheep, pig have been reared under traditional system of management. The animals are let loose throughout the day according to crop cycle and in the evening they are tied in animal shed. The yield level of such indigenous non-descript animals is very low, even then these animals are the backbone of the rural economy of N.E. Region.

Livestock rearing in the hilly region forms an integral part of the age-old crop livestock mixed farming system and assumes additional significance, as the scope of commercial livestock farming options are limited in these areas. In the Plains people reared animals like cows and buffaloes for milk and to use for different agricultural operations; while goat, pig etc., are reared exclusively for meat purposes. In the hills the people reared domestic animals for meat, skin, hides, manure and not for production of milk. The tribals living in the hills traditionally do not take milk or milk product, it was their social taboo. However, with the passes of time the new generation of the hill people are now conscious about the nutritious food and gradually shifted to milk and milk product and the demand for such items have been increasing.

In the N.E. region production of milk was 1095 thousand tonnes in 2001-2002. Indigenous cows and buffalo in general are the milch animals. The per capita availability of milk in the region is around 84 gms/ per head/per day, which is much lower than the national average of 226 gms/person/day. In Sikkim however it was reported that per capita per day availability of milk was 243 mls during the 9<sup>th</sup> Plan Period (Sikkim Annual Report - 2005-2006). In the N.E. region there is no recognised breed of cow and buffalo although these are the two important milk producing animals. In the plains and in valley regions

livestock is used to perform agricultural operations. Milk production is secondary to agricultural operations. There are hardly any commercial dairy farms in the hilly and backward areas. Animal husbandry is a sub-sector of agriculture, which plays a significant role in providing part-time employment opportunity to the small and marginal farmer's in particular and farming community in general. In the periphery of towns and cities some commercial dairy farms in small scale with cross breed cows are coming up as there is assured market for milk and milk products.

The fact is that land, livestock and agriculture in the State are interlined and play a very important role in the economy of N.E. region. The agriculture and allied sector contributed significantly to the State's income of the region.

The Budgetary allocation of resources for the Animal Husbandry and Dairy Sector in the sample States Meghalaya, Arunachal Pradesh, Mizoram and Sikkim are found to be nominal as shown in Table – 1.1. Of the total allocation of resources to Animal Husbandry and Veterinary the share of dairy sector appears to be quite low. At present, around 1/4<sup>th</sup> to 1/5<sup>th</sup> of the total Plan outlay is allocated to Animal Husbandry and Dairy sector. The field study conducted in 4 North-Eastern States revealed that the demand for milk, milk products have been increasing in these four hill States.

It is not denying the fact that in the livestock sector, the dairy in particular plays an important role in the hill States where livelihood options of people are limited. However, the livestock population seems to be by and large stable during the last few decades, yet, its composition has undergone some noticeable changes. The crossbreed cows are occupying the significant place in view of increasing demand for milk and milk products.

Table – 1.2 shows the district wise distribution of bovine livestock population as per 17<sup>th</sup> livestock census, of 2003 in 4 North-Eastern States under the Study. Table shows that of the total bovine livestock population, indigenous cows occupied the dominant place followed by crossbreed cows and buffaloes. It was observed that the acquisition of cross breed livestock developed in the States only during the last couple of decades. It is evident from the Table that the proportion of cross-breed cows are concentrated more in Sikkim than in other States covered by the Study. In Arunachal

Table : 1.1

**Allocation of Resources in Animal Husbandry and Dairy from 1990 -1991  
to 2004 - 05 in Meghalaya, Arunachal Pradesh , Mizoram and Sikkim**

( Rs. in Lakh )

Years	Meghalaya		Arunachal Pradesh		Mizoram		* Sikkim	
	A. Husb	P. C	A. Husb	P. C	A. Husb	P. C	A. Husb	P. C
1990 - 91	281.00	40.00	251.87	19.85	225.00	47.00	N.A	N.A
1991 - 92	300.00	41.00	324.00	45.00	238.00	47.00	N.A	N.A
1992 - 93	400.00	50.00	372.00	35.00	220.70	45.00	N.A	N.A
1993 - 94	500.00	75.00	365.00	44.00	228.00	42.00	N.A	N.A
1994 - 95	450.00	50.00	557.00	45.00	240.00	30.00	N.A	N.A
1995 - 96	600.00	76.00	698.00	41.00	240.00	30.00	N.A	N.A
1996 - 97	475.00	76.00	456.00	37.00	263.00	33.00	N.A	N.A
1997 - 98	650.00	100.00	575.00	32.00	274.00	33.00	N.A	N.A
1998 - 99	650.00	100.00	503.00	10.00	242.47	27.00	N.A	N.A
1999 - 00	650.00	100.00	548.00	10.00	434.00	31.00	N.A	N.A
2000 - 01	993.00	200.00	566.00	10.00	433.50	31.00	34.44	20.59
2001 - 02	1100.00	232.00	628.00	11.00	451.00	25.00	39.00	25.00
2002 - 03	804.88	125.00	655.00	27.00	445.00	40.00	175.00	120.00
2003 - 04	850.00	140.00	625.00	25.00	470.20	40.00	49.26	20.00
2004 - 05	689.00	134.00	709.42	40.00	812.00	40.00	50.00	22.00

Note: \* indicates that the CSS allocation is excluded

Source : Animal husbandry & Veterinary Departments of concerned States.



Table : 1.2  
District-Wise Bovine Live Stocks Population in Meghalaya, Arunachal Pradesh, Mizoram and Sikkim

Districts	Meghalaya				Arunachal Pradesh				Mizoram				Sikkim						
	Cross Breed	Indig. Cattle	Buffa loes	Total	Districts	Cross Breed	Indig. Cattle	Buffa loes	Total	Districts	Cross Breed	Indig. Cattle	Buffa loes	Total	Districts	Cross Breed	Indig. Cattle	Buffa loes	Total
1. East Garo Hills	74	156105	977	157156	1. Tawang	304	14447	38	14789	1. Mamit	114	2302	214	2630	1. East Sikkim	31191	20346	345	51972
2. East Khasi Hills	8720	45705	226	54651	2. West Kameng	605	18949	-	19554	2. Kalasib	1240	5960	9	7209	2. North Sikkim	7801	8198	56	16055
3. Jaintia Hills	1346	131905	2048	135229	3. East Kameng	1402	28097	-	29499	3. Aizwal	5457	8249	374	14080	3. South Sikkim	22965	20927	140	44032
4. Ri-Bhoi	9045	48426	3604	61075	4. Papum Pare	3050	22892	106	26048	4. Champhavi	346	7009	3058	10413	4. West Sikkim	17842	29792	1487	49121
5. South Garo Hills	113	39875	41	40029	5. Kurang Kumey	-	18033	-	18033	5. Serchhip	352	1718	967	3037					
6. West Garo Hills	3013	217549	8223	228785	6. Lower Subansiri	660	36104	68	36832	6. Lunglei	963	3239	109	4311					
7. West Khasi Hills	714	104402	2884	108000	7. Upper Suban. (Daporijo)	202	13594	-	13796	7. Lowinglali	177	2183	138	2498					
					8. West Siang	703	50400	7	51110	8. Saiha	154	4910	863	5927					
					9. Upper Siang	109	15379	7	15495										
					10. East Siang	1133	55856	673	57662										
					11. Upper Dibang valley	10	8	7	25										
					12. Lower Dibang Valley (Roing)	160	24012	537	24709										
					13. Lohit	3503	89826	6616	99945										
					14. Changlang	1010	43432	1166	45608										
					15. Tirap	620	12691	291	13602										
State Total :	23025	743967	18003	784995	State Total :	13471	443720	9516	466707	State Total :	8603	35570	5732	50105	State Total :	79799	79263	2118	161180

Source : Livestock Census , 2003

Pradesh, Meghalaya and Mizoram, the crossbreed cows occupied 2<sup>nd</sup> place but so far as milk production is concerned crossbreed cows occupied the first place.

Table – 1.3 shows the estimated milk production in Meghalaya, Arunachal Pradesh, Mizoram and Sikkim from 1990-91 to 2003-2004. It may be infer from the Table that the production of milk in the sample States have been increasing. It may be due to the fact that the Government sponsored schemes enhanced the production of milk for which milk products like curd, ghee, poneer etc. have been increasing in the market.

**Table – 1.3**

**Estimated Milk Production in Meghalaya, Arunachal Pradesh, Mizoram & Sikkim from 1991-1992 to 2003-2004**

('000 tonnes)

Years	Meghalaya	Arunachal Pradesh	Mizoram	Sikkim
1990-91	48.40	-	9.70	-
1991-92	50.40	32.00	10.01	34.00
1992-93	51.60	41.50	10.32	34.00
1993-94	52.90	42.00	10.64	34.00
1994-95	54.00	42.50	10.97	34.00
1995-96	55.40	43.00	11.31	34.00
1996-97	57.40	43.00	11.67	34.00
1997-98	59.10	44.00	20.03	37.00
1998-99	60.70	44.50	12.40	37.00
1999-2000	61.60	45.00	12.85	37.00
2000-2001	64.00	45.50	13.49	37.00
2001-2002	65.80	46.00	14.06	37.00
2002-2003	68.00	46.50	14.68	38.00
2003-2004	68.30	47.00	15.46	40.00
2004-05	-	47.5	-	46.00

Source: Directorate of Animal Husbandry and Veterinary of the respective States

**Integrated Dairy Development Project in Non-Operation Flood, Hilly and Backward Area:**

In the hilly region livestock sector particularly the Dairy sector, has undergone some changes in the last couple of decades. These changes have the implications on the increased demand for the livestock products, which resulted changes in the composition of livestock population due to entry of dairy farming on commercial lines.

In order to exploit the vast potential of dairy sector in the country, the National Dairy Development Board (NDDB) launched the Operation Flood (OF) Programme since 1970. The programme was implemented in three phases and covered 262 potential districts out of 478 districts in the country. In the non-OF areas no concerted plan efforts were made to develop dairying; only the concerned State Govts. have taken up some schemes for the development of dairy farming. Such measures suffered from clear vision and inadequate financial support to develop dairy as an important sector.

The OF Programme proved that dairying on commercial basis may improve the socio-economic status of rural as well as hill people. Keeping in view the importance of developing the dairy sector in the Non-OF, hilly and backward regions of the country, the Department of Animal Husbandry and Dairying, Ministry of Agriculture, Government of India launched an Integrated Dairy Development Project (IDDP) for stimulating milk production, procurement and marketing with provisions of working capital and manpower development through training programmes as per the project programme. The IDDP aimed at covering the small and marginal farmers, agricultural labourers, women and other weaker sections of the society (SC/ST) in Non-OF, hilly and backward areas.

The IDDP a Central Sector Scheme with 100 per cent grant-in-aid basis have been implemented in Non-OF, Hilly and Backward areas by the concerned State departments since 8<sup>th</sup> Five-Year Plan Period. The scheme has been continued during the 9<sup>th</sup> Five Year Plan with a total outlay of Rs. 250 crores. The Cabinet Committee on Economic Affairs (CCEA) also approved this scheme for continuation in the 10<sup>th</sup> Five Year Plan Period. The main objectives of the Scheme are:

- i. Development of milch cattle through cross breeding through artificial insemination using frozen semen of high quality breeding bulls ;
- ii. Increase of milk production by providing Technical guidance, Training and Input services ;
- iii. Procurement, processing and marketing of milk in a cost effective manner ;
- iv. Ensuring remunerative prices to milk producers ;
- v. Generation of additional employment opportunities and income ;
- vi. Improvement of social, economic and nutritional status of residents living comparatively in the disadvantaged hilly and backward regions.

The project proposals have been prepared by the State Government for Non-OF districts including the hilly and backward areas to be implemented by the concerned State Govt. Department. The North Eastern region is a backward area comprising of about 72 p.c. hill areas. Keeping in view the need for developing dairying in the hilly backward areas in N.E. States, the IDDP has been implemented in Arunachal Pradesh, Meghalaya, Mizoram and Sikkim, as these are hilly Non-OF States.

The present evaluation study has been taken up by the Agro-Economic Research Centre for N.E. India, Jorhat at the instance of the Department of Animal Husbandry and Dairying, Ministry of Agriculture, Government of India in Arunachal Pradesh, Meghalaya and Mizoram. For the other North-Eastern State Sikkim, the IDDP is evaluated by Agro-Economic Research Centre, Santiniketan. The main objective of this evaluation study is to provide feed back on the impact of IDDP programme to the Department of Animal Husbandry and Dairying, Govt. of India and the concerned State Governments.

**Objectives of the Study :**

The Study has been undertaken with the following objectives:

1. To assess the impact of IDDP in generation of additional employment and income to different categories of beneficiaries.
2. To assess the impact of IDDP in terms of genetic improvement of cattle through selective breeding/cross breeding and in making availability of feed and fodder.
3. To assess the impact of IDDP on milk production and in development of marketing and processing infrastructure in the Project area.
4. To assess whether the implementing agencies followed the guidelines in selection of beneficiaries and imparted training through dairy extension services amongst the farmers.
5. To study the problems faced by the implementing agencies in execution of the project programme as per guidelines laid down by the Department of Animal Husbandry and Dairying.
6. To suggest policy implications.

### **Methodology & Sampling Design :**

#### **Methodology:**

The evaluation of IDDP Study covered 4 (four) North-Eastern States i.e. Meghalaya, Arunachal Pradesh, Mizoram and Sikkim. Out of three IDDP covered districts in Meghalaya, 2 districts were selected for this Study. In Arunachal Pradesh, out of two IDDP covered districts, one district was selected; in Mizoram, out of 3 (three) IDDP covered district, 2 (two) districts were taken into account and in Sikkim as IDDP covered only 1(one) district, the same district was included in this Study.

#### **Selection of District-wise Co-Operative Societies, Beneficiaries and Non-Beneficiaries**

<b>IDDP Scheme Implementing States and selected districts</b>	<b>Nos. of Selected Milk Producing Co-operative Society</b>	<b>Nos. of Selected IDDP Beneficiary Society Member H.H.</b>	<b>Nos. of Society members but not beneficiary of IDDP Scheme</b>	<b>Nos. of selected non-member but owner of milch animals</b>
<b>1. <u>Meghalaya</u></b>				
(a) East Khasi Hills	3	50	8	5
(b) Jaintia Hills	3	50	7	5
<b>2. <u>Arunachal Pradesh</u></b>				
Papum Pare	4	80	20	20
<b>3. <u>Mizoram</u></b>				
(a) Aizwal	3	50	8	5
(b) Kolasib	3	50	7	5
<b>4. <u>Sikkim</u></b>				
North District	3	36	-	6
<b>All Total :</b>	<b>19</b>	<b>316</b>	<b>50</b>	<b>46</b>

The individual reports of each State covered by the IDDP have been completed and sent to the Directorate of Economics, Ministry of Agriculture, Govt. of India. As per decision in the last Officers In-Charge meeting an attempt has been made to consolidate the reports of 4 (four) individual reports highlighting the major findings.

#### **Sampling Design :**

A multi-stage stratified random sampling technique was adopted for selection of society and beneficiary farmers. From the control group farmers belonging to society membership but non-beneficiary and non-member but owner of milch animals were

selected. Keeping in view the manpower resource and time constraint, a sample of 316 beneficiary households were selected from 4 States of N.E. region. It has been decided that from each district at least 3 (three) milk co-operative societies were selected randomly and within each society a cluster of 3 to 5 (five) villages were selected to draw beneficiary households. In the hill areas of the North-Eastern States the average number of households in one village generally varied from 20 to 35 families. From each society 16 to 17 beneficiary members were selected at random with probability proportional to the number of members in each society. However, at least 50 beneficiary farmers were selected from each district except Sikkim. In Sikkim only one district was covered and 36 beneficiary families were studied. From each district 15 non-beneficiary but members of the societies have also been selected to study the reasons of not becoming the member of the society under the IDDP scheme. This category of universe however was not covered in Sikkim. Information from the non-member but the owner of milk animals were also selected and information were collected by case study method to assess whether the IDDP has any spin-off effect in the minds of the non-beneficiaries.

Thus, in all 19 milk producers co-operative society, 316 IDDP beneficiary member households, 50 society members but not the beneficiary of IDDP scheme and 52 non-member but owner of milch animal constituted the sample size of the Study. For selection of control group the non-beneficiary/non-member households which were selected from the same village or cluster of villages in which the sample society is located.

#### **Data Collection :**

The data for the study were collected from both the primary as well as secondary level sources. For collection of Primary data from the IDDP beneficiaries two sets of schedules and questionnaires were used. The other set of schedules were used for collection of data from the non-beneficiary but society member households. The field level data were collected by personal interview method from both the universes. The information from the non-beneficiary and non-member households were collected by case study method.

For collection of secondary level information 3 sets of schedules were used as detailed below.

**(a) The State Level Schedule :**

For collection of background information of the Non-OF States a set of schedules were used for collection of information from the Nodal Department of the concerned States. The detail information on various aspects of dairy sector of the sample State was collected. The required information had also been collected through discussions and personal interview method with the officials connected with implementation of IDDP at various stages.

**(b) The District Level Schedule :**

A set of schedules and questionnaires have also been prepared and used for collection of background information of the district on various aspects of implementation of IDDP. Case study method was also used for collection of additional information on implementation of IDDP from the concerned district/sub-divisional authority.

**(c) Schedules and Questionnaires for collection of required information from the Milk Producer's Co-operative Societies functioning under IDDP :**

The Co-operative Societies working under the IDDP for production and marketing of milk and other related issues have also been collected from the office bearers of the Society with the help of a set of schedules specially designed for the purpose. Case study method has also been used for collection of required information from the office bearers of the Society.

The information from the non-beneficiary but members of the society was collected through a different set of schedules and questionnaires. Information from the selected non-member households but owner of milch cattle were collected by case study method.

**Reference Period :** The data relate of the year 2005-2006.

## Chapter – II

### SOCIO-ECONOMIC PROFILE OF THE SAMPLE IDDP BENEFICIARY OF DIFFERENT STATES

In this Chapter an attempt has been made to highlight the socio-economic profile of the sample households selected for the study from four North-Eastern States. It may be stated that changes in Socio-Economic structure are very closely related to changes in economic status and development. This is true both at the micro as well as at the macro level. An attempt has been made here to compare and contrast the resource endowments of different categories of dairy farms in different States of the region. It is considered essential to study the level of knowledge and background of the sample IDDP beneficiaries as the viability of any enterprise dependent on the favourable attitudinal changes towards adoption of superior technical inputs or techniques of production, which in turn depends on skill, profile and resource endowment of dairy farmers. Based on the primary level data, distribution of beneficiary respondents by age-group and sex, educational level, occupational pattern, economic status, land holdings etc., are the important issues that has been focussed in this Chapter. There is great relevance in studying the socio-economic profile of population in context of adoption of new development programmes as the educational levels and economic status has an important role to play in effective participation of people in an innovative programme like IDDP in non-traditional OF types of programme in the hilly and backward areas. It is therefore essential to know the general socio-economic conditions of the sample respondents and the households in the context of evaluation study.

The socio-economic profile of the sample IDDP beneficiary households in different States are different depending on resource structure, educational levels, infrastructural support like good access to market, demand for livestock products as well as for services necessitates the government presence in service delivery system in areas under the study.



### **Sample Beneficiaries by Caste, Tribe and Sex :**

Table – 2.1 shows caste, tribe and sex wise distribution of sample beneficiaries in four sample States of the North-Eastern region. In Meghalaya of the total 100 sample beneficiaries Schedule Tribe beneficiaries constitutes 88.00 per cent and Schedule Caste population 12.00 per cent. In Arunachal Pradesh also Schedule Tribe population dominates the sample i.e. 86.25 per cent. Similarly, in Mizoram Schedule Tribe population occupy the major share of the population i.e. 83.00 per cent. In Sikkim the whole sample population belongs to Schedule Tribes. The overall composition as observed in the sample 87.34 per cent are Schedule Tribe population and the rest 12.66 per cent from schedule caste and other groups and communities.

### **Educational Levels of Beneficiary Respondent:**

Educational status of the sample beneficiary respondents are shown in Table – 2.2. Table shows that in Meghalaya only 1.00 per cent respondent beneficiary was illiterate and the rest 99.00 per cent are literate with educational qualification upto Matric/HSLC passed and above levels. There is no beneficiary above graduate level. In Arunachal Pradesh, of the total 80 sample beneficiary respondents 7.50 per cent (comprising of 66.67 per cent males and 33.37 per cent females) are illiterate and the rest 92.50 (comprising of 77.03 per cent males and 22.97 per cent females) are literate. Similarly in Mizoram also only 1.00 per cent respondent beneficiary was found to be illiterate and the rest 99.00 per cent (comprising of 85.86 per cent males and 14.14 per cent females) are literate. In Sikkim of the total 36 sample beneficiary respondents 19.44 per cent are illiterate and the rest 80.56 per cent (comprising of 89.66 per cent males and 10.34 per cent females) literate. The overall educational status in the sample was 4.75 per cent (comprising of 86.67 per cent males and 13.33 per cent females) illiterate and the rest 95.25 per cent (comprising of 75.42 per cent males and 24.58 per cent females) literate.

### **Economic Status :**

In order to assess the economic status of the population covered by the study (i.e. the beneficiary families) are classified as earner, earning dependent or helper and dependent or non-worker. The person, who are engaged in any productive economic activity for 8 hours a day for atleast 24 days in a month or employed in some government, semi-government or private organisations is considered as earner. The earning dependent

**Table - 2.1**  
**Distribution of Sample Beneficiaries According to Caste, Tribe and Sex**  
**in Different States**

Caste/ Tribe	Meghalaya			Arunachal Pradesh			Mizoram			Sikkim			All Total		
	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T
General	-	-	-	4	-	4	14	3	17	-	-	-	18	3	21
				(5.00)		(5.00)	(14.00)	(3.00)	(17.00)				(5.70)	(0.95)	(6.65)
S.T.	49	39	88	50	19	69	72	11	83	33	3	36	204	72	276
	(49.00)	(39.00)	(88.00)	(62.50)	(23.75)	(86.25)	(72.00)	(83.00)	(11.00)	(91.67)	(8.33)	(100.00)	(64.56)	(22.78)	(87.34)
S.C.	11	1	12	-	-	-	-	-	-	-	-	-	11	1	12
	(11.00)	(1.00)	(12.00)										(3.48)	(0.32)	(3.80)
Others	-	-	-	7	-	7	-	-	-	-	-	-	7	-	7
				(8.75)		(8.75)							(2.21)		(2.21)
Total	60	40	100	61	19	80	86	14	100	33	3	36	240	76	316
	(60.00)	(40.00)	(100.00)	(76.25)	(23.75)	(100.00)	(86.00)	(14.00)	(100.00)	(91.67)	(8.33)	(100.00)	(75.95)	(24.05)	(100.00)

Note : Figures in the parentheses indicate percentage to the total population

**Table - 2.2**  
**Distribution of Sample Beneficiaries according to Age-Groups, Sex and Educational Status**  
**in Sample States**

Age Group (in Yrs.)	Meghalaya			Arunachal Pradesh			Mizoram			Sikkim			All Total												
	Illiterate			Literate			Illiterate			Literate			Illiterate			Literate									
	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T							
15 - 25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
25 - 35	1	9	15	24	1	9	5	14	-	-	15	2	17	1	10	2	12	3	3	43	24	67			
35 - 45	-	21	21	41	2	4	39	9	48	-	-	34	5	39	1	4	1	5	3	2	5	98	36	134	
45 - 55	-	23	2	25	1	1	8	3	11	1	1	29	7	36	2	2	9	-	9	4	-	4	69	12	81
55 - 65	-	6	2	8	-	-	1	-	1	-	7	-	7	3	3	3	3	-	3	3	-	3	17	2	19
65 & above	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	1	59	40	99	4	2	6	57	17	74	1	85	14	99	7	26	3	29	13	2	15	227	74	301	

or helpers are those, whose main activities are different but casually assist in economic pursuits of the household. These category of workers are usually young children of adolescent age (i.e. below age of 15 years) not attending to schools or colleges and also the students of working age who participate in income-earning activities during their spare time. This also includes the aged persons who are not able to do full time work but casually assists in some household activities are classified as earning dependent. The dependent or non-worker are generally minor children, physically handicapped and disables persons and aged persons who are not able to do any productive work.

The economic status of population covered by this sample survey conducted in four North-Eastern States are presented in Table -2.3. It is found that in Meghalaya sample of the total population of 640 persons 40.78 per cent are earner or worker (comprising of 56.32 per cent males and 43.68 per cent females), 10.47 per cent earning dependent or helper (comprising of 35.82 per cent males and 64.18 per cent females) and 48.75 per cent are dependent or non-worker (comprising of 45.19 per cent males and 54.81 per cent females). As per 2001 Census the work participation rate in Meghalaya was 41.47 percent, the work participation rate is found to be lower in the sample . In Arunachal Pradesh of the total population of 624 persons, 37.82 per cent are earner (comprising of 61.44 per cent males and 38.56 per cent females), 16.19 per cent are earning dependent or helper (comprising of 34.65 per cent males and 65.35 per cent females) and 45.99 per cent are dependent or non-worker (comprising of 51.92 per cent males and 48.00 per cent females). As per 2001 Census the work participation rate in Arunachal Pradesh was 43.97 but the work participation rate in the sample is found to be lower. This may be due to different definitions used as worker by the Census (2001) and the definition we used for classification of worker as indicated above.

In Mizoram of the total population of 492 persons, 30.69 per cent are earner (comprising of 63.58 per cent males and 36.42 per cent females), 15.65 per cent earning dependent or helper (comprising of 33.77 per cent males and 66.23 per cent females) and 53.66 per cent dependent or non-worker (comprising of 49.24 per cent males and 50.76 per cent females). As per 2001 Census, the work participation rate in Mizoram State was 52.70 Per cent but the work participation rate in the sample was found to be lower.

**Table - 2.3**  
**Distribution of Population According to Economic Status**  
**in Sample States**

	Meghalaya			Arunachal Pradesh			Mizoram			Sikkim			Total		
	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T
Earners	147 (56.32)	114 (43.68)	261 (40.78)	145 (61.44)	91 (38.56)	236 (37.82)	96 (63.58)	55 (36.42)	151 (30.69)	49 (57.65)	36 (42.35)	85 (41.46)	437 (59.62)	296 (40.36)	733 (37.38)
Helper or Earning depen- dent	24 (35.82)	43 (64.18)	67 (10.47)	35 (34.65)	66 (65.35)	101 (16.19)	26 (33.77)	51 (66.23)	77 (15.65)	10 (37.04)	17 (62.96)	27 (13.17)	95 (34.93)	177 (65.07)	272 (13.87)
Non- Worker or Depen- dent	141 (45.19)	171 (54.81)	312 (48.75)	149 (51.92)	138 (48.00)	287 (45.99)	130 (49.24)	134 (50.76)	264 (53.66)	53 (56.99)	40 (43.01)	93 (45.37)	473 (49.48)	483 (50.52)	956 (48.75)
Total	312 (48.75)	328 (51.25)	640 (100.00)	329 (52.72)	295 (47.28)	624 (100.00)	252 (51.22)	240 (48.78)	492 (100.00)	112 (54.63)	93 (45.37)	205 (100.00)	1005 (51.25)	956 (48.75)	1961 (100.00)

Source : Figures in the parentheses indicate percentage of the total

In Sikkim also of the total population covered by the sample study was 205 persons of which 41.46 per cent earner or worker (comprising of 57.65 per cent males and 42.35 per cent females), 13.17 per cent are earning dependent or helper (comprising of 37.04 per cent males and 62.96 per cent females) and 45.37 per cent dependent or non-worker (comprising of 56.99 per cent males and 43.01 per cent females).

Of the total population covered by the study in four N.E. States revealed that only 37.38 per cent are earner (comprising of 59.62 per cent males and 40.38 per cent females), 13.87 per cent earning dependent or helper (comprising of 34.93 per cent males and 65.07 per cent females) and 48.75 per cent dependent or non-worker (comprising of 49.48 per cent males and 50.52 per cent females).

#### **Occupational Distribution :**

The main occupation of the respondents in the working age group is agriculture and allied activities i.e. animal husbandry and dairy farming. The occupational classification of the respondents as primary and secondary occupation in the sample area are presented in Table – 2.4 by age-groups. Table shows that of the total respondents in Meghalaya 73.00 per cent (Comprising of 58.90 per cent males and 41.10 per cent females) are primarily engaged in animal husbandry and the rest 27.00 per cent are engaged in other occupation like cultivation, service and professions. Of the total respondents 31 per cent (comprising of 54.84 per cent males and 45.16 per cent females) found to have persuaded some other income earning activities as secondary occupation. In Arunachal Pradesh of the total respondent 80.00 per cent (comprising of 76.56 per cent males and 23.44 per cent females) are primarily engaged in animal husbandry and the rest 20.00 per cent engaged in other activities like cultivation, trade and business, services and professions. Of the total respondents 73.75 per cent found to have persuaded some other income earning activities as secondary occupation. In Mizoram also of the total respondents 90.00 per cent (comprising of 84.44 per cent males and 15.56 per cent females) are primarily engaged in animal husbandry and the rest 10.00 per cent are engaged in other occupation like cultivation, service, trade and business. Of the total respondents 69.00 per cent found to have persuaded some other income earning activities as secondary occupation. In Sikkim also of the total respondents 22.22 per cent are

**Table - 2A**  
**Distribution of Collaborative Cases in the State**

Age Group (Years)	Mediterranean						Arabian						T	
	Primary			Secondary			Primary			Secondary				
	M	F	T	M	F	T	M	F	T	M	F	T		
5 - 25	-	-	-	-	-	-	14	8	22	10	5	15	12	27
5 - 35	10 (6)	15 (12)	25 (18)	6 (3)	8 (4)	14 (7)	26 (15)	14 (7)	40 (22)	41 (32)	11 (9)	52 (41)	53 (41)	105 (82)
35 - 45	21 (12)	21 (15)	42 (27)	12 (8)	14 (7)	26 (15)	17 (9)	4 (3)	21 (12)	9 (6)	3 (2)	24 (15)	26 (17)	50 (32)
45 - 55	23 (19)	2 (1)	25 (20)	13 (6)	4 (3)	17 (9)	5 (2)	2 (1)	7 (3)	1 (1)	-	8 (3)	9 (4)	17 (7)
55 - 65	6 (6)	2 (2)	8 (8)	3 (3)	2 (2)	5 (5)	1 (1)	1 (1)	2 (2)	1 (1)	-	2 (2)	2 (2)	4 (4)
& Above	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	60 (43)	40 (30)	100 (73)	34 (17)	28 (14)	62 (31)	62 (31)	28 (14)	90 (49)	61 (49)	19 (15)	80 (66)	88 (70)	168 (116)

Figures in the parentheses indicate the numbers of persons involved in animal husbandry work.

Contd. ....

Age Group (in Years)	Mizoram						Sikkim						Total					
	Primary			Secondary			Primary			Secondary			Primary			Secondary		
	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T
15 - 25	-	-	-	-	-	-	11	2	13	11	2	13	46	24	70	36	15	51
	(15)	(2)	(17)	(1)	(2)	(1)	(1)	(1)	(1)	(8)	(2)	(10)	(30)	(18)	(48)	(13)	(7)	(20)
25 - 35	34	5	39	25	2	27	6	-	6	6	-	6	102	37	139	73	24	97
	(29)	(5)	(34)	(5)	(5)	(5)	(2)	(2)	(4)	(4)	(4)	(75)	(29)	(104)	(26)	(9)	(357)	
35 - 45	30	7	37	21	5	26	11	-	11	11	-	11	73	12	85	52	10	62
	(25)	(7)	(32)	(5)	(5)	(5)	(2)	(2)	(9)	(9)	(9)	(54)	(10)	(64)	(21)	(4)	(25)	
45 - 55	7	1	7	4	-	4	6	-	6	6	-	6	20	2	22	14	2	16
	(7)	(1)	(7)	(4)	(4)	(4)	(3)	(3)	(5)	(5)	(5)	(17)	(2)	(19)	(5)	(5)	(5)	
55 - 65	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	(76)	(14)	(90)	(10)	(8)	(10)	(8)	(8)	(26)	(2)	(28)	(176)	(59)	(235)	(65)	(20)	(85)	
65 & Above	86	14	100	61	8	69	34	2	36	34	2	36	241	75	316	175	51	226
Total	(76)	(14)	(90)	(10)	(8)	(10)	(8)	(8)	(26)	(2)	(28)	(176)	(59)	(235)	(65)	(20)	(85)	

Note : Figures in the parentheses indicate the numbers of persons involved in animal husbandry sector



primarily engaged in animal husbandry and the rest 77.78 per cent are engaged in other occupation like cultivation, wage earning, trade/business and services.

In the sample States by and large, similar occupational pattern was observed in the sample except in the State of Sikkim. In Sikkim majority of the sample respondents reported to have taken up animal husbandry as secondary occupation. Of the total of 316 beneficiary respondents in the four sample States, 74.37 per cent (comprising of 74.89 per cent males and 25.11 per cent females) are primarily engaged in animal husbandry and the rest 25.63 per cent are engaged in other occupation like cultivation, wage earner, trade/business and service. Of the total respondents 71.52 per cent (comprising of 77.43 per cent males and 22.57 per cent females) found to have persuaded some other income earning activities as secondary occupation. It may be stated that for the beneficiary families like a family farm as all the able bodied family members engaged in collection of fodder from the wild sources, cleaning of cattle shed, supply of water to animals, chaffing fodder, preparing fodder and fed concentrates and marketing of milk etc.

#### **Operational Holdings of the Sample Beneficiaries :**

It was observed that the pattern of land holding donot clearly reflects the economic condition of the farm families. The operational holdings of the farm families supposed to be the indicator of the economic condition of the family, as the level of employment and income in the hill areas are mainly depend upon the size of operational holdings. In the hills there is no land ownership, land is communally owned which are distributed to the farmers by the village headman/village council depending on the family size. The operational holdings by farm size groups in the sample states are presented in Table – 2.5. Table shows that in Meghalaya of the operational holdings in the size group of below 1.00 hectares 17.12 per cent area are operated by 47.00 per cent of beneficiary households. Again 28.98 per cent area are operated by 36.00 per cent of beneficiary households in the size group of 1.00 – 2.00 hectares 17.78 per cent of area are operated by 10.00per cent of households in the size group of 2.00 to 4.00 hectares, 12.94 per cent of area are operated by 4.00 per cent of households in the size group of 4.00 – 10.00 hectares and 23.18 per cent of area are operated 3.00 per cent of household in the size group of 10.00 hectare and above.

**Table - 2.5**  
**Distribution of Operational Holdings of Beneficiary Respondents According to Farm Size group in Sample States**

Size Group	Meghalaya		Arunachal Pradesh		Mizoram		Sikkim		Total	
	House-holds	Total operational area	House-holds	Total operational area	House-holds	Total operational area	House-holds	Total operational area	House-holds	Total operational area
Below 1.00 hect.	47 (47.00)	25.15 (17.12)	17 (21.25)	3.74 (3.26)	31 (31.10)	12.75 (8.44)	19 (52.78)	8.15 (20.56)	114 (36.08)	49.79 (11.01)
1.00 - 2.00	36 (36.00)	42.57 (28.98)	34 (42.50)	37.86 (32.99)	30 (30.10)	35.72 (23.65)	12 (33.33)	14.48 (36.55)	112 (35.44)	130.63 (28.88)
2.00 - 4.00	10 (10.00)	26.12 (17.78)	21 (26.25)	48.86 (42.57)	33 (33.10)	72.03 (51.65)	4 (11.11)	10 (25.23)	68 (21.52)	163.01 (36.03)
4.00 - 10.00	4 (4.00)	19.01 (12.94)	8 (10.10)	24.31 (21.18)	6 (6.10)	24.57 (16.26)	1 (2.78)	7 (17.66)	19 (6.01)	74.89 (16.55)
10.00 & Above	3 (3.00)	34.06 (23.18)	-	-	-	-	-	-	3 (0.95)	34.06 (7.53)
Total	100 (100.00)	146.91 (100.00)	80 (80.00)	114.77 (100.00)	100 (100.00)	151.07 (100.00)	36 (100.00)	39.63 (100.00)	316 (100.00)	452.38 (100.00)

Note : Figures in the parentheses indicate percentage of area to the total operational area and percentage of households to the total number of households

In Arunachal Pradesh of the total operational holdings of 714.77 hectares 3.26 per cent of area are operated by 21.25 per cent beneficiary households in the size group of below 1.00 hectares, 32.99 per cent area are operated by 42.50 per cent of households in the size group of 1.00 – 2.00 hectares, 42.57 per cent of area are operated by 26.25 per cent of households in the size group of 2.00 – 4.00 hectares and the rest 21.18 per cent of area are operated by 10.00 per cent of households. Similarly, in Mizoram of the total operational holdings of 151.07 hectares 8.44 per cent of area are operated by 31.00 per cent of households in the size group of below 1.00 hectares, 23.65 per cent area are operated by 30.00 per cent of households in the size group of 1.00 – 2.00 hectares, 51.65 per cent area are operated by 33.00 per cent of beneficiary households in the size group of 2.00 – 4.00 and the rest 16.26 per cent of area are operated by 6.00 per cent of households in the size group of 4.00 – 10.00 hectares. In Sikkim also of the total operational holdings of 39.63 hectares, 8.15 per cent area are operated by 52.78 per cent of beneficiary households in the size group of below 1.00 hectares, 36.55 per cent of area are operated by 33.33 per cent of beneficiary households in the size group of 1.00 – 2.00 hectares, 25.23 per cent of area are operated by 11.11 per cent of beneficiary households in the size group of 2.00 – 4.00 hectares and the rest 17.66 per cent of area are operated by 2.78 per cent of households in the size group of 4.00 – 10.00 hectares. This has clearly indicated that in the hill areas also there are wide variations in operational land holding pattern.

It may be seen from the aggregate scenario of the total operational holdings pattern in the sample hill States that 11.01 per cent of area are operated by 36.08 per cent of beneficiary households in the size group of below 1 hectares, 28.88 per cent of area are operated by 35.44 per cent of beneficiary households in the size group of 2.00 – 4.00 hectares, 36.03 per cent of area are operated by 21.51 per cent of households in the size groups of 4.00 – 10.00 hectares and the rest 7.53 per cent area are operated by 0.95 per cent of beneficiary households in the size group of 10.00 hectares and above.

**Brief Profile of the Socio-Economic Condition of the Non-Beneficiary Members :**

An attempt has been made here to focus the socio-economic profile of the sample member non-beneficiary households selected randomly as control group of farmers for the States of Meghalaya, Arunachal Pradesh and Mizoram only. The socio-economic profile of the sample member non-beneficiaries was not studied in the State of Sikkim.

Table – 2.6 shows the distribution of member non-beneficiary respondents in the 3 sample States by age, sex and educational status. Table reveals that there is no illiterate non-beneficiary family in the sample states covered by this study. It was observed that the literacy level is usually upto matric standard or matric pass. There is no sample above matric pass i.e. upto degree level.

#### **Occupational Distribution :**

The occupational classification of the number non-beneficiary respondents in the sample study are presented in Table – 2.7. Table shows that of the total 50 member non-beneficiary respondents in the three sample states, 60.00 per cent (comprising of 86.67 per cent males and 13.33 per cent females) are reported to have primarily engaged in animal husbandry and the rest 40.00 per cent are engaged in other occupation like services, trade and business and cultivation. Of the total member non-beneficiary households 82.00 per cent (comprising of 78.05 males 21.95 per cent) reported to have persuaded some other activities as secondary occupation.

#### **Operational Holdings of the Sample Member Non-Beneficiaries :**

The operational holdings of member Non-beneficiary samples by the farm size group in three North-Eastern States are presented in Table – 2.8. Table shows that in Meghalaya the operational holdings in the size group below 1 hectares, 45.44 per cent area are operated by 66.67 per cent of households and the rest 54.54 per cent area are operated by 33.33 per cent of member non-beneficiary households in the size group of 1.00 – 2.00 hectares. In Arunachal Pradesh of the total operational holdings 3.66 per cent area are operated by 25.00 per cent of non-beneficiary households in the size group of below 1.00 hectares, 48.98 per cent area are operated by 50.00 per cent of member non-beneficiary households in the size group of 1.00 – 2.00 hectares, 29.89 per cent area are operated by 20 per cent of non-beneficiary households in the size group of 2.00 – 4.00 hectares and the rest 17.47 per cent area are operated by 5.00 per cent of member non-beneficiary households in the size group of 4.00 – 10.00 hectares. Similarly, in Mizoram also 13.98 per cent area are operated by 33.33 per cent of member non-beneficiary households in the size group of below 1.00 hectares, 48.42 per cent area are operated by 46.67 per cent of member non-beneficiary households in the size group of 1.00 – 2.00 hectares and the rest 37.60 per cent area operated by 20.00 per cent of member non-beneficiary households.



**Table - 2.7**  
**Distribution of Occupational Status of the Respondents by Age and Sex**  
**of Non-Beneficiary Sample Farmers**

Age Group (in Yrs.)	Meghalaya						Arunachal Pradesh					
	Primary			Secondary			Primary			Secondary		
	M	F	T	M	F	T	M	F	T	M	F	T
15 - 25	-	-	-	-	-	-	-	-	-	-	-	-
25 - 35	2 (2)	-	2 (2)	2	-	2	5 (3)	1	6 (3)	4 (2)	1 (1)	5 (3)
35 - 45	2	5 (2)	7 (2)	1 (1)	3 (3)	4 (4)	9 (6)	3	12 (6)	5 (2)	3 (3)	8 (5)
45 - 55	3 (2)	-	3 (2)	3 (1)	1 (1)	3 (1)	1 (1)	-	1 (1)	1 (1)	1	2
55 - 65	2 (1)	1 (1)	3 (2)	2 (1)	1 (1)	3 (1)	1 (1)	-	1 (1)	1	-	1
65 & Above	-	-	-	-	-	-	-	-	-	-	-	-
Total	9 (5)	6 (3)	15 (8)	8 (3)	4 (3)	12 (6)	16 (11)	4 (11)	20 (11)	11 (4)	5 (4)	16 (8)

Note : Figures in the parentheses indicate the numbers of persons involved in animal husbandry sector

Contd...../-

Age Group (in Yrs)	Mizoram						Total					
	Primary			Secondary			Primary			Secondary		
	M	F	T	M	F	T	M	F	T	M	F	T
15 - 25	-	-	-	-	-	-	-	-	-	-	-	-
25 - 35	3 (3)	-	3 (3)	3	-	3	10 (8)	1	11 (8)	9 (2)	1 (1)	10 (3)
35 - 45	5 (3)	1 (1)	6 (4)	5 (2)	-	5 (2)	16 (9)	9 (3)	25 (12)	11 (5)	6 (6)	17 (11)
45 - 55	5 (3)	-	5 (3)	4 (2)	-	4 (2)	9 (6)	-	9 (6)	8 (3)	1 (1)	9 (3)
55 - 65	1	-	1	1	-	1	4 (3)	1 (1)	5 (4)	4 (1)	1 (1)	5 (1)
65 & Above	-	-	-	-	-	-	-	-	-	-	-	-
Total	14 (10)	1 (1)	15 (11)	13 (4)	-	13 (4)	39 (26)	11 (4)	50 (30)	32 (11)	9 (7)	41 (18)

Note : Figures in the parentheses indicate the numbers of persons involved in animal husbandry sector

**Table - 2.8**  
**Distribution of Operational Holdings According to Size Group of**  
**Member Non-Beneficiary Sample Households**

Size Group	Meghalaya		Arunachal Pradesh		Mizoram		Total	
	Households	Total Operational Holdings	Households	Total Operational Holdings	Households	Total Operational Holdings	Households	Total Operational Holdings
Below 1.00 hect.	10 (66.67)	4.76 (45.44)	5 (25.00)	1.02 (3.66)	5 (33.33)	2.35 (13.98)	20 (40.00)	8.13 (14.74)
1.00 - 2.00	5 (33.33)	5.71 (54.54)	10 (50.00)	13.65 (48.98)	7 (46.67)	8.14 (48.92)	22 (44.00)	27.50 (49.86)
2.00 - 4.00	-	-	4 (20.00)	8.33 (29.89)	3 (20.00)	6.32 (37.00)	7 (14.00)	14.65 (26.57)
4.00 - 10.00	-	-	1 (5.00)	4.87 (17.47)	-	-	1 (2.00)	4.87 (8.83)
10.00 & Above	-	-	-	-	-	-	-	-
Total	15 (100.00)	10.47 (100.00)	20 (100.00)	27.87 (100.00)	15 (100.00)	16.81 (100.00)	50 (100.00)	55.15 (100.00)

Note : Figures in the parentheses indicate percentages of area to the total operational area and percentage of households to the total number of households



It was observed from the total sample in three States that of the total operational holdings in the study, 14.74 per cent of area are operated by 40.00 per cent of member non-beneficiary households in the size group of below 1.00 hectares, 49.86 per cent area are operated by 44.00 per cent of member non-beneficiary households in the size group of 1.00 – 2.00 hectares, 26.57 per cent of area are operated by 14.00 per cent of member non-beneficiary households in the size group 2.00 – 4.00 hectares and the rest 8.83 per cent of area are operated by 2.00 per cent of member non-beneficiary households in the size group of 4.00 – 10.00 hectares.

**Non-Beneficiary and Non-Member of Dairy Co-operative Society Sample:**

It was decided to collect the opinion from the non-beneficiary and non-member of dairy co-operative society but the owner of milch animals. It was observed that the farmers in this category is very limited as the farmers in the hill areas traditionally do not rear milch animals for production of milk.

Altogether 46 non-beneficiary and non-member of dairy co-operative society were contacted and relevant information was collected by case study method from the sample States. It was observed that the randomly selected farmers have not given much importance for production of milk for sale i.e. on commercial proportion.

The selected non-beneficiary and non-member of dairy co-operative society and owner of milch animals are shown in Table – 2.9 by farm size groups. Table shows that in Meghalaya the total milch animals possessed by the non-beneficiary and non-member sample households is 20 numbers. Of the total milch animals, 50.00 per cent milch animals are possessed by 50.00 per cent of the non-member households in the size group of below 1.00 hectares, 30.00 per cent milch animals are possessed by 30 per cent of non-member households in the size group of 1.00 – 2.00 hectares and the rest 20.00 per cent milch animals are possessed by 20.00 per cent of non-member households in the size group of 2.00 – 4.00 hectares. In Arunachal Pradesh, of the total milch animals, 33.33 per cent of milch animals are possessed by 45.00 per cent of non-member and non-beneficiary households in the size group of below 1.00 hectares, 43.86 per cent of milch animals are possessed by 40.00 per cent of non-member households in the size group of 1.00 – 2.00 hectares and the rest 22.81 per cent of milch animals are possessed by 15.00 per cent of non-member and non-beneficiary households in the size group of 2.00 – 4.00 hectares. In

**Table - 2.9**  
**Selected Non-Beneficiary and Non-Member of Dairy Co-operative Society and Owner**  
**of Milch Animals by Farm Size**

Size Group (in hect.)	Meghalaya		Arunachal Pradesh		Mizoram		*Sikkim		Total	
	No. of H.H.	Possession of milch cattle	No. of H.H.	Possession of milch cattle	No. of H.H.	Possession of milch cattle	No. of H.H.	Possession of milch cattle	No. of H.H.	Possession of milch cattle
Below 1.00 hect.	5 (50.00)	10 (50.00)	9 (45.00)	19 (33.33)	3 (30.00)	5 (20.00)	2 (33.33)	5 (29.42)	19 (41.30)	39 (32.77)
1.00 - 2.00	3 (30.00)	6 (30.00)	8 (40.00)	25 (43.86)	5 (50.00)	13 (52.00)	1 (16.67)	6 (35.29)	17 (36.96)	50 (42.02)
2.00 - 4.00	2 (20.00)	4 (20.00)	3 (15.00)	13 (22.81)	29 (20.00)	7 (28.00)	3 (50.00)	6 (35.29)	10 (21.74)	30 (25.21)
Total	10 (100.00)	20 (100.00)	20 (100.00)	57 (100.00)	10 (100.00)	25 (100.00)	6 (100.00)	17 (100.00)	46 (100.00)	119 (100.00)

\* Although the State of Sikkim took 12 numbers of non-beneficiary and non-member of Co-operative society but only 6 numbers of respondents possessed milch animals.

Note : Figures in the percentages indicate percentage of possession of milch cattle and percentage of households to the total number of households

Mizoram also of the total milch animals, 20.00 per cent of milch animals are possessed by 30.00 per cent of households in the size group of below 1.00 hectares, 52.00 per cent milch animals are possessed by 50.00 per cent of households in the size group of 1.00 – 2.00 hectares and the rest 28.00 per cent milch animals are possessed by 20.00 per cent of non-member and non-beneficiary households in the size group of 2.00 – 4.00 hectares.

In Sikkim of the total milch animals, 29.42 per cent are possessed by 33.33 per cent of households in the size group of below 1.00 hectares, 35.29 per cent of milch animals are possessed by 16.67 per cent of households in the size group of 1.00 – 2.00 hectares and the rest 35.29 per cent of milch animals are possessed by 50.00 per cent of non-member and non-beneficiary households in the size group of 2.00 – 4.00 hectares.

Of the total milch animals possessed by the non-member and non-beneficiary in the sample States, 32.77 per cent of milch animals are possessed by 41.30 per cent of households in the size group of below 1.00 hectares, 42.02 per cent of milch animals are possessed by 36.96 per cent of households in the size group of 1.00 – 2.00 hectares and the rest 25.21 per cent of milch animals are possessed by 21.74 per cent of non-member and non-beneficiary households in the size group of 2.00 – 4.00 hectares. From the analysis of non-beneficiary and non-member of dairy co-operative society, it was observed that due to lack of infrastructural support like marketing, the farmers are not paying attention in developing dairy farms on commercial basis. They also opined that in the hills the farmers are usually poor and cannot afford to buy milk at the prevailing market rate. Moreover veterinary services in the hill areas are poor, balanced feed and feed concentrates are also not available for which farmers in generally not interested in taking up of commercial dairy farms.

So far as socio-economic status of the sample non-beneficiary and non-member of dairy co-operative societies are concerned they are observed to be economically poor and educational levels varied from illiterate or just literate to high school standard.

The results and findings of this Chapter clearly revealed that the socio-economic condition of the people in general in the hill areas could not maintain the minimum standard of living. The economic condition in general is not so favourable in the study area like that of in other States.

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### Chapter – III

#### IMPLEMENTATION OF INTEGRATED DAIRY DEVELOPMENT PROGRAMME IN FOUR NORTH-EASTERN STATES

In this chapter an attempt has been made to analyse the implementation of IDDP in the four North-Eastern States, which is a new concept in the hill States of the region. The commercial dairy farming implemented through IDDP is expected to play a significant role in increasing employment potential and income as well as life style of hill people. The livestock sector bears additional significance, as the livelihood options in the hilly and backward areas are limited due to geographical isolation, hilly rough terrains and other compulsions. The growth of livestock sector, dairy in particular has been receiving utmost priority in the wake of animal husbandry and dairy development programmes as it is considered to be a source of milk, meat, skin, hides and also dung as the organic manure, which enriches the soil in increasing crop production. Dairying has been considered as one of the important sectors next only to agriculture proper. The well-established and scientific rearing of livestock sector has played a crucial role in generating employment and income. Agriculture and livestock have crucial role to play in providing food and nutritional security to the people living in the hilly and backward areas. It is also to be noted that livestock is a part of nature's chain of recycling nutrients, converting the low quality and other agro bio-products into good quality eco-friendly organic manure. This is important for improving the soil fertility in ecologically fragile hilly regions for improving the productivity of land. Therefore, the livestock farming and dairying in particular has a special significance in economic development in the hilly and backward areas.

The hill States are characterised by diverse mountain system with small land holdings in undulating terrains, prevalence of shifting cultivation, rainfed agriculture, sparse population, poor means of transport and communication system, migration of male workers in search of wage employment elsewhere, poor and fragile eco-system, low risk bearing capacity of farmers yet rich in plant and animal diversity has been maintained by application of local wisdom. In spite of all these constraints they have sustained in difficult conditions and their endeavour to livestock farming is a sensitive one. The indigenous

livestock provides a scope of using natural grassland where crop production is barely possible. It is presumed that the exotic animals may perform well in such situation provided proper health care of animals, balanced feed with feed supplement, and nutritious green fodder is supplied under stall feeding system. For livestock development attempt has been made for upgrading of local cows by way of cross breeding with bulls of exotic breeds as well as through artificial insemination. The pace of development in this direction is not at par with other States of the country but the hill States are steadily marching forward in the field of cattle development in general and milk production in particular. Improved management of livestock by small holders expected to contribute to increase the farm income, household nutrition and sustainability of livestock for economic upliftment. In fact, mixed farming is the choice of the farmers in the hill agro-eco system and livestock is an inseparable component of hill agriculture (Chand, Romesh,1995)<sup>1</sup>.

It is not denying the fact that there is no authentic, reliable and dependable data base on economics of livestock farming in the hill States of India. But they need to be analysed carefully before drawing any final conclusion. The contribution of dairy sector to the GDP in the hill States is significantly higher as revealed by the research studies on economics of livestock, production conducted in the States Himalayan Region. Sharma and Singh (1994)<sup>2</sup> studied the economics of milk production by different types of milch animals in Himachal Pradesh and concluded that the animals are the good source of income to the hill farmers.

The report of Tripathi (1995)<sup>3</sup> was based on economic analysis of milk production by the farmers living in different altitude in the hill areas indicated loss in milk production mainly due to locational disadvantages for marketing of milk and milk products.

Animal Husbandry sector is the major source of the supplementary income for the rural households. Livestock production had always been an integral part of the rural livelihood in the hill States. The livestock wealth of hill States still constitutes a natural

<sup>1</sup> Chand, Romesh : "Livestock in Himachal Pradesh : Factors Affecting Growth, Composition and Intensity", Indian Journal of Agricultural Economics, 1995.

<sup>2</sup> .Sharma, V.P. and R.V. Singh : "An Economic Analysis of Milk Animals in Humid Temperature Zones of Himachal Pradesh", Indian Journal of Dairy Science, 1994.

<sup>3</sup> .Tripathi, R.S. : "Cow Milk Production in Himachal Pradesh Hills – An Economic Approach", Indian Journal of Dairy Science, Vol.48(2),1995.

resource base with immense livelihood implications. Agriculture economy in the hill States depends upon symbiosis of crop and livestock production. However, in view of the limited cultivable land holdings and decline of soil fertility, livestock production is the ultimate answer to provide sustainable economic upliftment of the rural masses. Keeping these factors in view, the main objective of the Department of Animal Husbandry and Veterinary of the sample hill States is to make the farmers prosperous through increasing the production of milk, meat, eggs, fish, wool and other livestock products in a sustainable manner. In short, there is importance of livestock sector in the hill economy.

**Administrative Set up for Implementation of IDDP in Sample States :**

The IDDP is a Central Sector Project, which has been formulated and implemented by the concerned State Government for non-OF districts of hilly and backward areas. The Department of Animal Husbandry and Veterinary of respective State is the nodal department for implementing IDDP effectively in every sample State. For implementation of IDDP in the sample States, a high level Technical Management Committee (TMC) was constituted under the Chairmanship of Principal Secretary/Commissioner of Animal Husbandry and Veterinary department. The Joint Secretary, Dairy, Government of India is one of the members besides senior level officers from State Government Department. The TMC manages the affairs and formulate plans and policies for implementation of the programme considering the local conditions. The project is supposed to be additive in nature to encourage the interested dairy farmers to become co-operative members and dairy farmer. The co-operative society members were imparted training in dairy technology and farm management, input services and in provided technical guidance. The project programmes also undertook procurement, processing and marketing of milk in a cost-effective manner. Due care has been taken not to affect the normal development programmes of the State Department.

In addition to the State Level TMC, there is also an Implementing Committee at district level under the Chairmanship of the Director of Animal Husbandry and Veterinary Department of concerned State to evolve the modality for implementation of IDDP programme in the concerned districts depending on local conditions. The District Level Committee is required to review the progress of the IDDP in the concerned district. The District Level Committee is answerable to the TMC in implementation of the

programme. It is observed that strict measures have been adopted to make IDDP a viable scheme in the non-operation flood districts of the hill States.

Besides these two Committees, there is also a Monitoring and Co-ordination Committee under the Chairmanship of the Deputy Commissioner of the respective IDDP district. The main responsibility of the Committee is to review and monitor the performance of IDDP monthly and submit the progress report to the State Government.

#### **Progress of IDDP in Sample States :**

The implementing agency organised training programmes for the IDDP beneficiaries on various aspects of IDDP since initiation of the programme up to 2004-2005. The training programme is for technical skill upgradation of member beneficiaries and also to impart orientation-training programme to the society members, dairy personal and other field level officials associated with the implementation of the programme. Considering the crux of the programme skill upgradation and capacity building have been given maximum emphasis on implementation of dairy development programmes in the sample States. It was expected that through regular training of the dairy farmers, staffs of DCS and the officials of IDDP the project objectives would be achieved.

Table – 3.1 shows the achievement of IDDP in creation of physical facilities to meet the basic requirement for fruitful implementation of IDDP in the sample States. Necessary steps reported to have been taken by the IDDP implementing authority, so that, milk procurement, processing and marketing of milk produced by the IDDP Co-operative members are not affected. The fact is that the dairy farming is undertaken on commercial lines; the milk trade/marketing has always been an important and priority area. The pattern of trade in milk and milk products was some how restricted in the sample States owing to some inter State marketing problems and lack of value additions in the form of milk products which could have been more market oriented.

The Animal Husbandry and Dairy Department officials attached with the IDDP reported to have visited the member beneficiary households and the villages at regular intervals to assist the members in managing the dairy unit in a scientific manner. The co-operative members were motivated and encouraged to introduce cross-breed cows for increasing the milk production. The farmers were also imparted training on animal health care and management of dairy farms and scientific management of feeding, watering etc.



Table – 3.1

**Physical Facilities Created under IDDP in Mizoram**

Components approved for assistance under IDDP	Meghalaya		Arunachal Pradesh	
	End of Project target	Achievements at the end of March,2005	End of Project target	Achievements at the end of March,2005
<b>1. Organization of Cooperative:</b>				
(a) Dairy Clusters (No.)	-	-	-	-
(b) DCS (No.)	97	97	50	38
© Revival of defunct (DCS)(No.)	-	-	-	-
(d) Membership of DCS (No.)	6316	5015	1550	850
<b>2. Milk Procurement and marketing:</b>				
(a) Milk procurement (LPD)	15210	3596	2600 LPD	1950
(b) Milk Marketing (LPD)	14795	3423	2600	1950
© Purchase of Vans (No.)	-	1(one)	-	-
<b>3. Milk Chilling and Processing :</b>				
(a) Establishment of processing plants	-	-	-	-
(i) Number	3	3	1	1
(ii) Capacity (in '000 litres.)	26	26	5000 LPD	5000 LPD
<b>4. Technical Inputs :</b>				
(a) Induction of CB animals (No.)	250	250	500	195
(b) Fodder plots (No.)	No target	-	500 units	225
© Artificial insemination (No.)	-	-	-	-
(d) Fodder seeds distributed	-	-	-	-
<b>5. Animal Health Care:</b>				
(a) Mobile Veterinary Clinics(No.)	8	8	-	-
(b) Vaccination (No.)	-	10252	-	-
© First aid box medicines (No.)	31	-	-	-
(d)Others (specify)	-	-	ETP1	1
<b>6. Manpower Development :</b>				
(a) Induction Training for Farmers (No.)	402	198	609	112
(b) Training of DCS Staff	488	376	50	12
© Training of Dairy personal	11	2	17	7
(d)Others (specify)	549	252	-	-
<b>7. Others Components (Specify) :</b>				
(a) Farmer's Training	-	-	-	-
(b) Training of lead farmers	-	-	-	-

Contd...../-

### **Veterinary and Animal Health Care Programme :**

The Veterinary and Animal Husbandry health care facilities and services available in the concerned districts of the sample States are offered to the dairy farmers enrolled in the Dairy Co-operative Societies under IDDP. The Dairy Co-operative Societies formed under the IDDP in a cluster of villages is considered as a holistic programme not only for benefits like income and employment but also for some of indirect benefits. The direct benefits availed by the society members from the State Veterinary and Animal Husbandry Department from the district units are all types of veterinary and health care services and facilities, artificial insemination, emergency visits, vaccination, supply of veterinary medicines etc. at free of costs or at subsidised rates. The Government Departments are delivering many livestock services at the door steps of the dairy farmers. These services were made public and offered free by the State Veterinary Department as no private professional infrastructure are available to support the livestock sector.

Another very important aspect of IDDP is training for capacity building. Training is imparted on technical matters like dairy cattle management, feeding, housing, watering, awareness creation programme of health, nutrition management and hygiene of the dairy units including marketing of milk. Through training programmes the dairy farmers were made aware that the milk production per animal depends upon the supply of green fodders, feed concentrates, health care of animals. The farmers reported to be benefited from the training programmes arranged by the IDDP authority at district level.

### **Composition of Herd of Milch Animals :**

Hill people keep different breeds of animals for milk and meat production purposes. The milch animals maintained by the sample households are classified as cows, buffaloes and young stocks. The draught animals are not taken into account, as the milch animals are not used for draught purposes by the tribals living in the hills.

It has been observed that there is high degree of relationship between the composition of herd of milch animals, availability of feed and fodder, average daily feed intake by each milch animals determined the milk yield. The animal keepers reported that they paid special attention to supply feed to the pregnant cows, cows in-milk with cut green fodder, dry fodder and feed concentrates. The local indigenous cows and cross breed

cows in dry period and young stocks are let loose to graze in the jungle; only in the evening they are tied in the cattle shed.

Table – 3.2 shows the distribution of milch animals owned by the sample beneficiaries by land holding size groups. It shows that of the total milch animals possessed by the sample farmers in Meghalaya, the dairy farming is concentrated amongst the small and marginal farmers with uneconomic holdings (84.89 per cent). In Arunachal Pradesh, of the total milch animals possessed by sample farmers, 19.05 per cent possessed by marginal farmers, 38.41 per cent possessed by small farmers, 25.20 per cent possessed by semi-medium farmers and the rest 17.34 per cent possessed by medium size group farmers. In Mizoram also of the total milch animals reared by the sample beneficiaries, 25.13 per cent possessed by marginal farmers, 30.62 per cent by small farmers, 37.11 per cent by semi-medium farmers and the rest 7.14 per cent possessed by medium farm size group farmers. In Sikkim of the total milch animals possessed by the sample beneficiaries, 48.09 per cent possessed by the marginal farmers, 16.79 per cent by the small farmers and the rest 10.69 per cent possessed by semi-medium and medium size group of farmers.

It is conformed from the Table that of the total milch animals possessed by the sample beneficiaries in 4 (four) sample hill States, dairy farming is concentrated amongst the small and marginal farmers with uneconomic holdings (66.09 per cent). A large majority of sample farmers are adopting mixed farming i.e. crop cultivation and animal husbandry, which is inherent farming system in the hill areas.

Table – 3.3 shows the distribution of milch animals of the beneficiary farmers according to breeds showing proportion of cows in milk and in dry period. At the time of field survey in Meghalaya revealed that the beneficiary sample farmers had altogether 689 numbers of milch cows of which 67.49 per cent were in milk (Comprising of cross-breed 90.54 per cent and local cows 9.46 per cent) and 32.51 per cent dry (Comprising of 91.07 per cent cross-breed and 8.93 per cent indigenous cows). In Arunachal Pradesh the sample beneficiary farmers possessed 589 numbers of milch cows; of which 57.38 per cent were in milk (comprising of 78.40 per cent local and 21.60 per cent cross-breed cows) and 42.62 per cent remained dry (comprising of 81.27 per cent local and 18.73 per cent cross-breed cows). In Mizoram the sample farmers possessed only cross-breed cows, i.e. 985 numbers of milch cows. Of the total milch cows in the sample 59.90 per cent were in-milk cows and

**Table - 3.2**  
**Distribution of Milch Cattle Owned by the Beneficiary Farmers According to the Breeds of Animals in Different Farm Size Classes**

Farm Size Groups	Meghalaya			Arunachal Pradesh			Mizoram			Sikkim			Total						
	Types of animals			Types of animals			Types of animals			Types of animals			Types of animals						
	Cows	Buffa-loes	Young stock	Cows	Young stocks	Total	Cows	Young stocks	Total	Cows	Young stocks	Total	Cows	Buffa-loes	Young stocks	Total			
Marginal	Indig. breed	30	3	33	66	519	23	17	40	252	174	426	26	19	45	145	112	260	
	Cross breed	285	-	234	519	40	252	174	426	10	8	18	570	-	433	1003			
Small	Indig. breed	24	2	17	43	445	47	33	80	301	-	-	18	14	32	222	2	152	376
	Cross breed	250	-	195	445	40	301	218	519	8	7	15	606	-	453	1059			
Semi-Medium	Indig. breed	8	2	14	24	89	30	21	51	199	-	-	4	3	7	131	2	97	230
	Cross breed	49	-	40	89	44	366	263	629	3	2	5	448	-	326	774			
Medium	Indig. breed	1	-	1	2	44	20	16	36	66	55	121	3	2	5	114	-	92	206
	Cross breed	25	-	19	44	20	66	55	121	3	2	5	114	-	92	206			
Large	Indig. breed	1	-	2	3	29	-	-	-	-	-	-	-	-	1	-	-	2	3
	Cross breed	16	-	13	29	1126	-	-	-	-	-	-	-	-	16	-	-	13	29
Sub-Total	Indig. breed	64	7	67	138	469	120	87	207	985	710	1695	51	37	88	584	7	420	1011
	Cross breed	625	-	501	1126	403	992	589	403	985	710	1695	24	19	43	1754	-	1317	3071
Total	Indig. + Cross breed	689	7	568	1264	589	403	992	985	710	1695	75	56	131	2338	7	1737	4082	

Table - 3.3

Distribution of Milch Cattle According to in Milk and in Dry  
in Different Farm Size Classes

Farm Size Groups	Meghalaya						Arunachal Pradesh		Mizoram		Sikkim		Total			
	Cows		Buffaloes		Cows		Cows		Cows		Cows		Cows		Buffaloes	
	In Milk	Dry	In Milk	Dry	In Milk	Dry	In Milk	Dry	In Milk	Dry	In Milk	Dry	In Milk	Dry	In Milk	Dry
Marginal	Indigenous+	9	1	2	1	39	-	-	-	-	7	55	2	1	-	-
	Cross breed	191	94	-	-	146	106	8	2	19	211	90	2	-	-	-
Small	Indigenous+	15	9	-	2	102	78	-	-	14	4	131	91	-	2	-
	Cross breed	170	80	-	-	181	120	7	1	7	1	386	220	-	-	-
Semi Medium	Indigenous+	6	2	1	1	67	52	-	-	3	1	76	55	1	1	-
	Cross breed	34	15	-	-	18	12	218	148	2	2	272	176	-	-	-
Medium	Indigenous+	1	-	-	-	46	35	-	-	1	2	48	37	-	-	-
	Cross breed	16	9	-	-	13	7	45	21	2	1	76	38	-	-	-
Large	Indigenous+	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-
	Cross breed	10	6	-	-	-	-	-	-	-	-	10	6	-	-	-
Sub-Total	Indigenous+	44	20	3	4	265	204	-	-	37	14	346	238	3	4	-
	Cross breed	421	204	-	-	73	47	590	395	19	5	1103	651	-	-	-
Total	Indigenous + Cross breed	465	224	3	4	338	251	590	395	56	19	1449	889	3	4	-

40.10 per cent cows in dry period. Table also revealed that in Sikkim the sample beneficiary farmers possessed only 75 numbers of milch cows. Of the total milch cows 74.67 per cent were in milk (comprising of 66.07 per cent indigenous and 33.93 per cent cross-breed cows) and 25.33 per cent in-dry (comprising of 73.68 per cent indigenous and 26.32 per cent cross-breed cows) period.

It was observed from the Table that sample farmers of the selected hills States possessed 2338 numbers of milch cows and 7 numbers of buffaloes. Of the total milch cows 61.98 per cent were in-milk (comprising of 23.88 per cent indigenous and 76.12 per cent cross-breed cows) and 38.02 per cent in-dry period (comprising of 26.77 per cent indigenous and 73.23 per cent cross-breed cows). Of the total buffaloes, 42.86 per cent were in-milk and 57.14 per cent in dry-period.

It has been found that after the introduction of IDDP in the sample States, the society members increased the proportion of cross-breed cows in their dairy units. Table – 3.4 shows the induction of milch animals after becoming the member of the co-operative society under IDDP. In Meghalaya altogether 173 numbers of milch cows (comprising of 85.55 per cent cross-breed and 14.45 per cent indigenous cows) have been newly introduced by the 71 sample households. The sample farmers of Meghalaya introduced 2 numbers of she buffaloes also. In Arunachal Pradesh altogether 90 numbers of milch cows have been newly introduced by the 80 sample households. Of the total additional milch cows 60.00 per cent were cross-breed cows and 40.00 per cent indigenous cows. In Mizoram 107 numbers of cross-breed cows have been newly introduced by 54 numbers of sample households. In Sikkim 26 numbers of milch cows (comprising of 46.15 per cent cross-breed and 53.85 per cent indigenous cows) were newly introduced by the sample households. It was observed that the sample farmers of the four hill States introduced 398 numbers (comprising of 81.06 per cent cross-breed and 18.94 per cent indigenous cows) of milch cows after becoming co-operative members under IDDP.

The above analysis clearly shows that the prices of cross-breed cows and she-buffaloes are quite high. It is just not possible for the poor hill farmers to acquire such valuable milch animals without institutional credit support. The healthy sign is that the people in the hill State are showing enthusiasm in the development of dairy sector as they

Table - 3.4

**Introduction of Animals After Becoming Co-operative Member Under IDDP by  
Size Group of Milch Animals**

Size Group of Milch Animals (In Nos.)	Meghalaya			Arunachal Pradesh			Mizoram			Sikkim			Total			
	No. of H.H.	Cross breed	Indi- genous	No. of H.H.	Cross breed	Indi- genous	No. of H.H.	Cross breed	Indi- genous	No. of H.H.	Cross breed	Indi- genous	No. of H.H.	Cross breed	Indi- genous	Buffa- loes
Below 5	16	13 (165)	4 (9.2)	14	6 (65)	6 (12.7)	3	4 (101)	34	8	12	67	31 (331)	22 (21.9)	2 (21)	
5-10	28	45 (583)	5 (9.7)	45	28 (309)	21 (45.8)	26	50 (1274)	2	4	2	101	127 (2166)	28 (55.5)	-	
10-20	25	72 (871)	14 (27.8)	17	13 (142)	7 (12.6)	22	45 (1160)	-	-	-	64	130 (2173)	21 (43.4)	-	
20-30	1	9 (98)	1 (2.2)	4	7 (79)	2 (4.7)	3	8 (206)	-	-	-	8	24 (24)	3 (6.9)	-	
30-40	1	9 (120)	1 (2)	-	-	-	-	-	-	-	-	1	9 (120)	1 (2)	-	
Total	71	148 (1837)	25 (50.9)	80	54 (595)	36 (78.8)	54	107 (2741)	36	12	14	241	323 (5173)	75 (129.7)	2 (21)	

Note : 1. Figures in the parentheses indicate the value of milch animals in thousand rupees.

2. In case of Sikkim breed-wise value of milch cows is not given.

realised the need for milk and milk products as a source of nutritive food and also source of employment and income to uplift the economic condition of their family.

The people of hill region still practising jhuming which is not remunerative as the jhum cycle has been shortening as revealed by the research reports. In the interior hill areas horticultural crop cultivation also constrained by poor access to storage, marketing and processing. So, livelihood options of people living in the hills becoming limited. The recent transformations in demand for livestock and dairy products is expected to create better economic environment in the hills.

It may be stated that the State Governments and other agencies are fully aware about the evil effects of shifting cultivation in the hills. The most important and noticeable evil effect of shifting cultivation is destruction of forests in the hill areas which causes heavy soil erosion during the monsoon period and consequent siltation of river beds causing floods in the plains and low lying areas. Thus, shifting cultivation has resulted high national waste as it has converted green cover into fallow land due to jhum cycle. Above all, shifting cultivation feared to have upset the ecological balance due to environmental degradation and thus disturb the fragile eco-system.

In view of so much of problems due to shifting cultivation the State Governments and other agencies have undertaken various measures for control of shifting cultivation. The measures like soil conservation, construction of irrigated terraces, watershed management and settlement of jhumias through horticultural schemes etc., did not prove so effective in increasing the income and living standard of the hill people. Now, the opinion of the co-operative members under IDDP is expected to be result oriented in improving the standard of living of the hill people.

#### **Investment Pattern in Dairy Farms :**

The pattern of investment in dairy enterprise is an indicator of income generating capacity of the milk producing household. The patterns of investment in dairy farms are comprised of fixed and capital assets like cattle-shed and stores, feeding equipment and milch animals. Therefore, total investment made on cattle-shed and stores, dairy equipment, milch animals and miscellaneous other items were worked out. Table – 3.5 shows the investment pattern in dairy enterprise by the sample beneficiary households in four selected hill States. In the 100 samples of Meghalaya the overall investment in



**Table - 3.5**  
**Initial Investment in Dairy Farms by Size Group of Milch Animals**

Size Groups of Milch Animals	Meghalaya					Arunachal Pradesh						
	No. of H.H.	Cattle Shed & Store	Value of Milch Animals	Equip-ment for Feeding /Watering	Misce-llaneous Expen-ditures	Total	No. of H.H.	Cattle Shed & Store	Value of Milch Animals	Equip-ment for Feeding /Water-ing	Misce-llaneous Expen-ditures	Total
Below 5 Nos.	35	65600 (810)	772800 (9541)	32190 (397)	17205 (212)	887795 (10960)	14	45500 (1517)	83700 (2790)	11920 (397)	7200 (240)	148320 (4944)
5 - 10 Nos.	38	159000 (685)	1969000 (8487)	47660 (205)	29950 (129)	2205610 (9507)	45	192500 (1100)	539500 (3089)	44250 (253)	28200 (161)	804450 (4597)
10 - 20 Nos.	25	157100 (810)	2319700 (9913)	37290 (159)	32940 (141)	2547030 (10885)	17	88500 (691)	446600 (3489)	21660 (169)	10400 (81)	567160 (4431)
20 - 30 Nos.	1	4300 (671)	224200 (10191)	2300 (104)	3140 (143)	233940 (10634)	4	24000 (500)	163350 (3403)	6920 (144)	3100 (65)	197370 (4112)
30 - 40 Nos.	1	5000 (195)	298000 (11037)	2700 (100)	3330 (123)	309030 (11445)	-	--	-	-	-	-
40 & Above	-	-	-	-	-	--	-	-	-	-	-	-
Total :	100	391000 (656)	5583700 (9369)	22140 (205)	86565 (145)	6183405 (10375)	80	350500 (920)	1233150 (3237)	84750 (222)	48900 (128)	1717300 (4507)

Note : Figures in the parentheses indicate the average investment per milch animals.  
Value of youngstocks are not taken into account.

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Size Groups of Milch Animals	Mizoram						Sikkim					
	No. of H.H.	Cattle Shed & Store	Value of Milch Animals	Equip-ment for Feeding /Watering	Misce-laneous Expen-ditures	Total	No. of H.H.	Cattle Shed & Store	Value of Milch Animals	Equip-ment for Feeding /Watering	Misce-laneous Expen-ditures	Total
Below 5 Nos.	6	92000 (9200)	242500 (24250)	6220 (622)	2790 (279)	343510 (34351)	34	84000 (737)	375800 (3296)	9050 (79)	15705 (137)	484555 (3699)
5 - 10 Nos.	50	788000 (3920)	4931000 (24532)	60400 (301)	31250 (155)	5810650 (28909)	2	10000 (588)	45800 (2694)	850 (50)	2400 (141)	59050 (451)
10 - 20 Nos.	41	703000 (2359)	7329000 (24594)	58720 (197)	32150 (108)	8122870 (27258)	-	-	-	-	-	-
20 - 30 Nos.	3	58000 (1813)	779000 (24344)	5520 (173)	3030 (95)	845550 (26423)	-	-	-	-	-	-
30 - 40 Nos.	-	-	-	-	-	-	-	-	-	-	-	-
40 & Above	-	-	-	-	-	-	-	-	-	-	-	-
Total :	100	1641000 (3033)	13281500 (24550)	130860 (242)	69220 (128)	15122580 (27953)	36	9400 (717)	421600 (3218)	9900 (76)	18105 (138)	543605 (4150)

Note : Figures the parentheses indicate the average investment per milch animals.  
Value of youngstocks are not taken into account.

dairy enterprise was Rs. 61,83,405.00 comprised of 6.32 per cent in cattleshed and stores, 90.30 per cent on milch animals, 1.98 per cent on equipment for feeding/watering and 1.40 per cent on miscellaneous other items etc. The overall per household investment in dairy enterprise in Meghalaya sample was worked out at Rs. 61,834.05. In the 80 samples of Arunachal Pradesh the overall investment in dairy enterprise was Rs. 17,17,300.00 comprised of 20.41 per cent on cattle shed and stores, 71.81 per cent on milch animals, 4.93 per cent on equipment for feeding/watering and 2.85 per cent on miscellaneous items etc. The overall investment per household in dairy enterprise in Arunachal Pradesh sample worked out at Rs. 21,466.25. In the 100 samples of Mizoram State the overall investment in dairy enterprise was Rs. 1,51,22,580.00 comprised of 10.85 per cent on cattle shed and stores, 87.83 per cent on milch animals, 0.86 per cent on equipment for feeding, watering and 0.46 per cent on miscellaneous other items etc. The overall investment per household in dairy enterprise in Mizoram sample is worked out at Rs. 1,51,225.80. In the 36 samples of Sikkim State the overall investment in dairy enterprise was Rs. 5,43,605.00 comprised of 17.29 per cent on cattle shed and stores, 77.56 per cent on milch animals, 1.82 per cent on equipment for feeding/watering and 3.33 per cent on miscellaneous items etc. The overall investment per household in dairy enterprise in Sikkim sample is worked out at Rs. 15,100.14.

At the instance of the IDDP cattle wealth and dairy farming with cross-breed cows are becoming popular among the less privileged traditional Cattle Keepers of the region. The attitude of the farmers towards dairy farming with cross-breed cows reflected that they accept it as a means of changing the life style and family economic structure and life style of the people living in the Hilly and Backward regions of the country. Considering the productive performance of cross-breed dairy animals the sample farmers are found to be attracted towards commercial dairy farming.

The above analysis proved that the key to better milk production is the availability of quality animals, quality feed, fodder, control of animal diseases and marketing potential of milk and milk products. The analysis indicated that the fellow land needs to be exploited for cultivation of green fodder and utilization of non-conventional feed resource, which may augment, feed supply situation.

The application of bio-technology for improved livestock production are yet to be assessed and standardised. Cross-breeding of indigenous animals with superior germplasm through Artificial Insemination improved the quality of livestock and milk production scenario in the region. Access to information and motivation of farming towards Artificial Insemination is considered as the need of the hour to achieve growth and development of dairy sector. The analysis of field level data highlighted that there has been gradual increase in the per capita availability of milk and milk products after the introduction of IDDP in the North-Eastern States. Considering the productive performance and income generation from the cross-breed dairy cattle, the educated unemployed youths are attracted towards the dairy sector which may be considered as the healthy sign.

## Chapter – IV

### ECONOMICS OF DAIRY FARMING IMPLEMENTED UNDER INTEGRATED DAIRY DEVELOPMENT PROJECT

In this chapter an attempt has been made to work out the economics of dairy farming in the hilly and backward areas based on grass root level data collected from the sample beneficiaries of four selected North-Eastern States. In any business enterprise, profit is the basic motive of the entrepreneur. He tries to optimize his profit by utilising the limited resources in the best possible way. Thus, the success of any enterprise is based on the extent of its profitability and dairy farming is not an exception. The animal husbandry and dairying is an important component of farming system in the hill areas. Adoption of dairy farming on commercial lines is, therefore, influenced by its relative profitability than that of crop cultivation. The farmers in the hill areas now realise that there is need for diversification of farming system to achieve greater profits as there is shortage of suitable land to obtain sufficient production of Cereal Crops from jhum cultivation. Therefore, the role of dairy sector in stimulating milk production and thereby improving the economic condition and nutritional standard of people and at the same time generating employment opportunities and income in the hilly backward areas considered as viable alternative to crop cultivation in jhum land.

The Government of India launched a Technology Mission on Dairy Development (TMDD) in 1989 to co-ordinate the input programmes for the dairy sector which ended in March, 1999. The Operation Flood (OF) programme operated during last two decades established that dairying could be used as a tool for bringing socio-economic change among the farming community, which provides remunerative return to the dairy farmer. It is believed that the spread of co-operative net work is apparent for the growth of milk production and marketing of milk. There has been an encouraging trend in the source of milk production. Besides the above dairy development programmes in particular, Integrated Rural Development Programme (IRDP), Integrated Watershed Development Programme (IWDP), Draught Prone Area Programme (DPAP) etc. had livestock

component scheme where dairy is the priority area. In the backward hilly areas particularly the small dairy farmers become the key players in milk production for supplementary income and nutrition by providing milk for home consumption and for sale in the market. The un-organised sector continues to handle the bulk of the milk production and marketing; the share of organised sector in production and distribution is very limited. This chapter is divided into two parts. Part – I deals with the economics of dairy farming of beneficiary farmers of the sample States and Part – II deals with the economics of dairy farming of member non-beneficiary of IDDP and non-member non-beneficiary dairy farmers.

### **Part – I**

Table – 4.1 presents milk production by breeds of cows in milk and buffaloes owned by the sample beneficiaries of the sample States. Table shows that of the total cows in milk in Meghalaya, 44 numbers of indigenous cow produced 19,468 liters per annum. The per cow per day production is worked out at 1.80 liters. On the other hand 421 numbers of cross-breed cows produced 8,72,507 liters per annum and the per cow per day production is worked out at 7.21 liters on an average. The sample beneficiaries of Meghalaya also possessed buffaloes and 3 numbers of buffaloes in milk produced 5,652 liters per annum and the per buffalo per day production is worked out at 5.78 liters. In Arunachal Pradesh the IDDP beneficiaries possessed 265 numbers of indigenous cow in milk and produced 1,03,377 liters per annum. The per day per cow production is worked out at 1.58 liters. The sample beneficiaries possessed 73 numbers of cross-breed cow and produced 1,49,475 liters per annum. The per day production of milk per cross-breed cow on an average found at 7.13. This indicates that per day yield of milk in case of cross-breed cow is higher by 351 per cent than the indigenous cows.

In Mizoram sample it is observed that the IDDP beneficiary farmers possessed only cross-breed cows. There is no indigenous cow and buffalo in the sample. The beneficiary farmers possessed 590 numbers of cross-breed cows in milk and yielded 12,12,761 liters of milk per annum. The per cow per day production of milk on an average is found at 7.28 liters only. In case of 36 beneficiary farmers in Sikkim State the sample beneficiaries possessed 37 numbers of indigenous cow in milk and produced only 39,468

**Table - 4.1**  
**Milk Production By Breeds of Milch Animals in Milk in the Sample States**  
**by Size Groups of Milch Cattle**

Size Group of Milch Animal	Meghalaya										Arunachal Pradesh					
	No. of H.H	Cows in Milk				Buffaloes			No. of H.	Indigenous		Cross breed		Total Milk prod. (in Ltrs.)		
		Nos. in Milk	Milk prod. (in Ltrs.)	Nos. in Milk	Milk prod. (in Ltrs.)	Nos. in Milk	Milk prod. (in Ltrs.)	Total Milk prod. (in Ltrs.)		Nos. in Milk	Milk prod. (in Ltrs.)	Nos. in Milk	Milk prod. (in Ltrs.)			
Below 5 Nos.	35	5	2205 (1.89)	51	104427 (7.19)	2	3742 (5.76)	58	110374	14	18	6986 (1.60)	6	11902 (7.11)	24	18888
5 - 10 Nos.	38	24	10604 (1.80)	184	378780 (7.19)	1	1910 (5.83)	209	391294	45	120	46084 (1.57)	35	71222 (7.14)	155	117306
10 - 20 Nos.	25	15	6659 (1.78)	145	301919 (7.23)	-	-	160	308578	17	87	34532 (1.61)	22	45774 (7.15)	109	80306
20 - 30 Nos.	1	-	-	16	33890 (7.21)	-	-	16	33890	4	40	15775 (1.58)	10	20577 (7.12)	50	36352
Above 30 Nos.	1	-	-	25	53491 (7.23)	-	-	25	53491	-	-	-	-	-	-	-
Total :	100	44	19468 (1.80)	421	872507 (7.21)	3	5652 (5.78)	468	897627	80	265	103377 (1.58)	73	149475 (7.13)	338	252852

Contd...../-

Size Group of Milch Animal	Mizoram						Sikkim							
	No. of H.H.	Indigenous Cows in Milk			Cross breed Cows in Milk			No. of H.H.	Indigenous Cows in Milk			Cross breed Cows in Milk		
		Nos. in Milk	Milk prod. (in Ltrs.)	Total Milk prod. (in Ltrs.)	Nos. in Milk	Milk prod. (in Ltrs.)	Total Milk prod. (in Ltrs.)		Nos. in Milk	Milk prod. (in Ltrs.)	Total Milk prod. (in Ltrs.)	Nos. in Milk	Milk prod. (in Ltrs.)	Total Milk prod. (in Ltrs.)
Below 5 Nos.	6	-	-	18594 (7.24)	9	18594 (7.24)	34	31	32635 (2.88)	17	59626 (9.61)	48	90402 (5.16)	
5 - 10 Nos.	50	-	-	457923 (7.30)	222	457923 (7.30)	2	6	6833 (3.12)	2	7310 (10.01)	8	16002 (5.48)	
10 - 20 Nos.	41	-	-	669086 (7.27)	326	669086 (7.27)	-	-	-	-	-	-	-	
20 - 30 Nos.	3	-	-	67158 (7.28)	33	67158 (7.28)	-	-	-	-	-	-	-	
Above 30 Nos.	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total :	50	-	-	1212761 (7.28)	590	1212761 (7.28)	36	37	39468 (2.92)	19	66936 (9.65)	56	106404 (5.28)	



liters of milk per annum. On an average per cow per day production is worked out at 2.92 liters only. At the time of field investigation the sample beneficiaries possessed 19 numbers of cross-breed cow in milk and produced 66,936 liters of milk per annum and the per day per cow production is worked out at 9.65 liters. This shows that per day yield of milk in case of cross-breed cow is higher by 230.48 per cent than the indigenous cows in Sikkim.

It is needless to mention that the milk production per animal depends upon a number of factors like proportion of cows in milk, length of lactation period. There is also very high degree of relationship between the feeding pattern, management of dairy units, health condition of milch animals, which resulted milk yield. The availability of feeds, fodder, feed concentrate, housing and hygienic condition of dairy farms determine the yield potential of cows in milk. The higher milk yield per cross-breed cow may be due to genetic potentiality, adequate feeding and management. It was observed and also reported by the farmers that they try to make adjustment in the feeding pattern according to the yield potential of cows possessed by the farmers.

The feeding pattern of cows as reported by the sample dairy farmer is that more emphasis has been given on feeding with cut green grasses as the green grasses is available in the wild and also supplied of dry fodder. Due to economic reasons and shortage of feed concentrates, the farmers pay less interest to feed all animals with feed concentrates. However, cows in milk are invariably provided with one time concentrated feed. More quantity of feed and fodder are supplied to cross-breed in milk cows.

#### **Production and Utilization of Milk :**

Milk is a highly perishable product, as such it requires quick disposal or conversion into milk products. It is therefore essential to examine the volume of production, quantum of consumption and marketable surplus of milk. The assessment of these parameters is important for the dairy farmers and equally important to dairy Co-Operative Societies to evolve strategies for procurement of milk in the milk shed of the society. In respect of procurement of marketable surplus of milk by the co-operative milk producers' societies through the milk-shed is of vital importance which is expected to ensure marketing of marketable surplus of milk and remunerative prices to the dairy farmers. In this context an attempt has been made to ascertain levels of production,

consumption and marketing of milk based on grass root level data collected methodologically in the study area of the sample four hilly States of North-Eastern region.

Table – 4.2 shows the production and utilization of milk of the sample dairy farmers of four N.E. States by size group of milch animals. It is seen from the Table that in Meghalaya, of the total production of milk 5.62 per cent is used for home consumption, 48.63 per cent supplied to milk co-operative society and 45.76 per cent marketed at private sources in the reference year. The milk used for home consumption varied from 1.36 per cent to 9.63 per cent of the total production of milk among sample households by size group of ownership of milch animals. The milk used for home consumption depends upon family size and quantum of milk produced by the dairy farmers. It is seen that the sample dairy farmers supplied 47.97 per cent to 52.80 per cent of total production of milk to the dairy co-operatives society and the proportion of milk marketed at private sources varied from 42.40 per cent to 47.16 per cent. The dairy farmers prefer to sale milk in the open market, as price in the open market is higher than the price offered by the co-operative societies.

The dairy farmers however reported that demand for milk in the market is very poor due to food habit of the people and also due to poverty. In Arunachal Pradesh samples, of the total production of milk 13.24 per cent is used for home consumption, 63.19 per cent supplied to milk-co-operative societies and 23.57 per cent marketed at private sources. The milk used for home consumption varied from 6.30 per cent to 30.73 per cent of the total production of milk among sample households by size group of ownership of milch animals. The sample farmers supplied 47.64 per cent to 66.52 per cent of the total production of milk to the dairy co-operatives and the proportion of milk marketed at private sources varied from 21.39 per cent to 27.18 per cent. In Arunachal Pradesh also price offered by the Co-operative Society is lower than the market rate. But the demand for milk in the neighbourhood of dairy farmers is poor. Table also presents production and utilization of milk in Mizoram. It is seen that of the total production of milk on an average 4.18 per cent is used for home consumption, 75.55 per cent is supplied to milk co-operative society and 20.27 per cent marketed at private sources. Milk used for home consumption varied from 3.05 per cent to 13.74 per cent which depends upon total production of milk in the sample households and requirement of milk depends upon the

Table-4.2

## Production and Utilisation of Milk of the Sample Dairy Farmers by Size Group of Milch Animals

State	Aspects	Size Groups of Milch Animals					Total
		Below 5 Nos.	5 - 10 Nos.	10 - 20 Nos.	20 - 30 Nos.	Above 30 Nos.	
Meghalaya	Nos of House hold	35	38	25	1	1	100
	Milk Production (In Lts.)	110374 (100.00)	391294 (100.00)	308578 (100.00)	33890 (100.00)	53491 (100.00)	897627 (100.00)
	Home Consumption (In Lts.)	10628 (9.63)	22807 (5.83)	15527 (5.03)	720 (2.12)	730 (1.36)	50412 (5.62)
	Supplied to Milk Society (In Lts.)	52944 (47.97)	190147 (48.59)	147525 (47.81)	17894 (52.80)	27995 (52.34)	436505 (48.63)
	Marketed at Private Sources (In Lts.)	46802 (42.40)	178340 (45.58)	145526 (47.16)	15276 (45.08)	24766 (46.30)	410710 (45.76)
	Total Value of Milk (in Rs.)	1762336	5683176	4310267	466190	736877	12958846
	Nos of House hold	14	45	17	4	-	80
Arunachal Pradesh	Milk Production (In Lts.)	18888 (100.00)	117306 (100.00)	80306 (100.00)	36352 (100.00)	-	252852 (100.00)
	Home Consumption (In Lts.)	5805 (30.73)	17944 (15.30)	7446 (9.27)	2290 (6.30)	-	33485 (13.24)
	Supplied to Milk Society (In Lts.)	8998 (47.64)	74266 (63.31)	52335 (65.17)	24181 (66.52)	-	159780 (63.19)
	Marketed at Private Sources (In Lts.)	4085 (21.63)	25096 (21.39)	20525 (25.56)	9881 (27.18)	-	59587 (23.57)
	Total Value of Milk (in Rs.)	312989	1888709	1288502	581792	-	4071992
	Nos of House hold	6	50	41	3	-	100
Mizoram	Milk Production (In Lts.)	18594 (100.00)	457923 (100.00)	669086 (100.00)	67158 (100.00)	-	1212761 (100.00)
	Home Consumption (In Lts.)	2555 (13.74)	25550 (5.58)	20440 (3.05)	2190 (3.26)	-	50735 (4.18)
	Supplied to Milk Society (In Lts.)	11075 (59.56)	343816 (75.08)	511387 (76.43)	49945 (74.37)	-	916223 (75.55)
	Marketed at Private Sources (In Lts.)	4936 (26.55)	88557 (19.34)	137259 (20.51)	15023 (22.37)	-	245775 (20.27)
	Total Value of Milk (in Rs.)	353688	8355226	12162957	1227751	-	22099622
	Nos of House hold	34	2	-	-	-	36
Sikkim	Milk Production (In Lts.)	93060 (100.00)	13344 (100.00)	-	-	-	106404 (100.00)
	Home Consumption (In Lts.)	18352 (19.72)	2426 (18.18)	-	-	-	20778 (19.53)
	Supplied to Milk Society (In Lts.)	64806 (69.64)	8898 (66.68)	-	-	-	73704 (69.27)
	Marketed at Private Sources (In Lts.)	9902 (10.64)	2020 (15.14)	-	-	-	11922 (11.20)
	Total Value of Milk (in Rs.)	686730	130400	-	-	-	817130
	Nos of House hold	89	135	83	8	1	316
Over all	Milk Production (In Lts.)	240916 (100.00)	979867 (100.00)	1057970 (100.00)	137400 (100.00)	53491 (100.00)	2469644 (100.00)
	Home Consumption (In Lts.)	37340 (15.50)	68727 (7.01)	43413 (4.10)	5200 (3.78)	730 (1.36)	155410 (6.29)
	Supplied to Milk Society (In Lts.)	137823 (57.21)	617127 (62.98)	711247 (67.23)	92020 (66.97)	27995 (52.34)	1586212 (64.23)
	Marketed at Private Sources (In Lts.)	65725 (27.28)	294013 (30.01)	303310 (28.67)	40180 (29.24)	24766 (46.30)	727984 (29.48)
	Total Value of Milk (in Rs.)	3115743	16057511	17761726	2275733	736877	39947590

family size and consumption habit. They supplied 59.56 per cent to 76.43 per cent of milk to the dairy co-operatives and the proportion of milk sold in the open market varied from 19.34 per cent to 26.55 per cent.

In Sikkim samples, of the total production of milk 19.53 per cent is used for home consumption, 69.27 per cent supplied to milk co-operative society and 11.20 per cent marketed at private sources. The milk used for home consumption varied from 18.18 per cent to 19.72 per cent of the total production. The sample farmers supplied 66.68 per cent to 69.64 per cent of the total production of milk to the dairy co-operatives and the proportion of milk marketed at private sources varied from 10.64 per cent to 15.14 per cent.

It is observed from the analysis of production and utilization of milk per annum by 316 sample dairy farmers in 4 hilly States that on an average, 6.29 per cent of milk is used for home consumption, 64.23 per cent supplied to milk co-operative society and 29.48 per cent marketed at private sources. The milk used for home consumption varied from 1.36 per cent to 15.50 per cent of the total production of milk, which varied depending on the size of ownership of milch animals. It is seen that the sample dairy farmers supplied 52.34 per cent to 67.23 per cent of total production of milk to the dairy co-operatives societies and the proportion of milk marketed at private sources varied from 27.28 per cent to 46.30 per cent. It is observed that the dairy farmers prefer to sale the produce in the open market as the prices in the open market is higher than the prices offered by the co-operative Milk Societies. But the demand for milk in the open market is limited mainly due to poor economic condition of the people and backwardness of the study area and food habit of the people.

The milk procured by the co-operative society is collected in aluminum milk cans and then transported to the processing plants of the department. The milk is then tested for fat and SNF before acceptance. After testing, milk is pasteurized, chilled and packed and then dispatched to sells counter for marketing. The milk producers receive the payment of milk from the respective village co-operative usually on weekly basis, sometimes fortnightly and in some occasions monthly basis. The rate or milk is also based on fat content of milk.

**Procurement of Milk by Milk Co-operatives :**

The establishment of dairy co-operative at the village level has dual purposes; firstly, the society members were helped to acquire quality productive milch animals, ensured supply of inputs like feed concentrates, medicines, artificial insemination, treatment of animals either at free of costs or at subsidised rate and secondly, helped the milk producers to enhance production of milk and ensured assured market for sell of marketable surplus of milk round the year at reasonable prices. The 'Milk Booths' of the village level co-operative society is to collect the milk from the society members and maintain the record of collection of milk from the members individually including the record of fat content for payment. As a result of IDDP policies, in milk production in the sample hill States experienced a positive change. In fact, there has been an encouraging trend in the quantum of milk production in the districts covered by the IDDP net work. The increase in milk production is largely contributed by the increase in cross-breed milch cows encouraged and motivated by the IDDP implementing agencies.

It has been observed from the above analysis that dairy development in the study area has achieved a milestone in production of milk which has increased significantly and the source of milk production have also undergone some change due to introduction of cross-breed milch animals. Yet, the dairy sector suggests that there is sufficient scope for further improvement in the dairy farming in the sample hill States. In this context, it is necessary to assess the growth and performance of dairy sector across the districts of the sample States.

It is to be stated that the success of dairy farming depends upon the marketing facilities available to the producers. As milk is a highly perishable commodity it requires quick disposal or conversion into different dairy products. As stated earlier the sample households used different marketing agencies for disposal of milk such as the village level dairy co-operative milk vendors to dispose of their marketable surplus of milk produced in their dairy units. It is to be stated that the village level co-operative society is the agency, which ensured collection of marketable surplus of milk produced by the members of the co-operative societies. This implies that in the sample States the dairy co-operatives play a significant role in collection, processing and marketing of milk produced in the dairy farms of the members of the society.

The quantity of milk available for sale depends upon a number of factors such as quantum of production, prices and demand for milk in the study area. This suggests that concerted efforts should be made to increase the production of milk and the village level co-operative society can play a significant role in collection, processing and marketing of milk and thus may ensure remunerative return to the dairy farmers.

#### **Expenditure On Dairy Enterprise :**

The dairying is considered as an important subsidiary occupation in the hilly and backward areas mainly due to availability of green fodder at natural sources. The people living in the hills now aware that their main source of livelihood 'jhum cultivation' is not remunerative due to non-availability of fertile hill slopes due to shortening of jhum cycle. So, they are in search of alternative sources of livelihood to maintain a minimum standard of living. As the green fodder is available at natural sources it is therefore considered as a major plus point to opt for dairy farming ensuring marketing of milk through village level cooperative societies. The farmers had to spend less on feed and feed concentrates like rice polish, oil cakes of mustard or ground, bran flour etc. Aboveall, non-availability of these items in the market compel to carry these items in the interior hill areas which is very problematic due to poor road transport communication.

Nevertheless, the cost of milk production is a function of maintenance cost of milch animals and the milk yield per animal. The estimated expenditures incurred on different items by the sample dairy farmers are taken into account for estimating the costs and return from dairy enterprise. The major cost components have been categorised as fixed costs and variable costs. The procedure adopted to compute the value of purchased items and farmers' own resources are taken into account at the prevailing market rate in the Study area for estimation of cost of production of milk. The cost concept adopted in the analysis are :

#### **Fixed Costs :**

Fixed costs refer to those costs, which by and large remain unchanged in a short period of time. The fixed costs included here are depreciation on fixed assets like milch animals, cattle-shed and stores, the utensils and other equipments used in the dairy enterprise and interest on fixed capital.

**(a) Depreciation :**

Depreciation is a loss of value of an asset due to its use overtime and it has been calculated by straight-line method. The depreciation on milch animals is taken as 10 per cent assuming productive period of milch cow is between 10 to 12 years. The depreciation on cattle-shed and store is calculated at the rate of 10.0 per cent assuming its life as 10 years with normal repairing. The depreciation on equipments like feeding and watering buckets, milking cans utensils, chaff cutter etc. are calculated at 10.0 per cent depending on the expected life of items.

It may however be stated that in case of young stock and calves the value is appreciated at 10.0 per cent depending upon the age-group composition and breeds of calves.

**(b) Interest on Capital Costs :**

The interest on fixed capital is comprising of value of cattle-shed, stores, milch animals and dairy equipments etc., and worked out at the rate of 3.5 per cent per annum.

**Variable Cost:**

The variable costs comprised of expenses on fodder, fed concentrates, mineral mixture, expenses on veterinary items, human labour and miscellaneous other expenses on rope, electricity, repairing charges of cattle shed, stores, transportation costs, feed and fed supplements etc.

**Feed Costs :**

The feed costs comprised of green fodder, dry fodder, common cattle feed and feed concentrates etc. The value of purchased feed and fodder was recorded as reported by the respondents, where the farmers own feed and fodder were valued at market prices in the study area. The green fodder costs were estimated according to the cost of human labour in cutting and collecting the green fodder.

**Labour Costs :**

Labour has been utilised for looking after the animals, feeding, watering, cleaning of animals, cleaning of animal sheds, milking, marketing etc. Both males and females are engaged in different works as the dairy units are considered as family farms. The wages of

hired human labour has been taken as reported by the dairy farmer. The estimated value of family labour was valued at prevailing wage rate in the Study area.

**Veterinary Expenses :**

The expenses incurred on the Veterinary medicines, vaccination of milch animals on health care as recorded on the basis of personal enquiry method is taken into account.

**Transportation Cost :**

Actual expenses incurred on transportation of feed and feed supplements etc. are taken into account as per report of the respondents.

**Miscellaneous Expenses :**

Actual expenses incurred on items like electricity, normal annual repairing watering etc. are taken into account as reported by the respondents.

The interest on variable costs is taken at 3.5 per cent per annum.

**Annual Expenditure on Dairy Enterprise :**

As per the above costs concept an attempt has been made to estimate the annual expenditure on different items of costs in dairy farms of the sample States and presented in Table – 4.3 (a) for Meghalaya.

Table shows that under the head variable costs the expenditure incurred on fodder and feed concentrate is highest (53.72 per cent) followed by expenditure on human labour (23.79) then comes the expenses on veterinary charges including animal health care, vaccination and veterinary medicine etc. 9.93 per cent. Taking all the variable costs together it comes to 92.42 per cent. So far as fixed costs is concerned, the total fixed cost is estimated at 7.58 per cent. Of the total fixed costs depreciation on animal is found to be highest which is estimated at 5.87 per cent followed by interests on different items of fixed capital comprising of cattle shed, storage and dairy equipment etc. at 1.71 per cent.

Table – 4.3 (b) shows the annual expenditure on dairy farms of sample member beneficiary farmers in Arunachal Pradesh. Table depicts that under the head of variable costs the expenditure incurred on fodder and fed concentrate is highest (50.48 per cent) followed by expenditure on human labour (29.66 per cent) then comes the expenses on veterinary charges including animal health care, vaccination and veterinary medicine etc. Taking all the variable costs together it comes to 91.08 per cent. So far as fixed costs is concerned, the total fixed cost is estimated at 8.92 per cent. Of the total fixed costs depreciation on animal is found to be highest which is estimated at 5.64 per cent followed



Table - 4.3(a)

## Annual Expenditure on Dairy Farms of sample Member Beneficiary Farmers in Meghalaya

Items of costs	Local cows	Cross breed	Buffaloes	Total	Percentage to Total Cost
	with Young stock	with Young stock	with Young stock		
<b>A. Variable Cost</b>					
<b>1. Feed costs :</b>					
(a) Green fodder	39,131.61	1,867,173.00	23,101.00	1,929,405.61	15.23
Per Unit	310.57	1,658.24	1,925.08	1,526.43	
(b) Dry fodder	40,410.05	1,369,979.00	16,090.00	1,426,479.05	11.26
Per Unit	320.71	1,216.68	1,340.83	1,128.54	
(c) Cattle Feed and fed concentrates	62,805.00	3,382,234.60	3,234.00	3,448,273.60	27.23
Per Unit	498.45	3,003.76	269.50	2,728.06	
<b>Total Fodder Cost</b>	<b>142,346.66</b>	<b>6,619,386.60</b>	<b>42,425.00</b>	<b>6,804,158.26</b>	<b>53.72</b>
Per Unit	1,129.74	5,878.67	3,535.42	5,383.04	
<b>(2) Expenditure on Human labour :</b>					
(a) Family labour	84,953.89	1,532,648.00	20,331.00	1,637,932.89	12.93
Per Unit	674.24	1,361.14	1,694.25	1,295.83	
(b) Hired labour	16,448.73	1,355,348.50	3,994.00	1,375,791.23	10.86
Per Unit	130.55	1,203.68	332.83	1,088.44	
(3) Veterinary charges and costs of medicines etc.	11,509.93	1,238,225.00	7,900.00	1,257,634.93	9.93
Per Unit	91.35	1,099.67	658.33	994.96	
(4) Transportation costs of feed, feed supplements	4,214.00	116,920.00	1,020.00	122,154.00	0.96
Per Unit	33.44	103.84	85.00	96.64	
(5) Misc. costs.(1% of the total expenditure)	2,594.73	108,625.28	756.70	111,976.71	0.88
Per Unit	20.59	96.47	63.06	88.59	
(6) Interest on Variable Cost @3.5	9,172.38	383,990.37	2,674.93	395,837.68	3.13
Per Unit	72.80	341.02	222.91	313.16	
<b>Total variable costs :</b>	<b>271,240.32</b>	<b>11,355,143.75</b>	<b>79,101.63</b>	<b>11,705,485.70</b>	<b>92.42</b>
Per Unit	2,152.70	10,084.50	6,591.80	9,260.67	
<b>B. Fixed costs</b>					
(1) Depreciation on animals @ 10%	17,920.00	718,750.00	7,350.00	744,020.00	5.87
Per Unit	142.22	638.32	612.50	588.62	
(2) Appreciation on young animals @ 10%(-)	5,368.00	137,775.00	1,400.00	144,543.00	1.14
Per Unit	42.60	122.36	116.67	114.35	
(3) Depreciation on Cattle shed/storage & equipments	6,035.24	21,953.54	578.80	28,567.58	0.23
Per Unit	47.90	19.50	48.23	22.60	
(4) Interest on Capital Cost@3.5%	32,936.17	295,639.29	3,061.26	331,636.72	2.62
Per Unit	261.40	262.56	255.11	262.37	
<b>Total Fixed Cost</b>	<b>51,523.41</b>	<b>898,567.83</b>	<b>9,590.06</b>	<b>959,681.30</b>	<b>7.58</b>
Per Unit	408.92	798.02	799.17	759.24	
<b>Total Cost: (A+B)</b>	<b>322,763.73</b>	<b>12,253,711.58</b>	<b>88,691.69</b>	<b>12,665,167.00</b>	<b>100.00</b>
Per Unit	2,561.62	10,882.51	7,390.97	10,019.91	

Table - 4.3(b)

**Annual Expenditure on Dairy Farms of sample Member Beneficiary Farmers  
in Arunachal Pradesh**

Items of costs	Local cows with Young stock	Cross breed with Young stock	Total	Percentage to Total Cost
<b>A. Variable Cost</b>				
<b>1. Feed costs :</b>				
(a) Green fodder	196,250.00	225,470.61	421,720.61	11.51
Per Unit	250.00	1,089.23	425.12	
(b) Dry fodder	302,225.00	235,901.34	538,126.34	14.69
Per Unit	385.00	1,139.62	542.47	
(c) Cattle Feed and fed concentrates	353,250.00	536,616.45	889,866.45	24.28
Per Unit	450.00	2,592.35	897.04	
<b>Total Fodder Cost</b>	<b>851,725.00</b>	<b>997,988.40</b>	<b>1,849,713.40</b>	<b>50.48</b>
Per Unit	<b>1,085.00</b>	<b>4,821.20</b>	<b>1,864.63</b>	
<b>(2) Expenditure on Human labour :</b>				
(a) family labour	510,250.00	255,669.84	765,919.84	20.90
Per Unit	650.00	1,235.12	772.10	
(b) Hired labour	0.00	320,916.24	320,916.24	8.76
Per Unit	0.00	1,550.32	323.50	
(3) Veterinary charges and costs of medicines etc.	98,399.75	117,137.16	215,536.91	5.88
Per Unit	125.35	565.88	217.28	
(4) Transportation costs of feed, feed supplements	23,196.75	17,259.66	40,456.41	1.10
Per Unit	29.55	83.38	40.78	
(5) Misc. costs.(1% of the total expenditure)	14,835.72	17,089.71	31,925.43	0.87
Per Unit	18.90	82.56	32.18	
(6) Interest on Variable Cost @ 3.5%	52,444.25	60,412.14	112,856.39	3.08
Per Unit	66.81	291.85	113.77	
<b>Total variable costs :</b>	<b>1,550,851.47</b>	<b>1,786,473.15</b>	<b>3,337,324.62</b>	<b>91.08</b>
Per Unit	<b>1,975.61</b>	<b>8,630.31</b>	<b>3,364.24</b>	
<b>B. Fixed costs</b>				
(1) Depreciation on animals @ 10%	74,524.10	132,252.00	206,776.10	5.64
Per Unit	158.90	1,102.10	208.44	
(2) Appreciation on young animals @ 10%(-)	18,974.00	18,950.80	37,924.80	1.03
Per Unit	60.04	217.83	38.23	
(3) Depreciation on Cattle shed/storage & equipments	38,312.27	10,102.73	48,415.00	1.32
Per Unit	48.81	48.81	48.81	
(4) Interest on Capital Cost @ 3.5%	86,865.34	22,905.89	109,771.24	3.00
Per Unit	110.66	110.66	110.66	
<b>Total Fixed Cost</b>	<b>180,727.72</b>	<b>146,309.82</b>	<b>327,037.54</b>	<b>8.92</b>
Per Unit	<b>230.23</b>	<b>706.81</b>	<b>329.67</b>	
<b>Total Cost: (A+B)</b>	<b>1,731,579.18</b>	<b>1,932,782.97</b>	<b>3,664,362.15</b>	<b>100.00</b>
Per Unit	<b>2,205.83</b>	<b>9,337.12</b>	<b>3,693.91</b>	

by interests on different items of fixed capital comprising of cattle-shed, storage and dairy equipment (4.28 per cent) etc.

Table – 4.3(C) reveals the annual expenditure on dairy farms of sample member beneficiary farmers in Mizoram. Table reveals that under the head of variable costs the expenditure incurred on fodder and feed concentrate is 44.60 per cent followed by expenditure on human labour 24.67 per cent then comes the expenses on veterinary charges including animal health care, vaccination and veterinary medicine etc. Taking all the variable costs altogether estimated at 82.31 per cent. So far as fixed costs is concerned, the total fixed cost is estimated at 17.69 per cent. Of the total fixed costs depreciation on animal is found to be highest which is estimated at 14.50 per cent followed by interests on different items of fixed capital comprising of cattle-shed, storage and dairy equipment etc. are 3.19 per cent.

Table – 4.3(d) shows the annual expenditure on dairy farms of sample member beneficiaries farmers in Sikkim. Table reveals that under the head of fixed costs the expenditure incurred on depreciation on animal is highest being 5.51 per cent followed by interest on different items of fixed capital comprising of animals, cattle-shed, storage and dairy equipment etc. 4.41 per cent. Table depicts that under the head of variable costs the expenditure incurred on fodder and feed concentrate is 58.42 per cent followed by expenditure on human labour 20.69 per cent then comes the expenditure on veterinary charges 7.07 per cent. Taking all the variable costs together it is estimated at 90.08 per cent.

Table – 4.3(e) reveals the overall annual expenditure on dairy farms of sample member beneficiary farmers in Meghalaya, Arunachal Pradesh, Mizoram and Sikkim. Table shows that under the head variable costs the expenditure incurred on fodder and feed concentrate is 48.86 per cent followed by expenditure on human labour 24.79 per cent then comes the expenses on veterinary charges 8.78 per cent. Taking all the variable costs together it comes to 87.10 per cent. So far as fixed costs is concerned, of the total fixed costs depreciation on animal is found to be highest which is estimated at 10.21 per cent followed by interests on different items of fixed capital comprising of cattleshed, storage feeding Pan, Bucket and Other Dairy equipment etc. 2.69 per cent.

Table - 4.3 (c)

**Annual Expenditure on Dairy Farms of sample Member  
Beneficiary Farmers in Mizoram**

Items of costs	Cross breed with Young stock	Percentage to Total Cost
<b>A. Variable Cost</b>		
<b>1. Feed costs :</b>		
(a) Green fodder	1,654,750.60	9.43
Per Unit	976.25	
(b) Dry fodder	2,131,740.15	12.15
Per Unit	1,257.66	
(c) Cattle Feed and fed concentrates	4,040,923.85	23.03
Per Unit	2,384.03	
<b>Total Fodder Cost</b>	<b>7,827,414.60</b>	<b>44.60</b>
Per Unit	<b>4,617.94</b>	
<b>(2) Expenditure on Human labour :</b>		
(a) family labour	1,688,362.48	9.62
Per Unit	996.08	
(b) Hired labour	2,640,510.60	15.05
Per Unit	1,557.82	
(3) Veterinary charges and costs of medicines etc.	1,513,270.55	8.62
Per Unit		
(4) Transportation costs of feed, feed supplements	147,206.10	0.84
Per Unit	86.85	
(5) Misc. costs.(1% of the total expenditure)	138,167.64	0.79
Per Unit	81.51	
(6) Interest on Variable Cost @3.5	488,422.62	2.78
Per Unit	288.15	
<b>Total variable costs :</b>	<b>14,443,354.59</b>	<b>82.31</b>
Per Unit	<b>8,521.15</b>	
<b>B. Fixed costs</b>		
(1) Depreciation on animals @ 10%	2,544,579.90	14.50
Per Unit	1,501.23	
(2) Appreciation on young animals @ 10%(-)	132,891.40	0.76
Per Unit	78.40	
(3) Depreciation on Cattle shed/storage & equipments	164,100.00	0.94
Per Unit	96.81	
(4) Interest on Capital Cost@3.5%	529,290.30	3.02
Per Unit	312.27	
<b>Total Fixed Cost</b>	<b>3,105,078.80</b>	<b>17.69</b>
Per Unit	<b>1,831.90</b>	
<b>Total Cost: (A+B)</b>	<b>17,548,433.39</b>	<b>100.00</b>
Per Unit	<b>10,353.06</b>	

Table - 4.3(d)

**Annual Expenditure on Dairy Farms of sample Member Beneficiary Farmers  
in Sikkim**

Items of costs	Local cows with Young stock	Cross breed with Young stock	Total	Percentage to Total Cost
<b>A. Fixed costs</b>				
(1) Depreciation on animals @ 10%	19,340.00	22,820.00	42,160.00	5.51
Per Unit	219.77	530.70	321.83	
(2) Appreciation on young animals @ 10%(-)	2,500.00	2,770.00	5,270.00	0.69
Per Unit	28.41	64.42	40.23	
(3) Depreciation on Cattle shed/storage &	6,979.00	3,410.00	10,389.00	1.36
Per Unit	79.31	79.31	79.31	
(4) Interest on Capital Cost @ 3.5%	9,211.65	8,893.50	18,105.15	2.36
Per Unit	104.68	206.82	138.21	
<b>Total Fixed Cost</b>	<b>38,030.96</b>	<b>37,893.75</b>	<b>75,924.71</b>	<b>9.92</b>
<b>Per Unit</b>	<b>432.17</b>	<b>881.25</b>	<b>579.58</b>	
<b>B. Variable Cost</b>				
(1) Total Fodder Cost	277,200.00	169,850.00	447,050.00	58.42
Per Unit	3,150.00	3,950.00	3,412.59	
(2) Expenditure on Human labour :	89,900.00	68,400.00	158,300.00	20.69
Per Unit	1,021.60	1,590.70	1,208.40	
(3) Veterinary charges and costs of medicines etc.	25,575.00	28,500.00	54,075.00	7.07
Per Unit	290.63	662.79	412.79	
(5) Misc. costs.(1% of the total expenditure)	3,926.50	2,667.50	6,594.00	0.86
Per Unit	44.62	61.99	50.33	
(6) Interest on Variable Cost @ 3.5%	13,881.12	9,429.61	23,310.73	3.05
Per Unit	157.74	219.29	177.94	
<b>Total variable costs :</b>	<b>410,483.92</b>	<b>278,847.26</b>	<b>689,331.18</b>	<b>90.08</b>
<b>Per Unit</b>	<b>4,664.59</b>	<b>6,484.82</b>	<b>5,262.07</b>	
<b>Total Cost: (A+B)</b>	<b>448,514.88</b>	<b>316,741.01</b>	<b>765,255.89</b>	<b>100.00</b>
<b>Per Unit</b>	<b>5,096.76</b>	<b>7,366.07</b>	<b>5,841.65</b>	

Table - 4.3(e)

Over all Annual Expenditure on Dairy Farms of sample Member Beneficiary Farmers in Meghalaya, Arunachal Pradesh, Mizoram & Sikkim

Items of costs	Local cows with Young stock	Cross breed with Young stock	Buffaloes with Young stock	Total	Percentage to Total Cost
<b>A. Variable Cost</b>					
(1) Total Fodder Cost	1,271,271.66	15,614,639.60	42,425.00	16,928,336.26	48.86
Per Unit	1,272.54	5,084.55	3,535.42	4,147.07	
(2) Expenditure on Human labour :	701,552.62	7,861,855.66	24,325.00	8,587,733.28	24.79
Per Unit	702.25	2,560.03	2,027.08	2,103.81	
(3) Veterinary charges and costs of medicines etc.	135,484.68	2,897,132.71	7,900.00	3,040,517.39	8.78
Per Unit	135.62	943.38	658.33	744.86	
(4) Transportation costs of feed, feed supplements	27,410.75	281,385.76	1,020.00	309,816.51	0.89
Per Unit	27.44	91.63	85.00	75.90	
(5) Misc. costs.(1% of the total expenditure)	21,356.95	266,550.14	756.70	288,663.78	0.83
Per Unit	21.38	86.80	63.06	70.72	
(6) Interest on Variable Cost @3.5	75,497.75	942,254.73	2,674.93	1,020,427.42	2.95
Per Unit	75.57	306.82	222.91	249.98	
<b>Total variable costs :</b>	<b>2,232,575.71</b>	<b>27,863,818.75</b>	<b>79,101.63</b>	<b>30,175,496.09</b>	<b>87.10</b>
<b>Per Unit</b>	<b>2,234.81</b>	<b>9,073.21</b>	<b>6,591.80</b>	<b>7,392.33</b>	
<b>B. Fixed costs</b>					
(1) Depreciation on animals @ 10%	111,784.10	3,418,401.90	7,350.00	3,537,536.00	10.21
Per Unit	111.90	1,113.12	612.50	866.62	
(2) Appreciation on young animals @ 10%(-)	26,842.00	292,387.20	1,400.00	320,629.20	0.93
Per Unit	26.87	95.21	116.67	78.55	
(3) Depreciation on Cattle shed/storage & equipments	51,326.51	199,566.27	578.80	251,471.58	0.73
Per Unit	51.38	64.98	48.23	61.60	
(4) Interest on Capital Cost@3.5%	129,013.16	856,728.98	3,061.26	988,803.41	2.85
Per Unit	129.14	278.97	255.11	242.24	
<b>Total Fixed Cost</b>	<b>270,282.09</b>	<b>4,187,850.20</b>	<b>9,590.06</b>	<b>4,467,722.35</b>	<b>12.90</b>
<b>Per Unit</b>	<b>270.55</b>	<b>1,363.68</b>	<b>799.17</b>	<b>1,094.49</b>	
<b>Total Cost: (A+B)</b>	<b>2,502,857.79</b>	<b>32,051,668.95</b>	<b>88,691.69</b>	<b>34,643,218.43</b>	<b>100.00</b>
<b>Per Unit</b>	<b>2,505.36</b>	<b>10,436.88</b>	<b>7,390.97</b>	<b>8,486.82</b>	

**Table - 4.4**  
**Annual Income from Dairy Farms (Including Young Stock) by Size group of**  
**Milch Animals in the Sample States.**

Size group of Milch Animals	No. of H.H.	Indigenous		Cross Breed		Buffaloes		Total
		Value of milk	Value of young stock	Value of milk	Value of young stock	Value of milk	Value of young stock	
<b>Meghalaya</b>								
Below 5 Nos.	35	35,375	9,680	1,666,928	173,250	1,840,178	60,033	1,953,666
5 - 10 nos.	38	155,624	26,400	182,024	5,497,857	577,500	6,075,357	6,292,676
10 - 20 nos.	25	93,013	17,600	110,613	4,217,254	511,500	4,728,754	4,839,367
20 - 30 nos.	1	-	-	-	466,190	46,750	512,940	512,940
Above 30 nos.	1	-	-	-	736,877	68,750	805,627	805,627
<b>Total</b>	<b>100</b>	<b>284,012</b>	<b>53,680</b>	<b>337,692</b>	<b>12,565,106</b>	<b>1,377,750</b>	<b>13,962,856</b>	<b>89,728</b>
<b>Assam</b>								
Below 5 Nos.	14	115,764	12,800	128,564	197,226	15,550	212,776	341,340
5 - 10 nos.	45	741,985	85,550	827,535	1,146,724	91,350	1,238,074	2,065,609
10 - 20 nos.	17	554,062	62,550	616,612	734,439	56,650	791,089	1,407,701
20 - 30 nos.	4	252,469	28,950	281,419	329,323	25,950	355,273	636,692
Above 30 nos.	-	-	-	-	-	-	-	-
<b>Total</b>	<b>80</b>	<b>1,664,280</b>	<b>189,850</b>	<b>1,854,130</b>	<b>2,407,712</b>	<b>189,500</b>	<b>2,597,212</b>	<b>4,451,342</b>
<b>Mizoram</b>								
Below 5 Nos.	6	-	-	-	353,688	16,600	370,288	370,288
5 - 10 nos.	50	-	-	-	8,355,226	416,000	8,771,226	8,771,226
10 - 20 nos.	41	-	-	-	12,162,957	610,000	12,772,957	12,772,957
20 - 30 nos.	3	-	-	-	1,227,751	61,800	1,289,551	1,289,551
Above 30 nos.	-	-	-	-	-	-	-	-
<b>Total</b>	<b>100</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>22,089,622</b>	<b>1,104,400</b>	<b>23,204,022</b>	<b>23,204,022</b>
<b>Sikkim</b>								
Below 5 Nos.	34	313,572	20,800	334,372	373,158	24,500	397,658	732,030
5 - 10 nos.	2	85,200	4,200	89,400	45,200	3,200	48,400	137,800
10 - 20 nos.	-	-	-	-	-	-	-	-
20 - 30 nos.	-	-	-	-	-	-	-	-
Above 30 nos.	-	-	-	-	-	-	-	-
<b>Total</b>	<b>36</b>	<b>398,772</b>	<b>25,000</b>	<b>423,772</b>	<b>418,358</b>	<b>27,700</b>	<b>446,058</b>	<b>869,830</b>
<b>Overall</b>								
Below 5 Nos.	89	464,711	43,280	507,991	2,591,000	229,900	2,820,900	3,397,324
5 - 10 nos.	135	982,809	116,150	1,098,959	15,045,007	1,088,050	16,133,057	17,267,311
10 - 20 nos.	83	647,075	80,150	727,225	17,114,650	1,178,150	18,292,800	19,020,025
20 - 30 nos.	8	252,469	28,950	281,419	2,023,264	134,500	2,157,764	2,439,183
Above 30 nos.	1	-	-	-	736,877	68,750	805,627	805,627
<b>Total</b>	<b>316</b>	<b>2,347,064</b>	<b>268,530</b>	<b>2,615,594</b>	<b>37,510,798</b>	<b>2,699,350</b>	<b>40,210,148</b>	<b>42,929,470</b>

### **Annual Income From Dairy Enterprise :**

With a view to assessing the economics of dairy farming in the hill areas of the sample States, breed-wise annual milk production, value of young-stock (off spring) are taken into consideration. The scrap value of items like hides, skins and bones etc. are although utility items; these are not taken into account as the farmers are not aware about the utility of these scrap items. Although cow-dung is a valuable organic manure but there is no demand for cow-dung in the study area.

Table – 4.4 shows the annual income of dairy farms (including young stock) by size group of milch animals of the sample IDDP beneficiaries of the four North-Eastern hill States. A perusal of the table on economics of dairy enterprise in Meghalaya shows that of the total income of Rs. 14,404,276 about 89.97 per cent of income is derived from production of milk and 10.03 per cent on the estimated value of young stock. In Arunachal Pradesh of the total income of Rs. 4,451,342 about 91.48 per cent income is derived from production of milk and 8.52 per cent on the estimated value of young stock. In Mizoram of the total income of Rs. 23,204,022 about 95.24 per cent income is derived from production of milk and 4.76 per cent on the estimated value of young stock. Similarly in Sikkim of the total income from dairy farms 93.94 per cent income is derived from production of milk and 6.06 per cent on the estimated value of young stock.

It is observed from the above analysis that of the total income Rs. 42,929,470/- about 93.05 per cent income is derived from production of milk and 6.95 per cent on the estimated value of young stock. The profitability of dairy enterprise by and large depends on the breeds of milch animals maintained by the farmers and lactation length of cows in milk.

### **Cost of Production of Milk :**

In order to work out the cost of production of milk the annual expenditure on milch cows is divided by the total milk produced. The breed wise analysis of cost of production of milk in Meghalaya revealed that in case of local cows the average cost of production of a liter of milk is Rs. 16.58 and for cross breed cows it was estimated at Rs. 14.04 and the overall average cost was found at Rs. 14.10. The average cost of production of a liter of milk for buffalo is Rs. 15.69. In Arunachal Pradesh sample, the breed wise analysis of cost of production of milk showed that in case of local cows the average cost



of production of a liter of milk is Rs. 16.75 and for cross-breed cows it was estimated at Rs. 12.93 and the overall average was found at Rs. 14.49. In Mizoram sample the average cost of production of a liter of milk for cross-breed cows is Rs. 14.47. In case of Sikkim State, the breed wise analysis of cost of production of milk revealed that for local cows the average cost of production of a liter of milk is Rs. 11.36 and for cross-breed cows it was estimated at Rs. 4.73 and the overall average was found at Rs. 7.19.

It was observed that the overall breed wise analysis of cost of production of milk in the sample States showed that in case of local cows the average cost of production of a liter of milk is Rs. 15.42 and for cross-breed cows it was estimated at Rs. 13.93 with an overall average of Rs. 14.03.

#### **Benefit Cost Ratio Analysis :**

An attempt has been made to work out the Benefit Cost Ratio (BCR) by breed of milch animals maintained by the sample beneficiaries of the study area. The BCR is worked out by taking into account, the value of milk and youngstock at the prevailing market prices dividing it with the annual expenditure.

The estimates of BCR by breeds of animals in the sample States are presented in Table – 4.5. As indicated in the Table the BCR in Meghalaya for local cow is only 1.05:1 while for cross-breed cows it is found to be 1.14:1 and the BCR for buffaloes is worked out at 1.17:1. The overall BCR is worked out at 1.14:1. In Arunachal Pradesh the BCR for local cows is only 1.07:1 while for cross-breed cows it is found to be 1.34:1 and the overall BCR is worked out at 1.21:1. In Mizoram State the BCR for cross-breed cows is found to be 1.32:1. In Sikkim the BCR for local cows is only 0.94:1 while for cross-breed cows it is found to be 1.41:1 and the overall BCR is worked out at 1.14:1.

The overall BCR by breeds of animals for the sample States reveals that for local cow BCR is only 1.05:1 and the BCR for cross-breed it is found to be 1.25:1. The BCR for buffaloes is worked out at 1.17:1. The overall BCR is found to be 1.24:1. This indicates that the dairying is by and large economically viable enterprise. The dairy farming with indigenous cows are not found so remunerative as that of cross-breed cows. Summarily one can say that under the hill agro-eco system the farmers in the study area used their wisdom to exploit the resources substantially. The analysis of the

**Table – 4.5**  
**Estimated BCR by Breed of Milch Animal of Sample Member**  
**Beneficiary Farmers in different States**

Breed of Milch Animal	Annual Gross Income (milk & value of Youngstock)	Annual Expenditure	BCR
<b>Meghalaya</b>			
Local Cow	337,692.00	322,763.73	1.05:1
Cross breed	13,962,856.00	12,253,711.58	1.14:1
Buffaloes	103,728.00	88,691.69	1.17:1
Total	14,404,276.00	12,665,167.00	1.14:1
<b>Arunachal Pradesh</b>			
Local Cow	1,854,130.00	1,731,579.18	1.07:1
Cross breed	2,597,212.00	1,932,782.97	1.34:1
Total	4,451,342.00	3,664,362.15	1.21:1
<b>Mizoram</b>			
Cross breed	23,204,022.00	17,548,433.39	1.32:1
<b>Sikkim</b>			
Local Cow	423,722.00	448,514.88	0.94:1
Cross breed	446,058.00	316,741.01	1.41:1
Total	869,830.00	765,255.89	1.14:1
<b>Overall</b>			
Local Cow	2,615,594.00	2,502,857.79	1.05:1
Cross breed	40,210,148.00	32,051,668.95	1.25:1
Buffaloes	103,728.00	88,691.69	1.17:1
Total	42,929,470.00	34,643,218.43	1.24:1

study indicated that there is vast scope to tap the potential by improving the breed, feeding and management of livestock farming through optimum utilization of natural resources. The BCR analysis indicated that there is much potential to make the livestock farming remunerative by way of cross-breeding through Artificial Insemination and by improving the nutrition from locally available feed and fodder resources. The dairy farming is expected to make a real break through by transforming the dairying enterprise into a commercially viable proportion.

#### **Generation of Employment :**

The prime objective of IDDP is to ensure generation of employment and income and thereby improve the standard of living of the people living in the non-OF, backward and hilly areas. In general, people living in the hill areas are dependent on shifting cultivation, food gathering and hunting to eke out their living. In order to provide assured employment and income dairy farming at individual household level have been

implemented by the IDDP through village level co-operative societies. It may be stated that animal husbandry is an integral part of the rural economy both in the hills and Plains as it is firmly inter-woven with the socio-economic and cultural traits of the people. But the dairy is a different form of organisation which provides the basic matrix of development as the organic manure obtained from the animals are essential for crop production especially the vegetables and horticultural crops.

It may be mentioned here that the Co-operative Dairy Societies in the State have been suffering from some major weakness for which a good number of societies are in non-functional stage mainly due to mismanagement, lack of professional skill, absence of proper cooperation of the people. The IDDP attempted to revamp the milk Co-operative societies by providing technical skill, guidance, support services and marketing. The field level data revealed that the IDDP sponsored milk cooperative societies are now functioning well and the dairy farming have been able to generate employment and income to a considerable extent in the hilly and backward areas.

Table - 4.6 gives the details of generation of employment (Mandays) of the respondent Beneficiaries in the Sample States by size group of milch animals. So far as generation of employment in terms of mandays are concerned the dairy sector provided employment opportunity to family members from 60.41 per cent to 93.82 per cent mandays of the total mandays involved in all activities in Meghalaya sample leaving an overall average of 85.90 per cent mandays for all farms. In Arunachal Pradesh dairy sector provided employment opportunity from 49.26 per cent to 86.69 per cent mandays of the total mandays involved in all activities. The overall average is found to be 69.48 per cent mandays for all farms. In Mizoram dairy sector provided employment opportunity from 59.45 per cent to 96.41 per cent mandays of the total mandays of work involving all farm activities. The overall average is worked out at 84.78 per cent mandays for all farms. In Sikkim also dairy sector provided employment opportunity from 55.99 per cent to 71.84 per cent mandays of work leaving an overall average of 58.00 per cent mandays for all farms.

From the analysis of overall generation of employment in the sample States, it is found that the dairy sector provided highest proportion of employment opportunity to family members. The dairy sector provided employment opportunity from 60.31 per cent

Table-4.6

**Generation of Employment (Mandays) of the Respondent Beneficiaries  
by Size Group of Milch Animals in the Sample States**

Size Group (In Nos)	Agriculture Proper	Agril. and Other Sources	Dairy	Total	% of Dairy Sector To Total
<b>Meghalaya</b>					
Below 5	1540	2220	10795	14555	74.17
5 to 10	2720	2025	33359	38104	87.55
10 to 20	720	1150	28374	30244	93.82
20 to 30	860	625	2266	3751	60.41
30 to 40	640	325	3362	4327	77.70
<b>Total</b>	<b>6480</b>	<b>6345</b>	<b>78156</b>	<b>90981</b>	<b>85.90</b>
<b>Arunachal Pradesh</b>					
Below 5	1201	890	2030	4121	49.26
5 to 10	3975	3050	12271	19296	63.59
10 to 20	1601	610	8903	11114	80.11
20 to 30	329	280	3967	4576	86.69
<b>Total</b>	<b>7106</b>	<b>4830</b>	<b>27171</b>	<b>39107</b>	<b>69.48</b>
<b>Mizoram</b>					
Below 5	530	260	1158	1948	59.45
5 to 10	4955	1906	26802	33663	79.62
10 to 20	3894	1240	39621	44755	88.53
20 to 30	170	0	4567	4737	96.41
<b>Total</b>	<b>9549</b>	<b>3406</b>	<b>72148</b>	<b>85103</b>	<b>84.78</b>
<b>Sikkim</b>					
Below 5	9400	6310	19985	35695	55.99
5 to 10	820	640	3725	5185	71.84
<b>Total</b>	<b>10220</b>	<b>6950</b>	<b>23710</b>	<b>40880</b>	<b>58.00</b>
<b>Over All</b>					
Below 5	12671	9680	33968	56319	60.31
5 to 10	12470	7621	76157	96248	79.13
10 to 20	6215	3000	76898	86113	89.30
20 to 30	1359	905	10800	13064	82.67
30 to 40	640	8561	102681	111882	91.78
<b>Total</b>	<b>33355</b>	<b>21531</b>	<b>201185</b>	<b>256071</b>	<b>78.57</b>

Table-4.7

**Generation of Income of the Beneficiaries by Farm Size Group of Operational Holdings in the Sample State**

(In Rs.)

Size Group (In Ha.)	Agriculture Proper	Other Allied Activities		Dairy	Total	% of Dairy Sector To Total
		Farm	Non-farm			
<b>Meghalaya</b>						
Below 1 Ha.	184,220.00	5,400.00	368,400.00	6,608,403.00	7,166,423.00	92.21
1 to 2 Ha.	307,957.00	21,600.00	216,400.00	5,697,446.00	6,243,403.00	91.26
2 to 4 Ha.	167,776.00	28,800.00	55,000.00	1,214,891.00	1,466,467.00	82.84
4 to 10 Ha.	129,444.00	0.00	94,600.00	526,501.00	750,545.00	70.15
10Ha. & above	252,003.00	0.00	84,000.00	357,035.00	693,038.00	51.52
<b>Total</b>	<b>1,041,400.00</b>	<b>55,800.00</b>	<b>818,400.00</b>	<b>14,404,276.00</b>	<b>16,319,876.00</b>	<b>88.26</b>
<b>Arunachal Pradesh</b>						
Below 1 Ha.	29,924.00	0.00	259,200.00	847,932.00	1,137,056.00	74.57
1 to 2 Ha.	260,822.00	0.00	396,000.00	1,709,856.00	2,366,678.00	72.25
2 to 4 Ha.	365,883.00	0.00	61,200.00	1,109,188.00	1,536,271.00	72.20
4 to 10 Ha.	183,054.00	0.00	0.00	784,366.00	967,420.00	81.08
10Ha. & above	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total</b>	<b>839,683.00</b>	<b>0.00</b>	<b>716,400.00</b>	<b>4,451,342.00</b>	<b>6,007,425.00</b>	<b>74.10</b>
<b>Mizoram</b>						
Below 1 Ha.	97,124.00	40,200.00	74,400.00	370,288.00	582,012.00	63.62
1 to 2 Ha.	259,744.00	0.00	159,600.00	8,771,226.00	9,190,570.00	95.44
2 to 4 Ha.	555,903.00	0.00	208,800.00	12,772,957.00	13,537,660.00	94.35
4 to 10 Ha.	170,533.00	0.00	0.00	1,289,551.00	1,460,084.00	88.32
10Ha. & above	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total</b>	<b>1,083,304.00</b>	<b>40,200.00</b>	<b>442,800.00</b>	<b>23,204,022.00</b>	<b>24,770,326.00</b>	<b>93.68</b>
<b>Sikkim</b>						
Below 1 Ha.	157,000.00	0.00	342,000.00	479,850.00	978,850.00	49.02
1 to 2 Ha.	180,000.00	0.00	0.00	243,166.00	423,166.00	57.46
2 to 4 Ha.	116,200.00	0.00	0.00	101,273.00	217,473.00	46.57
4 to 10 Ha.	25,000.00	0.00	0.00	45,541.00	70,541.00	64.56
10Ha. & above	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total</b>	<b>478,200.00</b>	<b>0.00</b>	<b>342,000.00</b>	<b>869,830.00</b>	<b>1,690,030.00</b>	<b>51.47</b>
<b>Over all</b>						
Below 1 Ha.	468,268.00	45,600.00	1,044,000.00	8,306,473.00	9,864,341.00	84.21
1 to 2 Ha.	1,008,523.00	21,600.00	772,000.00	16,421,694.00	18,223,817.00	90.11
2 to 4 Ha.	1,205,762.00	28,800.00	325,000.00	15,198,309.00	16,757,871.00	90.69
4 to 10 Ha.	508,031.00	0.00	94,600.00	2,645,959.00	3,248,590.00	81.45
10Ha. & above	252,003.00	0.00	84,000.00	357,035.00	693,038.00	51.52
<b>Total</b>	<b>3,442,587.00</b>	<b>96,000.00</b>	<b>2,319,600.00</b>	<b>42,929,470.00</b>	<b>48,787,657.00</b>	<b>87.99</b>

to 91.78 per cent mandays of taking all activities together. It is also observed that most of the sample farmers of the sample States consider dairy farming as primary occupation, agriculture and other allied activities become secondary to them.

**Generation of Income :**

The annual income of the beneficiaries have been worked out by the farm size group of operational holdings in the sample States and presented in Table – 4.7. So far as generation of income by the dairy farming is concerned in the samples of Meghalaya the proportion of income of dairy units to total family income is estimated at 88.26 per cent. The farm size group wise share of income from dairy enterprise varied from 51.52 per cent to 92.21 per cent. In Arunachal Pradesh sample the proportion of income of dairy units to total family income is estimated at 74.10. The farm size group wise share of income from dairy enterprise varied from 72.20 per cent to 81.80 per cent. In Mizoram sample, the proportion of income of dairy units to total family income is found to be 93.68. The farm size group wise share of income from dairy enterprise varied from 63.62 per cent to 95.44 per cent. In Sikkim sample the proportion of income of dairy units to total family income is found to be 51.47 per cent. The farm size group wise share of income from dairy enterprise varied from 46.57 per cent to 64.56 per cent.

The overall farm size group wise share proportion of income from dairy units to total family income is estimated at 87.99 per cent. The farm size group wise share of income from dairy enterprise varied from 51.52 per cent to 90.69 per cent. This has clearly reveals that a large majority of dairy farmers taken up dairying as the primary source of employment and income. It is also very clear that possession of quality milch animal is one of the criteria of making the dairy enterprise economically viable.

It is observed that the IDDP authority has implemented the intended programme in proper perspectives. From observation and opinion of the dairy farmers summarily, it can be said that a good beginning has been made by the IDDP for the development of dairy sector in the hilly and backward areas of North-Eastern region.

**PART – II****Member Non-Beneficiary of IDDP :**

With a view to assessing the impact of IDDP on Non-beneficiary, 50 co-operative members but not beneficiary of IDDP were selected randomly from 3 (three) sample States Meghalaya, Arunachal Pradesh and Mizoram for comparative analysis. Due to non-availability of data on members non-beneficiary of IDDP in Sikkim State, the consolidation work in this regard for Sikkim State could not be done. Table – 4.8 shows the possession of milch animals in the dairy units of the member non-beneficiary farmers in the 3 sample States. Table shows that in Meghalaya 15 member non-beneficiary farmers

**Table – 4.8****Animal Size Group Wise Milch Animals Owned by the Sample Member Non-Beneficiary Farmers**

Size Group of Milch Animals	Meghalaya		Arunachal Pradesh		Mizoram		Total	
	No. of H.H.	No. of Milch Animals	No. of H.H.	No. of Milch Animals	No. of H.H.	No. of Milch Animals	No. of H.H.	No. of Milch Animals
Below 5 Nos.	13	37	6	22	7	22	26	81
5 - 10 Nos.	2	12	14	83	5	32	21	127
10 - 20 Nos.	-	-	-	-	3	32	3	32
Total :	15	49	20	105	15	86	50	240

Note : Member non-beneficiary samples are not covered by AERC, Santiniketan.

possessed 49 milch cows, 20 member non-beneficiary farmers of Arunachal Pradesh possessed 105 milch cows, 15 member non-beneficiary farmers of Mizoram possessed 86 milch cows. Altogether 50 member non-beneficiary farmers in the sample study possessed 240 numbers of milch cows.

Table – 4.9 shows breed wise milk production in the dairy units of member non-beneficiary farmers. The total annual milk production of indigenous cows in

Table - 4.9  
Breed wise Milk Production of the Sample Member Non-Beneficiary Farmers

Size Group of Milch Animals	Meghalaya				Arunachal Pradesh				Total
	Indigenous		Cross breed		Indigenous		Cross breed		
	Cows in Milk	Milk Production	Cows in Milk	Milk Production	Cows in Milk	Milk Production	Cows in Milk	Milk Production	
Below 5 Nos.	12	3408 (1.15)	13	19666 (5.32)	10	2903 (1.18)	2	3010 (5.28)	5913
5 - 10 Nos	3	926 (1.25)	5	7722 (5.40)	37	10967 (1.20)	10	15272 (5.34)	26239
10 - 20 Nos.	-	-	-	-	-	-	-	-	-
Total :	15	4334 (1.17)	18	27388 (5.35)	47	13870 (1.20)	12	18282 (5.33)	32152

Note : Figures in the parentheses indicate average per day milk production.

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Size Group of Milch Animals	Mizoram						Total			
	Indigenous		Cross breed		Total	Indigenous		Cross breed		Total
	Cows in Milk	Milk Production	Cows in Milk	Milk Production		Cows in Milk	Milk Production	Cows in Milk	Milk Production	
Below 5 Nos.	3	916 (1.24)	12	18466 (5.39)	19382	25	7227	27	41142	48369
5 - 10 Nos	3	910 (1.27)	17	26349 (5.41)	27259	43	12803	32	49343	62146
10 - 20 Nos.	1	322 (1.30)	17	26638 (5.45)	26960	1	322	17	26638	26960
Total :	7	2148 (1.26)	46	71453 (5.42)	73601	69	20352	76	117123	137475

Note : Figures in the parentheses indicate average per day milk production

Meghalaya sample is 4,334 liters while the cross-breed cows produced 27,388 liters. The average per day per cow milk production in case of indigenous cow is 1.17 liters and for cross-breed cows the respective figure is found at 5.35 liters. In Arunachal Pradesh the annual milk production of indigenous cow is 13,870 liters while the cross-breed cows produced 18,282 liters. The average per day per cow milk production in case of indigenous cow is 1.20 liters and for cross-breed cows it was found at 5.33 liters. In Mizoram State the annual milk production of indigenous cow is 2,148 liters while the cross-breed cows produced 71,453 liters. The average per day per cow milk production in case of indigenous cow is 1.26 liters and for cross-breed cows it is found at 5.42 liters. Altogether 69 numbers of indigenous cows in milk of the sample produced 20,352 liters of milk per annum while 76 numbers of cross-breed cows produced 1,17,123 liters of milk.

Table – 4.10 shows the animal size group wise total production and utilization milk in the year under reference. The sample member non-beneficiary households of Meghalaya produced 31,722 liters of milk in their dairy units of which 20.36 per cent of milk used for home consumption and 79.64 per cent marketed. In Arunachal Pradesh the sample member non-beneficiary households produced 32,152 liters of milk in their dairy units of which 26.56 per cent of milk used for home consumption and 73.44 per cent are marketed. In Mizoram the sample member non-beneficiary household produced 73,601 liters of milk in their dairy units of which 9.75 per cent of production used for home consumption, 61.40 per cent supplied to milk society and 28.85 per cent marketed at private sources. It may be stated that the member non-beneficiary of Mizoram had to sale milk in the milk booth of Co-operative Society at lower price due to poor demand for milk at Private Sources. Altogether 50 numbers of member non-beneficiary households produced 1,37,475 liters of milk in their dairy units of which 16.14 per cent of milk used for home consumption, 32.87 per cent supplied to milk society and 50.99 per cent marketed.

Table – 4.10

**Animal Size Group wise Production and Utilization of Milk per annum by the Sample Member Non-beneficiary Farmers**

Size Group of Milch Animals	No. of H.H.	Total Milk Production (in Ltrs.)	Home Consumption	Supplied to Milk Society (in Ltrs.)	Sold in Open Market (in Ltrs.)	Total Value of Milk (in Rs.)
<b>Meghalaya</b>						
Below 10 Nos.	13	23074	5584	-	17490	423900
5 – 10 Nos.	2	8648	876	-	7772	138368
Total	15	31722	6460 (20.36)	-	25262 (79.64)	562268
<b>Arunachal Pradesh</b>						
Below 10 Nos.	6	5913	2409	-	3504	106434
5 – 10 Nos.	14	26239	6132	-	20107	472302
Total	20	32152	8541 (26.56)	-	23611 (73.44)	578736
<b>Mizoram</b>						
Below 10 Nos.	7	19382	3192	11736	4454	367724
5 – 10 Nos.	5	27259	2463	17008	7788	514658
10 – 20 Nos.	3	26960	1525	16446	8989	510890
Total	15	73601	7180 (9.75)	45190 (61.40)	21231 (28.85)	1393272
<b>Overall</b>						
Below 10 Nos.	26	48369	11185	11736	25448	898058
5 – 10 Nos.	21	62146	9471	17008	35667	1125328
10 – 20 Nos.	3	26960	1525	16446	8989	510890
Total	50	137475	22181 (16.14)	45190 (32.87)	70104 (50.99)	2534276

Note : Figures in the parentheses indicate percentage to total.

Table – 4.11(a) shows the annual expenditure on dairy farms incurred by the sample member non-beneficiary farmers of IDDP in Meghalaya. Table revealed that in Meghalaya, taking both milch cows and young stock together, expenditure on variable

Table - 4.11(a)

**Annual Expenditure on Dairy Farms of Sample Member  
Non - Beneficiary Farmers of Meghalaya**

Items of costs	Local cows	Cross breed	Total	Percentage to Total Cost
	with Young stock	with Young stock		
<b>A. Variable Cost</b>				
<b>1. Feed costs :</b>				
(a) Green fodder	8,495.04	44,532.73	53,027.77	9.87
Per Unit	229.60	989.62	646.68	
(b) Dry fodder	11,373.36	53,735.13	65,108.49	12.11
Per Unit	307.39	1,194.11	794.01	
(c) Cattle Feed and feed concentrates	13,598.00	104,817.32	118,415.32	22.03
Per Unit	367.51	2,329.27	1,444.09	
<b>Total Fodder Cost</b>	<b>33,466.40</b>	<b>203,085.18</b>	<b>236,551.58</b>	<b>44.02</b>
Per Unit	904.50	4,513.00	2,884.78	
<b>(2) Expenditure on Human labour :</b>				
(a) family labour	31,062.89	83,002.27	114,065.16	21.22
Per Unit	839.54	1,844.49	1,391.04	
(b) Hired labour	0.00	70,600.70	70,600.70	13.14
Per Unit	0.00	1,568.90	860.98	
(3) Veterinary charges and costs of medicines etc.	2,647.36	33,566.93	36,214.29	6.74
Per Unit	71.55	745.93	441.64	
(4) Transportation costs of feed, feed supplements	1,240.18	4,477.92	5,718.10	1.06
Per Unit	33.52	99.51	69.73	
(5) Misc. costs.(1% of the total expenditure)	995.20	3,606.59	4,601.79	0.86
Per Unit	26.90	80.15	56.12	
(6) Interest on Variable Cost @ 3.5%	2,429.42	13,941.89	16,371.31	3.05
Per Unit	65.66	309.82	199.65	
<b>Total variable costs :</b>	<b>71,841.45</b>	<b>412,281.48</b>	<b>484,122.93</b>	<b>90.08</b>
Per Unit	1,941.66	9,161.81	5,903.94	
<b>B. Fixed costs</b>				
(1) Depreciation on animals @ 10%	4,314.00	30,888.00	35,202.00	6.55
Per Unit	116.59	686.40	429.29	
(2) Appreciation on young animals @ 10%(-)	1,341.60	5,445.00	6,786.60	1.26
Per Unit	36.26	121.00	82.76	
(3) Depreciation on Cattle shed/storage & equipments	3,155.06	3,946.63	7,101.69	1.32
Per Unit	85.27	87.70	86.61	
(4) Interest on Capital Cost @ 3.5%	7,448.96	10,344.94	17,793.90	3.31
Per Unit	201.32	229.89	217.00	
<b>Total Fixed Cost</b>	<b>13,576.42</b>	<b>39,734.57</b>	<b>53,310.99</b>	<b>9.92</b>
Per Unit	366.93	882.99	650.13	
<b>Total Cost: (A+B)</b>	<b>85,417.87</b>	<b>452,016.05</b>	<b>537,433.92</b>	<b>100.00</b>
Per Unit	2,308.59	10,044.80	6,554.07	

Table – 4.11(b)

**Annual Expenditure on Dairy Farms of Sample Member  
Non - beneficiary Farmers of Arunachal Pradesh**

Items of costs	Local cows	Cross breed	Total	Percentage to Total Cost
	with Young stock	with Young stock		
<b>A. Variable Cost</b>				
1. Feed costs :				
(a) Green fodder	32,750.00	37,966.50	70,716.50	13.15
Per Unit	250.00	1,150.50	431.20	
(b) Dry fodder	44,867.50	42,091.50	86,959.00	16.17
Per Unit	342.50	1,275.50	530.24	
(c) Cattle Feed and fed concentrates	37,335.00	74,250.00	111,585.00	20.75
Per Unit	285.00	2,250.00	680.40	
<b>Total Fodder Cost</b>	<b>114,952.50</b>	<b>154,308.00</b>	<b>269,260.50</b>	<b>50.08</b>
Per Unit	877.50	4,676.00	1,641.83	
(2) Expenditure on Human labour :				
(a) family labour	81,875.00	31,350.00	113,225.00	21.06
Per Unit	625.00	950.00	690.40	
(b) Hired labour	0.00	41,761.50	41,761.50	7.77
Per Unit	0.00	1,265.50	623.31	
(3) Veterinary charges and costs of medicines etc.	11,182.16	21,450.00	32,632.16	6.07
Per Unit	85.36	650.00	198.98	
(4) Transportation costs of feed, feed supplements	4,159.25	2,991.45	7,150.70	1.33
Per Unit	31.75	90.65	43.60	
(5) Misc. costs.(1% of the total expenditure)	2,121.69	2,100.99	4,222.68	0.79
Per Unit	16.20	63.67	25.75	
(6) Interest on Variable Cost @ 3.5%	7,500.17	8,888.67	16,388.84	3.05
Per Unit	57.25	269.35	99.93	
<b>Total variable costs :</b>	<b>221,790.77</b>	<b>262,850.61</b>	<b>484,641.38</b>	<b>90.14</b>
Per Unit	1,693.06	7,965.17	2,955.13	
<b>B. Fixed costs</b>				
(1) Depreciation on animals @ 10%	13,599.11	22,849.20	36,448.31	6.78
Per Unit	103.81	692.40	222.25	
(2) Appreciation on young animals @ 10%(-)	4,476.27	3,408.90	7,885.17	1.47
Per Unit	34.17	103.30	48.08	
(3) Depreciation on Cattle shed/storage & equipments	5,940.85	1,496.55	7,437.40	1.38
Per Unit	45.35	45.35	45.35	
(4) Interest on Capital Cost @ 3.5%	13,575.53	3,419.79	16,995.32	3.16
Per Unit	103.63	103.63	103.63	
<b>Total Fixed Cost</b>	<b>28,639.22</b>	<b>24,356.64</b>	<b>52,995.86</b>	<b>9.86</b>
Per Unit	218.62	738.08	323.15	
			0.00	
<b>Total Cost: (A+B)</b>	<b>250,429.99</b>	<b>287,207.25</b>	<b>537,637.24</b>	<b>100.00</b>
Per Unit	1,911.68	8,703.25	3,278.28	

Table - 4.11(c)

**Annual Expenditure on Dairy Farms of sample Member  
Non - beneficiary Farmers of Mizoram**

Items of costs	Local cows	Cross breed	Total	Percentage to Total Cost
	with Young stock	with Young stock		
<b>A. Variable Cost</b>				
1. Feed costs :				
(a) Green fodder	3476.32	89985.89	93462.21	7.63
Per Unit	204.49	743.69	677.26	
(b) Dry fodder	3949.64	113208.37	117158.01	9.56
Per Unit	232.33	935.61	848.97	
(c) Cattle Feed and fed concentrates	5567.20	279452.78	285019.98	23.26
Per Unit	327.48	2309.53	2065.36	
<b>Total Fodder Cost</b>	<b>12993.16</b>	<b>482647.04</b>	<b>495640.20</b>	<b>40.44</b>
Per Unit	764.30	3988.82	3591.60	
(2) Expenditure on Human labour :				
(a) family labour	15523.20	191289.42	206812.62	16.88
Per Unit	913.13	1580.90	1498.64	
(b) Hired labour	0.00	127921.52	127921.52	10.44
Per Unit	0.00	1057.20	926.97	
(3) Veterinary charges and costs of medicines etc.	613.59	87282.65	87896.24	7.17
Per Unit	36.09	721.34	636.93	
(4) Transportation costs of feed, feed supplements	532.08	16809.99	17342.07	1.42
Per Unit	31.30	138.93	125.67	
(5) Misc. costs.(1% of the total expenditure)	296.62	9059.51	9356.13	0.76
Per Unit	17.45	74.87	67.80	
(6) Interest on Variable Cost @ 3.5%	1048.55	32025.35	33073.91	2.70
Per Unit	61.68	264.67	239.67	
<b>Total variable costs :</b>	<b>31007.20</b>	<b>947035.48</b>	<b>978042.68</b>	<b>79.81</b>
Per Unit	1823.95	7826.74	7087.27	
<b>B. Fixed costs</b>				
(1) Depreciation on animals @ 10%	3850.00	185900.00	189750.00	15.48
Per Unit	226.47	1536.36	1375.00	
(2) Appreciation on young animals @ 10%(-)	506.00	8613.80	9119.80	0.74
Per Unit	29.76	71.19	66.09	
(3) Depreciation on Cattle shed/storage & equipments	2670.58	19057.42	21728.00	1.77
Per Unit	157.09	157.50	157.45	
(4) Interest on Capital Cost @ 3.5%	5550.18	39574.62	45124.80	3.68
Per Unit	326.48	327.06	326.99	
<b>Total Fixed Cost</b>	<b>11564.75</b>	<b>235918.25</b>	<b>247483.00</b>	<b>20.19</b>
Per Unit	1156.48	3370.26	3093.54	
<b>Total Cost: (A+B)</b>	<b>42571.95</b>	<b>1182953.73</b>	<b>1225525.68</b>	<b>100.00</b>
Per Unit	2504.23	9776.48	8880.62	

costs is worked out at 90.08 per cent. The feed cost is found to be highest being 44.02 per cent of total variable cost. The cattle feed and feed concentrates comprised of 22.03 per cent, dry fodder 12.11 per cent and green fodder 9.87 per cent. The overall expenditure on human labour is estimated at 34.36 per cent followed by veterinary expenses 6.74 per cent. Other costs and charges are nominal. So far as fixed costs are concerned depreciation on animals are found to be 6.55 per cent followed by interest on capital 3.31 per cent, depreciation on cattle shed and storage 1.32 per cent. Breed-wise per unit costs of all items are worked out which shows that per unit costs on cross-breed animals are much higher than the indigenous cows.

Table 4.11(b) shows the annual expenditure on dairy farms incurred by the sample member non-beneficiary farmers of IDDP in Arunachal Pradesh. In Arunachal Pradesh taking both milch cows and young stock together, expenditure on variable costs is worked out at 90.14 per cent. The feed cost is found to be highest being 50.08 per cent of total variable cost. The cattle feed and feed concentrates comprised of 20.75 per cent, green fodder 13.15 per cent and dry fodder 16.17 per cent. The overall expenditure on human labour is estimated at 28.83 per cent followed by veterinary expenses 6.07 per cent and other costs and charges are nominal. So far as fixed costs are concerned depreciation on animals are found to be 6.78 per cent followed by interest on capital 3.16 per cent, depreciation on cattle shed and storage 1.38 per cent. Breed wise per unit costs of all items are worked out and presented in Table which shows that per unit costs on cross-breed animals are considerably higher than the indigenous cows.

Table 4.11 ( C ) shows the annual expenditure on dairy farms incurred by the sample member non-beneficiary farmers of IDDP in Mizoram. Table shows that in Mizoram, taking both milch cows and young stock together, expenditure on variable costs is worked out at 79.81 per cent. The feed cost is found to be highest being 40.44 per cent. The cattle feed and feed concentrates comprised of 23.26 per cent, green fodder 7.63 per cent and dry fodder 9.56 per cent. The overall expenditure on human labour is estimated at 27.32 per cent followed by veterinary expenses 7.17 per cent and other costs and charges are nominal. So far as fixed costs are concerned depreciation on animals are found to be 15.48 per cent followed by interest on capital cost at 3.68 per cent.

Table – 4.11(d)

**Over all Annual Expenditure on Dairy Farms of Sample Member  
Non-beneficiary Farmers of Meghalaya, Arunachal Pradesh & Mizoram**

Items of costs	Local cows	Cross breed	Total	Percentage to Total Cost
	with Young stock	with Young stock		
<b>A. Variable Cost</b>				
(1) Total Fodder Cost	161,412.06	840,040.22	1,001,452.28	43.53
Per Unit	872.50	4,221.31	2,607.95	
(2) Expenditure on Human labour :	128,461.09	545,925.41	674,386.50	29.31
Per Unit	694.38	2,743.34	1,756.21	
(3) Veterinary charges and costs of medicines etc.	14,443.11	142,299.58	156,742.69	6.81
Per Unit	78.07	715.07	408.18	
(4) Transportation costs of feed, feed supplements	1,772.26	21,287.91	23,060.17	1.00
Per Unit	9.58	106.97	60.05	
(5) Misc. costs.(1% of the total expenditure)	3,413.51	14,767.09	18,180.60	0.79
Per Unit	18.45	74.21	47.35	
(6) Interest on Variable Cost @3.5	10,978.14	54,855.91	65,834.05	2.86
Per Unit	59.34	275.66	171.44	
<b>Total variable costs :</b>	<b>324,639.42</b>	<b>1,622,167.57</b>	<b>1,946,806.99</b>	<b>84.62</b>
Per Unit	<b>1,754.81</b>	<b>8,151.60</b>	<b>5,069.81</b>	
<b>B. Fixed costs</b>				
(1) Depreciation on animals @ 10%	21,763.11	239,637.20	261,400.31	11.36
Per Unit	117.64	1,204.21	680.73	
(2) Appreciation on young animals @ 10%(-)	6,323.87	17,467.70	23,791.57	1.03
Per Unit	34.18	87.78	61.96	
(3) Depreciation on Cattle shed/storage & equipments	11,766.49	24,500.60	36,267.09	1.58
Per Unit	63.60	123.12	94.45	
(4) Interest on Capital Cost@3.5%	26,574.67	53,339.35	79,914.02	3.47
Per Unit	143.65	268.04	208.11	
<b>Total Fixed Cost</b>	<b>53,780.39</b>	<b>300,009.46</b>	<b>353,789.85</b>	<b>15.38</b>
Per Unit	<b>290.70</b>	<b>1,507.59</b>	<b>921.33</b>	
<b>Total Cost: (A+B)</b>	<b>378,419.81</b>	<b>1,922,177.03</b>	<b>2,300,596.84</b>	<b>100.00</b>
Per Unit	<b>2,045.51</b>	<b>9,659.18</b>	<b>5,991.14</b>	



Table – 4.11 (d) shows the overall annual expenditure on dairy farms incurred by the sample member non-beneficiary farmers of IDDP in Meghalaya, Arunachal Pradesh and Mizoram. Table shows that taking both milch cattle and young stock together overall expenditure on variable costs is worked out at 84.62 per cent. The fodder cost is found to be highest being 43.53 per cent of total variable cost. The overall expenditure on human labour is estimated at 29.31 per cent followed by veterinary expenses 6.81 per cent and other costs and charges are nominal. So far as fixed costs are concerned depreciation on animals are found to be 11.36 per cent followed by interest on capital cost at 3.47 per cent. Table also revealed that per unit costs on cross-breed animals are much higher than the indigenous cows.

The estimated Benefit Cost Ratio (BCR) by breed of milch animal of sample member non-beneficiary farmers in the sample states are worked out and presented in Table – 4.12. Table shows that in Meghalaya the BCR for the indigenous milch cows is

**Table – 4.12**

**Estimated BCR by Breed of Milch Animal of Sample Member Non-beneficiary Farmers in different States**

Breed of Milch Animal	Annual Gross Income (milk & Value of Young stock)	Annual Expenditure	BCR
<b>Meghalaya</b>			
<b>Local Cow</b>	89,092.00	85,417.87	1.04:1
<b>Cross Breed</b>	521,976.00	452,016.05	1.15:1
<b>Total</b>	611,068.00	537,433.92	1.14:1
<b>Arunachal Pradesh</b>			
<b>Local Cow</b>	267,461.00	250,429.99	1.07:1
<b>Cross Breed</b>	340,130.00	287,207.25	1.18:1
<b>Total</b>	607,591.00	537,637.24	1.13:1
<b>Mizoram</b>			
<b>Local Cow</b>	46,956.00	42,571.95	1.10:1
<b>Cross Breed</b>	1,454,050.00	1,182,953.73	1.23:1
<b>Total</b>	1,501,006.00	1,225,525.68	1.22:1
<b>Overall</b>			
<b>Local Cow</b>	403,509.00	378,419.81	1.07:1
<b>Cross Breed</b>	2,316,156.00	1,922,177.03	1.20:1
<b>Total</b>	2,719,665.00	2,300,596.84	1.18:1

is found at 1.04:1 and in case of cross-breed cows the BCR is found at 1.15:1. The overall BCR is worked out at 1.14:1 taking into account both the breeds of milch cows. In Arunachal Pradesh the BCR for the indigenous milch cows is found at 1.07:1 and in case of cross-breed cows the BCR is found at 1.18:1. The overall BCR is worked out at 1.13:1 for both the breeds of milch cows. In Mizoram the BCR for the indigenous milch cows is found at 1.10:1 and in case of cross-breed cows the BCR is found at 1.23:1. The overall BCR is worked out at 1.22:1 for both the breeds of milch cattle. The overall estimated BCR for the sample States are worked out. The BCR for the indigenous milch cows is found at 1.07 and in case of cross-breed cows the BCR is worked out at 1.20. The overall BCR is worked out at 1.18 for both the breeds of milch cattle.

**Non-Member Non-Beneficiary :**

Altogether 46 non-member of co-operative society and non-beneficiary of IDDP but owner of milch animals were selected and interviewed by case study method. It was found that majority of the non-member non-beneficiary sample families possessed both indigenous and cross-breed cows reared mostly to meet the requirement of milk for domestic consumption of milk, only the surpluses are marketed.

Table – 4.13 shows the possession of milch animals by the non-member non-beneficiaries households and production of milk by size group of milch cows. Table shows that in Meghalaya 10 non-member non-beneficiary farmers possessed 20 milch cows of which 13 (65.00 per cent) are in milk. The total milk production per annum is found at 3576 liters and is valued at Rs. 63,328/- as per market rate. In Arunachal Pradesh 20 non-member non-beneficiary farmers possessed 57 milch cows of which 33 (57.89 per cent) are in milk. The total milk production per annum is found at 11,357 liters and is valued at Rs. 2,04,426/- as per prevailing market rate. In Mizoram 10 non-member non-beneficiary farmers possessed 25 milch cows of which 15 (60.00 per cent) are in milk. The total milk production per annum is worked out at 19,691 liters and valued at Rs. 3,93,820/-. Similarly in Sikkim also 6 non-member non-beneficiary farmers possessed 19 milch cows of which 11 (64.71 per cent) are in milk. The total milk production per annum is found at 13,505 liters and as per prevailing market rate the value of milk would be Rs. 1,26,410/-. Altogether 46 non-member non-beneficiary farmers in the four sample hill States

**Table - 4.13**  
**Animal Size Group Wise Milch Animals owned by the Sample<sup>Non</sup> Member Non-Beneficiary Farmers**

Size Group of Milch Animals	No. of H.H.	No. of Milch Animals	Indigenous		Cross breed		Total Milk Production	Value of Milk (in Rs.)
			Cows in Milk	Milk Production	Cows in Milk	Milk Production		
<b>Meghalaya</b>								
Below 5 Nos.	10	20	13	3576	-	-	3576	63328
Total	10	20	13	3576	-	-	3576	63328
<b>Arunachal Pradesh</b>								
Below 5 Nos.	15	23	13	3326	1	1590	4916	88488
5 - 10 Nos.	5	34	18	4802	1	1639	6441	115938
Total :	20	57	31	8128	2	3229	11357	204426
<b>Mizoram</b>								
Below 5 Nos.	10	25	3	985	12	18706	19691	393820
Total	10	25	3	985	12	18706	19691	393820
<b>Sikkim</b>								
Below 5 Nos.	6	13	6	1	5	-	13505	126410
Total	6	13	6	-	5	-	13505	126410
<b>Overall</b>								
Below 5 Nos.	41	85	35	7887	18	20296	41688	672046
5 - 10 Nos.	5	34	18	4802	1	1639	6441	115938
Total :	46	119	53	12689	19	21935	48129	787984

Note : In Sikkim State breed-wise milk production data are not provided by AERC, Santiniketan

possessed 119 milch cows of which 72 (60.50 per cent) are in milk. The total production of milk per annum is found at 48,129 liters which is valued at Rs. 7,87,984/-.

Table – 4.14 shows the production and utilization of milk by the sample non-member non-beneficiary farmers selected for the study. Table shows that in Meghalaya out of the total production of milk 93.76 per cent are consumed at home and 6.24 per cent marketed. In Arunachal Pradesh out of the total production of milk 55.45 per cent are consumed at home and 44.55 per cent marketed. In Mizoram out of the total production of milk 32.43 per cent consumed at home and 67.57 per cent marketed. In Sikkim out of the

**Table – 4.14**

**Production and Utilization of Milk by Size Group of Milch Cows of the Sample Non-Member Non-Beneficiary Households**

Size Group of Milch Animals	No. of H.H.	No. of Milch Animals	Total Production of Milk	Home Consumption	Sold Amount
<b>Meghalaya</b>					
Below 5 Nos.	10	20	3576	3353	223
Total :	10	20	3576	3353	223
<b>Arunachal Pradesh</b>					
Below 5 Nos.	15	23	4916	4015	901
5 - 10 Nos.	5	34	6441	2282	4159
Total :	20	57	11357	6297	5060
<b>Mizoram</b>					
Below 5 Nos.	10	25	19691	6385	13306
Total :	10	25	19691	6385	13306
<b>Sikkim</b>					
Below 5 Nos.	6	17	13505	5840	7665
Total :	6	17	13505	5840	7665
<b>Overall</b>					
Below 5 Nos.	41	85	41688	19593	22095
5 - 10 Nos.	5	34	6441	2282	4159
Total :	46	119	48129	21875	26254

total production of milk 43.24 per cent consumed at home and 56.76 per cent marketed. Altogether 46 non-member non-beneficiary sample farmers consumed at home 45.45 per cent of total milk production and the rest 54.55 per cent were marketed.

The total annual expenditure on dairy units of non-member non-beneficiary farmers in Meghalaya is worked out and presented in Table – 4.15(a). Of the total annual expenditure on dairy enterprise 87.63 per cent are on variable cost of which feed costs

Table - 4.15 (a)

**Annual Expenditure on Dairy Farms of sample Non-member  
Non - beneficiary Farmers in Meghalaya**

Items of costs	Local cows with Young stock	Percentage to Total Cost
<b>A. Variable Cost</b>		
<b>1. Feed costs :</b>		
(a) Green fodder	7,723.41	10.71
Per Unit	234.04	
(b) Dry fodder	10,651.80	14.77
Per Unit	322.78	
(c) Cattle Feed and fed concentrates	12,501.00	17.34
Per Unit	378.82	
<b>Total Fodder Cost</b>	<b>30,876.21</b>	<b>42.82</b>
<b>Per Unit</b>	<b>935.64</b>	
<b>(2) Expenditure on Human labour :</b>		
(a) Family labour	25,451.91	35.30
Per Unit	771.27	
(b) Hired labour	0.00	0.00
Per Unit	0.00	
(3) Veterinary charges and costs of medicines etc.	2,665.32	3.70
Per Unit	80.77	
(4) Transportation costs of feed, feed supplements	1,384.74	1.92
Per Unit	41.96	
(5) Misc. costs.(1% of the total expenditure)	671.60	0.93
Per Unit	20.35	
(6) Interest on Variable Cost @ 3.5%	2,136.74	2.96
Per Unit	64.75	
<b>Total variable costs :</b>	<b>63,186.52</b>	<b>87.63</b>
<b>Per Unit</b>	<b>1,914.74</b>	
<b>B. Fixed costs</b>		
(1) Depreciation on animals @ 10%	4,736.75	6.57
Per Unit	143.54	
(2) Depreciation on young animals @ 10%(-)	1,125.40	1.56
Per Unit	34.10	
(3) Depreciation on Cattle shed/storage & equipments	2,072.34	2.87
Per Unit	62.80	
(4) Interest on Capital Cost @ 3.5%	3,231.80	4.48
Per Unit	97.93	
<b>Total Fixed Cost</b>	<b>8,915.49</b>	<b>12.37</b>
<b>Per Unit</b>	<b>270.17</b>	
<b>Total Cost: (A+B)</b>	<b>72,102.01</b>	<b>100.00</b>
<b>Per Unit</b>	<b>2,184.91</b>	

Table - 4.15(b)

**Annual Expenditure on Dairy Farms of sample Non-member  
Non - beneficiary Farmers in Arunachal Pradesh**

Items of costs	Local cows with Young stock	Cross breed with Young stock	Total	Percentage to Total Cost
<b>A. Variable Cost</b>				
<b>1. Feed costs :</b>				
(a) Green fodder	18,480.00	8,050.00	26,530.00	12.24
Per Unit	220.00	1,150.00	291.54	
(b) Dry fodder	21,672.00	8,715.00	30,387.00	14.02
Per Unit	258.00	1,245.00	333.92	
(c) Cattle Feed and fed concentrates	27,300.00	16,455.46	43,755.46	20.19
Per Unit	325.00	2,350.78	480.83	
<b>Total Fodder Cost</b>	<b>67,452.00</b>	<b>33,220.46</b>	<b>100,672.46</b>	<b>46.45</b>
Per Unit	803.00	4,745.78	1,106.29	
<b>(2) Expenditure on Human labour :</b>				
(a) family labour	55,872.60	7,632.31	63,504.91	29.30
Per Unit	665.15	1,090.33	697.86	
(b) Hired labour	0.00	5,363.75	5,363.75	2.47
Per Unit	0.00	766.25	157.76	
(3) Veterinary charges and costs of medicines etc.	6,582.24	4,189.36	10,771.60	4.97
Per Unit	78.36	598.48	118.37	
(4) Transportation costs of feed, feed supplements	2,646.00	603.75	3,249.75	1.50
Per Unit	31.50	86.25	35.71	
(5) Misc. costs.(1% of the total expenditure)	1,325.53	510.10	1,835.62	0.85
Per Unit	15.78	72.87	20.17	
(6) Interest on Variable Cost @ 3.5%	4,685.74	1,803.19	6,488.93	2.99
Per Unit	55.78	257.60	71.31	
<b>Total variable costs :</b>	<b>138,564.11</b>	<b>53,322.92</b>	<b>191,887.03</b>	<b>88.53</b>
Per Unit	1,649.57	7,617.56	2,108.65	
<b>B. Fixed costs</b>				
(1) Depreciation on animals @ 10%	9,728.88	4,600.05	14,328.93	6.61
Per Unit	115.82	657.15	157.46	
(2) Appreciation on young animals @ 10%(-)	2,385.60	674.52	3,060.12	1.41
Per Unit	28.40	96.36	33.63	
(3) Depreciation on Cattle shed/storage & equipments	4,588.08	380.24	4,968.32	2.29
Per Unit	54.62	54.32	54.60	
(4) Interest on Capital Cost @ 3.5%	7,950.60	661.78	8,612.38	3.97
Per Unit	94.65	94.54	94.64	
<b>Total Fixed Cost</b>	<b>19,881.96</b>	<b>4,967.55</b>	<b>24,849.51</b>	<b>11.47</b>
Per Unit	236.69	709.65	273.07	
<b>Total Cost: (A+B)</b>	<b>158,446.07</b>	<b>58,290.47</b>	<b>216,736.54</b>	<b>100.00</b>
Per Unit	1,886.26	8,327.21	2,381.72	

Table – 4.15(c)

**Annual Expenditure on Dairy Farms of sample Non-member  
Non - beneficiary Farmers in Mizoram**

Items of costs	Local cows	Cross breed	Total	Percentage to Total Cost
	with Young stock	with Young stock		
<b>A. Variable Cost</b>				
<b>1. Feed costs :</b>				
(a) Green fodder	1,592.68	27,594.84	29,187.52	8.47
Per Unit	199.09	836.21	711.89	
(b) Dry fodder	1,717.40	31,132.24	32,849.64	9.54
Per Unit	214.68	943.40	801.21	
(c) Cattle Feed and fed concentrates	2,510.25	78,995.11	81,505.36	23.66
Per Unit	313.78	2,393.79	1,987.94	
<b>Total Fodder Cost</b>	<b>5,820.33</b>	<b>137,722.19</b>	<b>143,542.52</b>	<b>41.67</b>
Per Unit	727.54	4,173.40	3,501.04	
<b>(2) Expenditure on Human labour :</b>				
(a) family labour	7,439.35	51,889.40	59,328.75	17.22
Per Unit	929.92	1,572.41	1,447.04	
(b) Hired labour	0.00	29,897.01	29,897.01	8.68
Per Unit	0.00	905.97	729.20	
(3) Veterinary charges and costs of	273.37	25,325.92	25,599.29	7.43
Per Unit	34.17	767.45	624.37	
(4) Transportation costs of feed,	255.09	3,215.19	3,470.28	1.01
Per Unit	31.89	97.43	84.64	
(5) Misc. costs.(1% of the total	137.88	2,480.50	2,618.38	0.76
Per Unit	17.24	75.17	63.86	
(6) Interest on Variable Cost @	487.41	8,768.56	9,255.97	2.69
Per Unit	60.93	265.71	225.76	
<b>Total variable costs :</b>	<b>14,413.43</b>	<b>259,298.76</b>	<b>273,712.20</b>	<b>79.45</b>
Per Unit	1,801.68	7,857.54	6,675.91	
<b>B. Fixed costs</b>				
(1) Depreciation on animals @ 10%	1,750.00	51,450.00	53,200.00	15.44
Per Unit	218.75	1,559.09	1,297.56	
(2) Appreciation on young animals	253.00	2,234.40	2,487.40	0.72
Per Unit	31.63	67.71	60.67	
(3) Depreciation on Cattle	1,160.58	5,596.63	6,757.21	1.96
Per Unit	145.07	169.59	164.81	
(4) Interest on Capital Cost @ 3.5%	2,560.04	10,746.40	13,306.44	3.86
Per Unit	320.01	325.65	324.55	
<b>Total Fixed Cost</b>	<b>5,217.62</b>	<b>65,558.64</b>	<b>70,776.26</b>	<b>20.55</b>
Per Unit	652.20	1,986.63	1,726.25	
<b>Total Cost: (A+B)</b>	<b>19,631.05</b>	<b>324,857.40</b>	<b>344,488.45</b>	<b>100.00</b>
Per Unit	2,453.88	9,844.16	8,402.16	

Table - 4.15(d)

**Annual Expenditure on Dairy Farms of sample Non-member  
Non - beneficiary Farmers in Sikkim**

Items of costs	Local cows	Cross breed	Total	Percentage to Total Cost
	with Young stock	with Young stock		
<b>A. Fixed costs</b>				
(1) Depreciation on animals @ 10%	3,470.00	5,090.00	8,560.00	6.18
Per Unit	266.92	462.73	356.67	
(2) Depreciation on young animals @ 10%(-)	570.00	690.00	1,260.00	0.91
Per Unit	43.85	62.73	52.50	
(3) Depreciation on Cattle shed/storage &	1,107.00	937.00	2,044.00	1.48
Per Unit	85.15	85.18	85.17	
(4) Interest on Capital Cost @ 3.5%	1,602.48	2,109.73	3,712.21	2.68
Per Unit	123.27	191.79	154.68	
<b>Total Fixed Cost</b>	<b>6,749.48</b>	<b>8,826.73</b>	<b>15,576.21</b>	<b>11.24</b>
<b>Per Unit</b>	<b>519.19</b>	<b>802.43</b>	<b>649.01</b>	
<b>B. Variable Cost</b>				
(1) Total Fodder Cost	36,400.00	39,050.00	75,450.00	54.46
Per Unit	2,800.00	3,550.00	3,143.75	
(2) Expenditure on Human labour :	12,352.00	19,255.45	31,607.45	22.81
Per Unit	950.15	1,750.50	1,316.98	
(3) Veterinary charges and costs of medicines	3,903.25	6,625.30	10,528.55	7.60
Per Unit	300.25	602.30	438.69	
(5) Misc. costs.(1% of the total expenditure)	526.55	649.30	1,175.85	0.85
Per Unit	40.50	59.03	48.99	
(6) Interest on Variable Cost @ 3.5%	1,861.36	2,352.87	4,214.23	3.04
Per Unit	143.18	213.90	175.59	
<b>Total variable costs :</b>	<b>55,043.16</b>	<b>67,932.92</b>	<b>122,976.08</b>	<b>88.76</b>
<b>Per Unit</b>	<b>4,234.09</b>	<b>6,175.72</b>	<b>5,124.00</b>	
<b>Total Cost: (A+B)</b>	<b>61,792.64</b>	<b>76,759.65</b>	<b>138,552.29</b>	<b>100.00</b>
<b>Per Unit</b>	<b>4,753.28</b>	<b>6,978.15</b>	<b>5,773.01</b>	



Table – 4.15(e)

**Over all Annual Expenditure on Dairy Farms of sample Non-member Non-beneficiary Farmers in Meghalaya, Arunachal Pradesh, Mizoram & Sikkim**

Items of costs	Local cows with Young stock	Cross breed with Young stock	Total	Percentage to Total Cost
<b>A. Variable Cost</b>				
(1) Total Fodder Cost	140,548.54	209,992.65	350,541.19	45.41
Per Unit	1,018.47	4,117.50	1,854.72	
(2) Expenditure on Human labour :	101,115.86	114,037.92	215,153.78	27.87
Per Unit	732.72	2,236.04	1,138.38	
(3) Veterinary charges and costs of medicines etc.	13,424.18	36,140.58	49,564.76	6.42
Per Unit	97.28	708.64	262.25	
(4) Transportation costs of feed, feed supplements	4,285.83	3,818.94	8,104.77	1.05
Per Unit	34.29	95.47	42.88	
(5) Misc. costs.(1% of the total expenditure)	2,661.56	3,639.90	6,301.46	0.82
Per Unit	19.29	71.37	33.34	
(6) Interest on Variable Cost @3.5	9,171.25	12,924.62	22,095.87	2.86
Per Unit	66.46	253.42	116.91	
<b>Total variable costs :</b>	<b>271,207.22</b>	<b>380,554.60</b>	<b>651,761.82</b>	<b>84.44</b>
<b>Per Unit</b>	<b>1,965.27</b>	<b>7,461.85</b>	<b>3,448.48</b>	
<b>B. Fixed costs</b>				
(1) Depreciation on animals @ 10%	19,685.63	61,140.05	80,825.68	10.47
Per Unit	142.65	1,198.82	427.65	
(2) Appreciation on young animals @ 10%(-)	4,334.00	3,598.92	7,932.92	1.03
Per Unit	31.41	70.57	41.97	
(3) Depreciation on Cattle shed/storage & equipments	8,928.00	6,913.87	15,841.87	2.05
Per Unit	64.70	135.57	83.82	
(4) Interest on Capital Cost@3.5%	15,344.92	13,517.91	28,862.83	3.74
Per Unit	111.20	265.06	152.71	
<b>Total Fixed Cost</b>	<b>40,764.55</b>	<b>79,352.92</b>	<b>120,117.47</b>	<b>15.56</b>
<b>Per Unit</b>	<b>295.40</b>	<b>1,555.94</b>	<b>635.54</b>	
<b>Total Cost: (A+B)</b>	<b>311,971.77</b>	<b>459,907.52</b>	<b>771,879.29</b>	<b>100.00</b>
<b>Per Unit</b>	<b>2,260.67</b>	<b>9,017.79</b>	<b>4,084.02</b>	

accounted 42.82 per cent. The total fixed costs is worked out at 12.37 per cent including depreciation on animals, cattle sheds, storage and equipment and interest on capital etc.

The total annual expenditure on dairy units of non-member non-beneficiary farmers in Arunachal Pradesh is presented in Table – 4.15(b). Of the total annual expenditure on dairy enterprise 88.53 per cent are on variable cost of which feed costs accounted 46.45 per cent. The total fixed costs is worked out at 11.47 per cent including depreciation on animals, cattle sheds, storage and equipment and interest on capital etc.

The total annual expenditure on dairy units of non-member non-beneficiary farmers in Mizoram is presented in Table – 4.15(C). Of the total annual expenditure on dairy enterprise 79.45 per cent are on variable cost of which feed costs accounted 41.67 per cent. The total fixed costs is worked out at 20.55 per cent including depreciation on animals, cattle sheds, storage and equipment and interest on capital etc.

The total annual expenditure on dairy units of non-member non-beneficiary farmers in Sikkim is worked out and presented in Table – 4.15(d). Of the total annual expenditure on dairy enterprise 88.76 per cent are on variable cost of which feed cost alone accounted 54.46 per cent followed by expenditure on human labour 22.81 per cent. The total fixed costs is estimated 11.24 per cent including depreciation on animals, cattle sheds, storage and interest on capital etc.

The overall annual expenditure on dairy farms of sample non-member non-beneficiary farmers in Meghalaya, Arunachal Pradesh, Mizoram and Sikkim is worked out and presented in Table – 4.15(e). Of the total annual expenditure on dairy enterprise 84.44 per cent are on variable cost of which feed costs accounted 45.41 per cent. The total fixed costs is worked out at 15.56 including depreciation on animals, cattle sheds, storage and equipment and interest on capital costs. The analysis showed that the per unit costs of maintenance of indigenous cows possessed by the IDDP beneficiaries, member non-beneficiaries and non-members non-beneficiaries per annum do not have much variations. The estimated Benefit Cost Ratios (BCR) for non-member non-beneficiary farmers in the sample States are worked out and presented in Table – 4.16. Table shows that in Meghalaya BCR for local cow is only 1.03:1. In Arunachal Pradesh the BCR for local cow is 1.06:1 while for cross-breed cows it is found to be 1.13:1 and the overall BCR is worked out at 1.08:1. In Mizoram the BCR for local cow is only 1.10:1 while for cross-breed cows

it is found to be 1.22:1 and the overall BCR is worked out at 1.21:1. Similarly in Sikkim also the BCR for local cow is only 0.78:1 while for cross-breed cows it is found to be 1.18:1 and the overall BCR is worked out at 1.00. The overall BCR for the four (4) sample States are also worked out. The BCR for local cow is only 1.00:1 while for cross-breed cows it is found to be 1.20:1 and the overall BCR is found at 1.12:1. This indicates that the dairy farming is

**Table - 4.16**

**Estimated BCR by Breed of Milch Animal of Sample Non-member Non-Beneficiary farmers in the Sample States**

Breed of Milch Animal	Annual Gross Income (milk & value of Youngstock)	Annual Expenditure	BCR
<b>Meghalaya</b>			
Local Cow	74,371.00	72,102.01	1.03
<b>Arunachal Pradesh</b>			
Local Cow	168,504.00	158,290.47	1.06
Cross breed	65,922.00	58,290.47	1.13
Total	234,426.00	216,736.54	1.08
<b>Mizoram</b>			
Local Cow	21,630.00	19,631.05	1.10
Cross breed	396,572.00	324,857.40	1.22
Total	418,202.00	344,488.45	1.21
<b>Sikkim</b>			
Local Cow	48,170.00	61,792.64	0.78
Cross breed	90,840.00	76,759.65	1.18
Total	139,010.00	138,552.29	1.00
<b>Overall</b>			
Local Cow	312,675.00	311,971.77	1.00
Cross breed	553,334.00	459,907.52	1.20
Total	866,009.00	771,879.29	1.12

comparatively remunerative as some margins are there and hence can be considered as profitable in the sense that dairy farming provided the consumption needs of the

households, the surplus of milk produced by the farmers provided cash income to run their dairy units smoothly and also helped to maintain a standard of living.

**Summary Findings :**

The analysis of field level data sufficiently established that dairy farming provide ample employment opportunity and income to the farmers living in the remote hilly and backward areas.

The results and findings of the study clearly demonstrated that the milk co-operative societies in the village and support services of the IDDP have created positive impact on dairy farming. The introduction of cross-breed milch animals by the member beneficiary and member non-beneficiary farmers have created direct impact on increasing the production of milk. The IDDP provided training, technical skills, veterinary services and other support services to the member beneficiaries including Artificial Insemination and assured market for milk and dairy products round the year have created enthusiasm in the minds of the beneficiary. The services offered by the IDDP have helped the dairy farmers to improve the productivity and quality of milch animals through cross-breeding and thereby milk production. The member beneficiaries and member non-beneficiaries have inducted cross-breed cows in their dairy units and thereby increased the marketable surplus of milk. The young stocks at the disposal of the farmers obtained through cross-breeding with superior germplasm expected to increase the quality milch animals of the dairy farmers in due course of time.

The discussion in this Chapter clearly revealed that the dairy enterprises in the study area of the sample States have been able to improve the economic condition and standard of living of the member beneficiaries in particular and member non-beneficiaries also benefited from the dairy farming. This gives a clear impression that dairy farming in the hilly and backward areas can be instrumental for changing the economic condition and life style of hill people provided the scheme is implemented by the concerned authority with right earnest along with the development of infrastructural facilities.

## Chapter – V

### SUMMARY, SUGGESTION AND CONCLUSIONS

Animal husbandry is a sub-sector of agricultural economy and plays an important role in providing gainful employment and income to the rural people, particularly to small and marginal farmers, agricultural labourers and economically weaker sections of the society. The livestock sector has been receiving significant priority in India in the last couple of decades. The dairy farming in particular act as an agency in providing employment, income, nutritive food to the people and cowdung as organic manure to enrich soil fertility and thus help in increasing crop production. It is an established fact that dairying is carried out mostly by the poorer section of population and this sector provided part time/whole time employment to about 19.00 million people which is about 8.3 per cent (p.c.) of total working force in 2002-2003.

The contribution of dairy sector in India to total national income is increasing at a faster rate in comparison to agriculture proper. The growth of dairy sector during the last couple of decades have been very impressive as the bovine population increased by about 34.0 p.c., the production of milk has been doubled during the last two decades. The Government policy adopted for the development of dairy sector believed to be the key factor for this impressive growth. With the objective of increasing milk production Intensive Cattle Development Project (ICDP), Key Village Scheme etc., under the OF programme and lateron Integrated Dairy Development Project (IDDP) are the key factors for the growth and development of the dairy sector. In recent decades India's milk production reached the second place in the World next to USA. The dairy sector in India derives its strength from 288 million cattle and buffaloes which is about 52 p.c. of Asia's bovine population. The livestock sector contributed 25.5 p.c. of national agricultural G.D.P. and 5.6 p.c. of total National G.D.P. in 2001-2002. The share of livestock sector of the Gross value of agricultural out put has increased from 8.6 p.c. in 1971-72 to 35.5 p.c. in 2001-2002. The milk production in India has raised from 31.6 million tonnes in 1980-81 to 60.8 million tonnes in 1993-94 and further to 84.6 million tonnes in 2001-02.

The dairy development programmes like Operation Flood (OF) has created a sound infrastructure with the establishment of milk processing plant in different districts of the country. Out of 478 districts of the country 262 districts were covered under OF upto Phase - III. The remaining districts supposed to be covered by the State Plan Schemes. But, due to limited resources adequate attention could not be given under the State Plan particularly in non-OF, hilly and backward areas.

The dairy sector in rural India is largely a subsistence activity as the dairy farmers usually keep indigenous milch animals. Therefore, the average milk yield per milch animal in India is one of the lowest in the World. However, as a result of introduction of cross-breeding programme milk production since 90's have been quite encouraging which have resulted higher potential of milk.

In the context of globalization and technological change a number of developing countries including India consider livestock production system vulnerable to trade liberalisation mainly because of dominance of small-holder system. The small holders production is constrained by lack of adoption of improve technologies, high prices of feed, fodder, feed concentrates, veterinary services and poor asses to market. But the developed countries with significant advantages in all areas with value additions are in asses to capital, new technologies and marketing net work with processed dairy products.

The IDDP, a Central Sector Scheme with 100.00 p.c. grant-in-aid basis has been implemented in Non-OF, Hilly and Backward Areas by the concerned State Governments since 8<sup>th</sup> Five Year Plan and continued during 9<sup>th</sup> and upto 10<sup>th</sup> Plan Period.

#### **Dairy Sector in the N.E. Region :**

Livestock is an important subsidiary occupation of the rural households in the North-Eastern (N.E.) States. A large percentage of animals in this Part of the country are indigenous and of non-descript type; less productive and poorly managed. The yield potential of indigenous animals are very low, yet, it is one of the major subsidiary sector in the rural areas. The production of milk in the region was 1095 thousand tonnes in 2001-2002. The per capita availability of milk is abysmally low (around 84 gms. per head per day) than the national average of 226 grams. It is also lower than the nutritional requirement of 248 gms per capita per day as recommended by the Indian Council of Medical Research.

In the North-Eastern India agriculture i.e. crop cultivation and livestock rearing are interlinked and plays an important role in the State's economy. The agriculture and allied sector contributed nearly 31.0 p.c. of the State income at current prices in 2002-2003. The analysis of allocation of resources revealed that of the total annual allocation to Animal Husbandry and Veterinary sector the share of dairy sector has been very low which is found to have varied from 10.0 p.c. to 18.0 p.c. only. The livestock sector particularly the dairying plays an important role in the hilly and backward region where livelihood options of the people are limited. The livestock sector forms an integral part of the age old crop livestock mixed farming system. With the increase in demand for milk and milk products the cross-breed milch animals have been developed in the region only during the last couple of decades. The people living in the hills of the N.E. Region reared livestock more for meat and less for milk purpose. So far as concentration of milch animals are concerned indigenous cows still in dominance and proportionately cross-breed cows are limited.

#### **Implementation of IDDP:**

Keeping in view the importance of dairy sector in the non-OF, hilly and backward regions the Central Sector Scheme IDDP have been implemented in 4 (four) States of North-Eastern region. The basic objectives of the scheme are :

- i. Development of milch cattle through cross breeding.
- ii. Increase of milk production by providing technical guidance; training and supply of input services.
- iii. Procurement, processing and marketing of milk in a cost-effective manner.
- iv. Ensuring remunerative prices to milk producer.
- v. Generation of additional employment and income.
- vi. Improvement of social, economic and nutritional status of people living in the disadvantaged hilly and backward areas.

#### **Objectives of the Study :**

The Study has been undertaken with the following objectives:

1. To assess the impact of IDDP in generation of additional employment and income to the different categories of beneficiaries.

2. To assess the impact of IDDP in terms of genetic improvement of cattle through selective breeding/cross breeding and in making availability of feed, fodder and other essential items for the development of dairy sector.
3. To assess the impact of IDDP in milk production and in development of marketing and processing infrastructure in the Project area.
4. To assess whether the implementing agencies followed the guidelines in selection of beneficiaries imparted training through dairy extension services amongst the farmers.
5. To study the problems faced by the implementing agencies in execution of the project as per guidelines laid down by the Department of Animal Husbandry and Dairying.
6. To suggest policy implications.

**Methodology & Sampling Design :**

The consolidated study covers 4 (four) States of North-Eastern Region and 6 districts.

**Sampling Design :**

A multi-stage stratified random sampling techniques were adopted for selection of society, beneficiary farmers, farmers belonging to society membership but non-beneficiary and non-member but owner of milch animals. A sample of at least 50 beneficiary households proposed to be selected from each district. From each district atleast 3 (three) milk co-operative societies were selected randomly and within each society a cluster of 3 to 5 villages were covered. From each society 5 to 6 beneficiary members were selected at random with probability proportional to the number of members in different farm size groups. However, it has been decided to cover 50 beneficiary farmers from Sikkim however the Santiniketan Centre covered only 36 IDDP beneficiaries in one district. From each society area 2 or 3 non-beneficiary but society members have also been randomly selected to assess the reasons of not becoming the member beneficiary under the IDDP scheme. Information from the 5 non-member and non-beneficiary but owner of milch cattle was selected from each district.

Thus, in all 19 milk producer's co-operative society, 316 beneficiary member households, 50 co-operative society members but not the beneficiary of IDDP scheme and 46 non-member but owner of milch animals constituted the sample size of the Study.



**Data Collection :**

The data for the study were collected from both the primary as well as secondary level sources. For collection of Primary data two sets of schedules and a questionnaire were canvassed. One set of schedules and questionnaire were used for collection of grass root level data from the beneficiary households and the other set for collection of data from the non-beneficiary but members of the co-operative society households. The field level data were collected by personal interview method from both the universes. The information from the non-member households but owner of milch animals was collected by case study method.

For collection of secondary level information 3 sets of schedules were used as detailed below.

**(a) The State Level Schedule :**

For collection of background information of the Non-OF States a set of schedules were used for collection of information from the Nodal Department of the concerned States. The detail information on various aspects of dairy sector of the Sample State was collected. The required information had also been collected through discussions and personal interview method with the officials connected with implementation of IDDP at various stages.

**(b) The District Level Schedule :**

A set of schedules and questionnaires have also been prepared and used for collection of background information of the district on various aspects of implementation of IDDP. Case study method was also used for collection of additional information on implementation of IDDP from the concerned district/sub-divisional authority.

**(c) Schedules and Questionnaires for collection of required information from the Milk Producer's Co-operative Societies functioning under IDDP :**

The Co-operative Societies working under the IDDP for production and marketing of milk and other related issues have also been collected from the office bearers of the Society with the help of a set of schedules specially designed for the purpose. Case study method has also been used for collection of required information from the office bearers of the Society.

**Reference Period:**

The reference year of the Study is 2005-2006.

**The Results and Findings :**

In the N.E. region and in our sample nearly 82 p.c. of population are tribals.

The distribution of respondents Meghalaya revealed that 99.00 p.c. is literate with educational qualification upto matric/HSLC passed and above levels. In Arunachal Pradesh of the total 80 sample beneficiary respondents 7.50 p.c. are illiterate and the rest 92.50 literate. Similarly in Mizoram also only 1.00 p.c. respondent beneficiary was illiterate and the rest 99.00 p.c. literate. In Sikkim of the total 36 sample beneficiary respondents 19.44 p.c. are illiterate and the rest 80.56 p.c. literate. The overall educational status in the sample was 4.75 p.c. illiterate and the rest 95.25 p.c. literate.

So far as economic status is concerned in Meghalaya sample of the total population of 640 persons in the sample 40.78 p.c. are earner, 10.47 p.c. helper and 48.75 p.c. non-worker. In Arunachal Pradesh of the total population of 624 persons, 37.82 p.c. are earner, 16.19 p.c. helper and 45.99 p.c. non-worker. In Mizoram of the total population of 492 persons in the sample 30.69 p.c. are earner, 15.65 p.c. helper and 53.66 p.c. non-worker. In Sikkim also of the total population of 205 persons in the sample 41.46 p.c. worker, 13.77 p.c. helper and 45.37 p.c. non-worker. Of the total population covered by the study, 37.38 p.c. are earner, 13.87 p.c. helper and 48.75 p.c. non-worker. The main occupation of the respondents in the working age group is agriculture and allied activities including animal husbandry and dairy farming. In Meghalaya sample 73.00 p.c. are primarily engaged in animal husbandry and the rest 27.00 p.c. are engaged in other occupation like cultivation, service and professions. In Arunachal Pradesh sample 80.00 p.c. are primarily engaged in animal husbandry and the rest 20.00 p.c. engaged in other activities like cultivation, services and professions. In Mizoram also of the total respondents 90.00 p.c. are primarily engaged in animal husbandry and the rest 10.00 p.c. are engaged in other occupation like cultivation, service, trade and business. In Sikkim also of the total respondents 22.22 p.c. are primarily engaged in animal husbandry and the rest 77.78 p.c. are engaged in other occupation.

The operational holdings are comprised of land allocated for cereal crop cultivation and horticultural crops. The average size of operational holding in Meghalaya is 1.47 hectares, 1.43 hectares in Arunachal Pradesh, 1.51 hectares in Mizoram and 1.10 hectares in Sikkim.

So far as member non-beneficiary and non-member non-beneficiary farmers are concerned the educational status, economic status and occupational status of population in both the samples not much significant differences are noticed.

The sample hill States of North-Eastern region is characterised by undulating terrain with poor road transport, communication facility, prevalence of shifting cultivation, small and fragmented holdings. Crop cultivation in the region is almost entirely dependent on rainfall, as status of irrigation is very poor.

The IDDP is a Central sector project implemented in the sample four hill States as the State government's effort to develop this crucial sector could not provide needed support and services due to certain limitations. There is however no authentic, reliable and dependable data base on economics of livestock farming. The implementing agency of IDDP organised training programmes for the beneficiary farmers, impart orientation programme to society members, dairy personnel and field level officers associated with the programmes. Due care has been taken for procurement, processing and marketing of milk produced by the members of the milk co-operative society. The implementing agencies have undertaken a number of programmes through the milk co-operative societies in providing inputs, emergency veterinary services, Artificial Insemination, veterinary first aid services and distribution of cattle feed and feed concentrates at subsidised rates.

The sample dairy farmers of Meghalaya possessed 689 numbers of milch cows of which 67.49 p.c. were in milk (comprising of 90.54 p.c. cross-breed and 9.46 p.c. local cows) and 32.51 p.c. dry (comprising of 91.07 p.c. cross-breed and 8.93 p.c. indigenous cows) at the time of field study. In Arunachal Pradesh the sample beneficiary farmers possessed 589 numbers of milch cows of which 57.38 p.c. were in milk (comprising of 78.40 p.c. local and 21.60 p.c. cross-breed) and 42.62 p.c. remained dry (comprising of 81.27 p.c. local and 18.73 cross-breed cows). In Mizoram the sample farmers possessed i.e. 985 numbers of cross-breed milch cows. Of the total milch cows in the sample 59.90 p.c. were in-milk cows and 40.10 p.c. cows in dry period. In Sikkim the

farmers possessed only 75 numbers of milch cows of which 74.67 p.c. were in milk (comprising of 66.07 p.c. local and 33.93 p.c. cross-breed cows) and 25.33 p.c. dry (comprising of 73.68 p.c. local and 26.32 p.c. cross-breed cows).

It was found that after becoming the co-operative society member under IDDP in Meghalaya altogether 173 numbers of milch cows (comprising of 85.55 p.c. cross-breed and 14.45 p.c. indigenous cows) have been newly introduced by 71 sample households. In Arunachal Pradesh altogether the 80 sample households have newly introduced 90 numbers of milch cows. Of the total additional milch cows 60.00 p.c. were cross-breed cows and 40.00 p.c. indigenous cows. In Mizoram 107 numbers of cross-breed cows have been newly introduced by the sample households. In Sikkim 26 numbers of milch cows (comprising of 46.15 p.c. cross-breed and 53.85 p.c. indigenous cows) were newly introduced by the sample households. It was observed that the sample farmers of the four hill States introduced 398 numbers of milch cows (comprising of 81.06 p.c. cross-breed and 18.94 p.c. indigenous) after becoming co-operative members under IDDP.

The investment patterns in dairy farms are comprised of fixed and capital assets like milch animals, cattle-shed and stores, feeding equipments etc. In the 100 samples of Meghalaya the overall investment in dairy enterprise was Rs. 61,83,405.00 comprised of 6.32 p.c. on cattleshed and stores, 90.30 p.c. on milch animals, 1.98 p.c. on equipments and 1.40 p.c. on miscellaneous other items. The overall per household investment in dairy enterprise in Meghalaya sample was worked out at Rs. 61,834.05. In the 80 samples of Arunachal Pradesh the overall investment in dairy enterprise was Rs. 17,17,300.00 comprised of 20.41 p.c. on cattle shed and stores, 71.81 p.c. on milch animals, 4.93 p.c. on equipments and 2.85 p.c. on miscellaneous items. The overall investment per household in dairy enterprise in Arunachal Pradesh sample worked out at Rs. 21,466.25. In the 100 samples of Mizoram State the overall investment in dairy enterprise was Rs. 1,51,22,580.00 comprised of 10.85 p.c. on cattle shed and stores, 87.83 p.c. on milch animals, 0.86 p.c. on equipments and 0.46 p.c. on miscellaneous other items. The overall investment per household in dairy enterprise in Mizoram sample is worked out at Rs. 1,51,225.80. In the 36 samples of Sikkim State the overall investment in dairy enterprise was Rs. 5,43,605.00 comprised of 17.29 p.c. on cattle shed and stores, 77.56 p.c. on milch animals, 1.82 p.c. on equipments and 3.33 p.c. on miscellaneous items etc. The

overall investment per household in dairy enterprise in Sikkim is found out at Rs. 15,100.14.

The Study revealed that of the total cows in milk in Meghalaya, 44 numbers of indigenous cow produced 19,468 liters per annum i.e. per cow per day production is 1.80 liters. On the other hand 421 numbers of cross-breed cows produced 8,72,507 liters per annum and the per cow per day production is worked out at 7.21 liters. The sample beneficiaries of Meghalaya possessed buffaloes also and 3 numbers of she-buffaloes were in milk and produced 5,652 liters per annum and per day/per buffalo production is worked out at 5.78 liters. In Arunachal Pradesh the IDDP beneficiaries possessed 265 numbers of indigenous cow in milk and produced 1,03,377 liters i.e. per day per cow production is 1.58 liters. The sample beneficiaries possessed 73 numbers of cross-breed cow and produced 1,49,475 liters i.e. per day/cow production of milk is found at 7.13 liters. This indicates that per day yield of milk in case of cross-breed cow is higher by 351 p.c. than the indigenous cows.

The beneficiary farmers in Mizoram possessed 590 numbers of cross-breed cows in milk and produced 12,12,761 liters of milk per annum i.e. per cow per day production is found at 7.28 liters. In case of 36 beneficiary farmers in Sikkim State the sample beneficiaries possessed 37 numbers of indigenous cows in milk and produced only 39,468 liters of i.e. per cow per day production is worked out at 2.92 liters. The sample beneficiaries possessed 19 numbers of cross-breed cow in milk and produced 66,936 liters of milk per annum and the per day per cow production is worked out at 9.65 liters. This shows that per day yield of milk in case of cross-breed cow is higher by 230.48 p.c. than the indigenous cows in Sikkim.

In Meghalaya, of the total production of milk 5.62 p.c. is used for home consumption, 48.63 p.c. supplied to milk co-operative society and 45.75 p.c. marketed at private sources in the reference year. The sample dairy farmers supplied 47.97 p.c. to 52.80 p.c. of total production of milk to the dairy co-operatives society and the proportion of milk marketed at private sources varied from 42.40 p.c. to 47.16 p.c. The dairy farmers prefer to sale milk in the open market, as price in the open market is higher than the price offered by the co-operative societies, but the demand for milk in the market is very poor due to food habit of the people and also due to poverty.

In Arunachal Pradesh samples, of the total production of milk 13.24 p.c. is used for home consumption, 63.19 p.c. supplied to milk-co-operative societies and 23.57 p.c. marketed at private sources. The sample farmers supplied 47.64 p.c. to 66.52 p.c. of the total production of milk to the dairy co-operatives and the proportion of milk marketed at private sources varied from 21.39 p.c. to 27.18 p.c. In Arunachal Pradesh also price offered by the Co-operative Society is lower than the prevailing market rate. But the demand for milk in the neighbourhood of dairy farmers is poor. In Mizoram, of the total production of milk in aggregate 4.18 p.c. is used for home consumption, 75.55 p.c. is supplied to milk co-operative society and 20.27 p.c. marketed at private sources. They supplied 59.56 p.c. to 76.43 p.c. of milk to the dairy co-operatives and the proportion of milk sold in the open market varied from 19.34 p.c. to 26.55 p.c.

In Sikkim samples, of the total production of milk 19.53 p.c. is used for home consumption, 69.27 p.c. supplied to milk co-operative society and 11.20 p.c. marketed at private sources. The milk used for home consumption varied from 18.18 p.c. to 19.72 p.c. The sample farmers supplied 66.68 p.c. to 69.64 p.c. of the total production of milk to the dairy co-operatives and the proportion of milk marketed at private sources varied from 10.64 p.c. to 15.14 p.c.

It is observed from the analysis of production and utilization of milk per annum by 316 sample dairy farmers in 4 (four) hilly States that on an average, 6.29 p.c. of milk is used for home consumption, 64.23 p.c. supplied to milk co-operative society and 29.48 p.c. marketed at private sources. The milk used for home consumption varied from 1.36 p.c. to 15.50 p.c. of the total production of milk, which varied depending on the requirement of milk, size of the family and food habit. It is seen that the sample dairy farmers supplied 52.34 p.c. to 67.23 p.c. of total production of milk to the dairy co-operatives societies and the proportion of milk marketed at private sources varied from 27.28 p.c. to 46.30 p.c.

The annual expenditure on dairy farms of the sample beneficiaries in Meghalaya revealed that under the head variable costs the expenditure incurred on fodder, feed and feed concentrate is highest (53.72 p.c.) followed by expenditure on human labour (23.79) then comes the expenses on veterinary charges including animal health care, vaccination and veterinary medicine etc. 9.93 p.c.. Taking all the variable costs together it comes to 92.42 p.c. The total fixed cost is estimated at 7.58 p.c. Of the total fixed costs depreciation

on animal is found to be highest which is estimated at 5.87 p.c. followed by interests on different items of fixed capital comprising of cattle shed, storage and dairy equipment etc. at 1.71 p.c.

The annual expenditure on dairy farms of sample member beneficiary farmers of Arunachal Pradesh revealed that under the head 'variable costs' the expenditure on fodder, feed and feed concentrate is highest (50.48 p.c.) followed by expenditure on human labour (29.66 p.c.) then comes the expenses on veterinary charges including animal health care, vaccination and veterinary medicine etc. Taking all the variable costs together it comes to 91.08 p.c.. So far as fixed costs is concerned, the total fixed cost is estimated at 8.92 p.c. Of the total fixed costs depreciation on animal is found to be 5.64 p.c. followed by interests on fixed capital comprising of cattle-shed, storage and dairy equipment (4.28 p.c.) etc.

The annual expenditure on dairy farms in Mizoram, the variable costs i.e. the expenditure incurred on fodder, feed and feed concentrate is 44.60 p.c. followed by expenditure on human labour 24.67 p.c. then comes the expenses on veterinary charges including animal health care, vaccination and veterinary medicine etc. Taking all the variable costs altogether estimated expenditure was found at 82.31 p.c., and total fixed cost is estimated at 17.69 p.c.. Of the total fixed costs depreciation on animal is found to be highest i.e. 14.50 p.c. followed by interests on different items of fixed capital comprising of cattle-shed, storage and dairy equipment etc. are 3.19 p.c.

The annual expenditure on dairy farms of sample member beneficiaries farmers in Sikkim revealed that under the head of fixed costs the expenditure incurred on depreciation on animal is highest being 5.51 p.c. followed by interest on different items of fixed capital comprising of animals, cattle-shed, storage and dairy equipment etc. 4.41 p.c. It shows that under the head of variable costs the expenditure incurred on fodder and feed concentrate is 58.42 p.c. followed by expenditure on human labour 20.69 p.c. then comes the expenditure on veterinary charges 7.07 p.c. Taking all the variable costs together it is estimated at 90.08 p.c.

The overall annual expenditure on dairy farms of sample member beneficiary farmers in Meghalaya, Arunachal Pradesh, Mizoram and Sikkim revealed that under the head variable costs the expenditure incurred on fodder and feed concentrate is 48.86 p.c.

followed by expenditure on human labour 24.79 p.c. then comes the expenses on veterinary charges 8.78 p.c. Taking all the variable costs together it comes to 87.10 p.c. So far as fixed costs is concerned, the total fixed cost is estimated at 12.90 p.c. Of the total fixed costs depreciation on animal is found to be 10.21 p.c. followed by interests on different items of fixed capital comprising of cattleshed, storage feeding Pan, Bucket and other dairy equipment etc. 2.69 p.c..

Economic analysis of dairy enterprise in Meghalaya showed that of the total income of Rs. 14,404,276 about 89.97 p.c. of income is derived from production of milk and 10.03 p.c. on the estimated value of young stock in the year under Study. In Arunachal Pradesh of the total income of Rs. 4,451,342 about 91.48 p.c. income is obtained from production of milk and 8.52 p.c. on the estimated value of young stock. In Mizoram of the total income of Rs. 23,204,022 about 95.24 p.c. income is derived from production of milk and 4.76 p.c. on the estimated value of young stock. Similarly in Sikkim of the total income from dairy farms 93.94 p.c. income is derived from production of milk and 6.06 p.c. on the estimated value of young stock.

It is observed from the analysis of 4 (four) N.E. States that of the total income Rs. 42,929,470/- about 93.05 p.c. of income is derived from production of milk and 6.95 p.c. on the estimated value of young stock. The profitability of dairy enterprise by and large depends on the breeds of milch animals maintained by the dairy farmers and lactation length of cows in milk.

The breed wise analysis of cost of production of milk in Meghalaya revealed that in case of local cows the average cost of production of a liter of milk is Rs. 16.58 and for cross breed cows it was estimated at Rs. 14.04 and the overall average cost was found at Rs. 14.10. The average cost of production of a liter of milk for buffalo is Rs. 15.69. In Arunachal Pradesh sample, the breed wise analysis of cost of production of milk showed that in case of local cows the average cost of production of a liter of milk is Rs. 16.75 and for cross-breed cows it was estimated at Rs. 12.93 and the overall average was found at Rs. 14.49. In Mizoram sample the average cost of production of a liter of milk for cross-breed cows is Rs. 14.47. In case of Sikkim State, the breed wise analysis of cost of production of milk revealed that for local cows the average cost of production of a liter of milk is Rs.



11.36 and for cross-breed cows it was estimated at Rs. 4.73 and the overall average was worked out at Rs. 7.19.

It was observed that the overall breed wise analysis of cost of production of milk in the sample States showed that in case of local cows the average cost of production of a liter of milk is Rs. 15.42 and for cross-breed cows at Rs. 13.93 with an overall average of Rs. 14.03/per liter.

The estimates of BCR in Meghalaya for local cow is only 1.05:1 while for cross-breed cows it is found to be 1.14:1 and the BCR for buffaloes is worked out at 1.17:1. The overall BCR is worked out at 1.14:1. In Arunachal Pradesh the BCR for local cows is only 1.07:1 while for cross-breed cows it is found to be 1.34:1 and the overall BCR is worked out at 1.21:1. In Mizoram the BCR for cross-breed cows is found to be 1.32:1. In Sikkim the BCR for local cows is 0.94:1 while for cross-breed cows it is found at 1.41:1 and the overall BCR is worked out at 1.14:1.

The overall BCR by breeds of animals in the four sample States reveals that for local cow BCR is only 1.05:1 and for cross-breed it is found to be 1.25:1. The BCR for buffaloes is worked out at 1.17:1. The overall BCR is found to be 1.24:1. This indicates that the dairying is by and large a economically viable enterprise. The dairy farming with indigenous cows are not found so remunerative like that of cross-breed cows. Summarily one can say that under the hill agro-eco system the farmers in the study area used their wisdom to exploit the available resources substantially. The analysis of the study indicated that there is vast scope to tap the potential by improving the breed, feeding and management of livestock farming through optimum utilization of natural resources. The BCR analysis indicated that there is much potential to make the livestock farming remunerative by way of cross-breeding through Artificial Insemination and by improving the nutritional status from locally available feed and fodder resources. The dairy farming is expected to make a real break by transforming the dairying enterprise into a commercially viable proportion.

#### **Generation of Employment:**

The prime objective of IDDP is to ensure generation of employment and income and thereby improve the standard of living of the people living in the non-OF, hilly and backward areas.

So far as generation of employment in terms of mandays are concerned the dairy sector provided employment opportunity to family members from 60.41 p.c. to 93.82 p.c. mandays of the total mandays involved in all activities in Meghalaya leaving an overall average of 85.90 p.c. mandays for all farms. In Arunachal Pradesh dairy sector provided employment opportunity from 49.26 p.c. to 86.69 p.c. mandays of the total mandays involved in all activities. The overall average is found to be 69.48 p.c. mandays for all farms. In Mizoram dairy sector provided employment opportunity from 59.45 p.c. to 96.41 p.c. mandays of the total mandays of work involving all farm activities. The overall average is worked out at 84.78 p.c. mandays for all farms. In Sikkim dairy sector provided employment opportunity from 55.99 p.c. to 71.84 p.c. mandays of work leaving an overall average of 58.00 p.c. mandays for all farm activities.

From the analysis of overall generation of employment in the 4 (four) sample States, it is found that the dairy sector provided highest proportion of employment opportunity to family members which varied from 60.31 p.c. to 91.78 p.c. mandays of taking all activities together. It is also observed that most of the sample farmers of the sample States consider dairy farming as primary occupation, agriculture and other activities become secondary to them.

#### **Generation of Income :**

So far as generation of income by the sample dairy farms are concerned, in the samples of Meghalaya the proportion of income of dairy units to total family income is estimated at 88.26 p.c.. The farm size group wise share of income from dairy enterprise varied from 51.52 p.c. to 92.21 p.c.. In Arunachal Pradesh sample the proportion of income of dairy units to total family income is estimated at 74.10. The farm size group wise share of income from dairy enterprise varied from 72.20 p.c. to 81.80 p.c. In Mizoram samples, the proportion of income of dairy units to total family income varied from 63.62 p.c. to 95.44 p.c. In Sikkim the proportion of income of dairy units to total family income is found to be 51.47 p.c. The farm size group wise share of income from dairy enterprise varied from 46.57 p.c. to 64.56 p.c.

The overall farm size group wise proportion of income from dairy units to total family income is estimated at 87.99 p.c. and farm size group wise share of income from dairy enterprise varied from 51.52 p.c. to 90.69 p.c. This has clearly revealed that a large

majority of dairy farmers have taken up dairying as the primary source of employment and income. It is also very clear that possession of quality milch animal is one of the criteria of making the dairy enterprise economically viable.

With a view to assessing the impact of IDDP on Non-beneficiary, 50 cooperative members but not the beneficiary of IDDP were selected randomly from 3 (three) sample States Meghalaya, Arunachal Pradesh and Mizoram for comparative analysis. Due to non-availability of data on member's non-beneficiary of IDDP in Sikkim State, the consolidation work in this regard could not be done. In Meghalaya 15 member non-beneficiary farmers possessed 49 milch cows, 20 member non-beneficiary farmers of Arunachal Pradesh possessed 105 milch cows, 15 member non-beneficiary farmers of Mizoram possessed 86 milch cows. Altogether 50 member non-beneficiary farmers in the sample possessed 240 numbers of milch cows.

Breed wise milk production in the dairy units of member non-beneficiary farmers revealed that indigenous cows in Meghalaya sample produced 4,334 liters while the cross-breed cows produced 27,388 liters. The average per day per cow milk production in case of indigenous cow is 1.17 liters and for cross-breed cows 5.35 liters. In Arunachal Pradesh the annual milk production of indigenous cow is 13,870 liters while the cross-breed cows produced 18,282 liters. The average per day per cow milk production in case of indigenous cow is 1.20 liters and for cross-breed cows at 5.33 liters. In Mizoram State the annual milk production of indigenous cow is 2,148 liters while the cross-breed cows produced 71,453 liters. The average per day per cow milk production in case of indigenous cows at 1.26 liters and for cross-breed cows at 5.42 liters. Altogether 69 numbers of indigenous cows in milk of the sample produced 20,352 liters of milk while 76 numbers of cross-breed cows produced 1,17,123 liters of milk.

The sample member non-beneficiary households of Meghalaya produced 31,722 liters of milk in their dairy units of which 20.36 p.c. of milk used for home consumption and 79.64 p.c. marketed. In Arunachal Pradesh the sample member non-beneficiary households produced 32,152 liters of milk in their dairy units of which 26.56 p.c. is used for home consumption and 73.44 p.c. are marketed. In Mizoram the sample member non-beneficiary household produced 73,601 liters of milk in their dairy units of which 9.75 p.c. is used for home consumption, 61.40 p.c. supplied to milk society and

28.85 p.c. marketed at private sources. It may be stated that the member non-beneficiary of Mizoram had to sale milk in the milk booth of Co-operative Society at lower price due to inadequate demand for milk at Private Sources. Altogether 50 member non-beneficiary households produced 1,37,475 liters of milk in their dairy units of which 16.14 p.c. is used for home consumption, 32.87 p.c. supplied to milk society and 50.99 p.c. marketed at private sources.

The annual expenditure on dairy farms incurred by the sample member non-beneficiary farmers of IDDP in Meghalaya shows that taking both milch cows and young stock together, expenditure on variable costs is worked out at 90.08 p.c.. The feed cost is found to be highest being 44.02 p.c. of total variable cost. The cattle feed and feed concentrates comprised of 22.03 p.c., dry fodder 12.11 p.c. and green fodder 9.87 p.c.. The overall expenditure on human labour is estimated at 34.36 p.c. followed by veterinary expenses 6.74 p.c.. Other costs and charges are nominal. So far as fixed costs are concerned depreciation on animals are found to be 6.55 p.c. followed by interest on capital 3.31 p.c., depreciation on cattle shed and storage 1.32 p.c.

In Arunachal Pradesh taking both milch cows and young stock together, expenditure on variable costs is worked out at 90.14 p.c.. The feed cost is found to be highest being 50.08 p.c. of total variable cost. The cattle feed and feed concentrates comprised of 20.75 p.c., green fodder 13.15 p.c. and dry fodder 16.17 p.c. The overall expenditure on human labour is estimated at 28.83 p.c. followed by veterinary expenses 6.07 p.c. and other costs and charges are nominal. So far as fixed costs are concerned depreciation on animals are found to be 6.78 p.c. followed by interest on capital 3.16 p.c., depreciation on cattle shed and storage 1.38 p.c.

In Mizoram, taking both milch cows and young stock together, expenditure on variable costs is worked out at 79.81 p.c.. The feed cost is found to be highest being 40.44 p.c. The cattle feed and feed concentrates comprised of 23.26 p.c., green fodder 7.63 p.c. and dry fodder 9.56 p.c. The overall expenditure on human labour is estimated at 27.32 p.c. followed by veterinary expenses 7.17 p.c. and other costs and charges are nominal. So far as fixed costs are concerned depreciation on animals are found to be 15.48 p.c. followed by interest on capital cost at 3.68 p.c.

The overall annual expenditure on dairy farms incurred by the sample member non-beneficiary farmers of IDDP in Meghalaya, Arunachal Pradesh and Mizoram shows that taking both milch cattle and young stock together overall expenditure on variable costs is worked out at 84.62 p.c. The fodder cost is found to be highest being 43.53 p.c. of total variable cost. The overall expenditure on human labour is estimated at 29.31 p.c. followed by veterinary expenses 6.81 p.c. and other costs and charges are nominal. So far as fixed costs are concerned depreciation on animals are found to be 11.36 p.c. followed by interest on capital cost at 3.47 p.c.

In Meghalaya the BCR for the indigenous milch cows is found at 1.04:1 and in case of cross-breed cows the BCR is found at 1.15:1. The overall BCR is worked out at 1.14:1 taking into account both the breeds of milch cows. In Arunachal Pradesh the BCR for the indigenous milch cows is found at 1.07:1 and for cross-breed cows at 1.18:1. The overall BCR is worked out at 1.13:1 for both the breeds of milch cows. In Mizoram the BCR for the indigenous milch cows is found at 1.10:1 and in case of cross-breed cows the BCR is found at 1.23:1. The overall BCR is worked out at 1.22:1 for both the breeds of milch cattle. The overall estimated BCR for the sample States are worked out. The BCR for the indigenous milch cows is found at 1.07:1 and for cross-breed cows at 1.20:1. The overall BCR is worked out at 1.18 for both the breeds of milch cattle.

Altogether 46 non-member of co-operative society and non-beneficiary of IDDP but owner of milch animals were selected and interviewed by case study method. It was found that majority of the non-member non-beneficiary sample families possessed both indigenous and cross-breed cows reared mostly to meet the domestic requirement of milk, only the surpluses are marketed.

In Meghalaya 10 non-member non-beneficiary farmers possessed 20 milch cattle of which 13 (65.00 p.c.) are in milk. The total milk production per annum is found at 3576 liters and is valued at Rs. 63,328/- as per market rate. In Arunachal Pradesh 20 non-member non-beneficiary farmers possessed 57 milch cows of which 33 (57.89 p.c.) are in milk. The total milk production per annum is found at 11,357 liters and is valued at Rs. 2,04,426/- as per prevailing market rate. In Mizoram 10 non-member non-beneficiary farmers possessed 25 milch cattle of which 15 (60.00 p.c.) are in milk. The total milk production per annum is worked out at 19,691 liters and valued at Rs. 3,93,820/-. Similarly

in Sikkim also 6 non-member non-beneficiary farmers possessed 19 milch cows of which 11 (64.71 p.c.) are in milk. The total milk production per annum is found at 13,505 liters and the value of milk is found at Rs. 1,26,410/-. Altogether 46 non-member non-beneficiary farmers in the four sample hill States possessed 119 milch cows of which 72 (60.50 p.c.) are in milk. The total production of milk per annum is found at 48,129 liters which is valued at Rs. 7,87,984/-.

In Meghalaya out of the total production of milk 93.76 p.c. are consumed at home and 6.24 p.c. marketed. In Arunachal Pradesh out of the total milk production 55.45 p.c. are consumed at home and 44.55 p.c. marketed. In Mizoram out of the total production of milk 32.43 p.c. consumed at home and 67.57 p.c. marketed. In Sikkim out of the total production of milk 43.24 p.c. consumed at home and 56.76 p.c. marketed.

So far as the annual expenditure on dairy enterprise is concerned in Meghalaya 87.63 p.c. are on variable cost of which feed costs accounted 42.82 p.c.. The total fixed costs is worked out at 12.37 p.c. including depreciation on animals, cattle sheds, storage and equipment and interest on capital etc.

In Arunachal Pradesh of the total annual expenditure on dairy enterprise 88.53 p.c. are variable cost of which feed costs accounted 46.45 p.c.. The total fixed costs is worked out at 11.47 p.c. including depreciation on animals, cattle sheds, storage and equipment and interest on capital etc.

In Mizoram of the total annual expenditure 79.45 p.c. are variable cost of which feed costs accounted 41.67 p.c.. The total fixed costs is worked out at 20.55 p.c. including depreciation on animals, cattle sheds, storage and equipment and interest on capital etc.

Of the total annual expenditure on dairy units of non-member non-beneficiary farmers in Sikkim 88.76 p.c. are on variable cost of which feed cost accounted 54.46 p.c. followed by expenditure on human labour 22.81 p.c.. The total fixed costs is estimated 11.24 p.c. including depreciation on animals, cattle sheds, storage and interest on capital etc.

The overall annual expenditure on dairy farms of sample non-member non-beneficiary farmers in Meghalaya, Arunachal Pradesh, Mizoram and Sikkim are worked out. Of the total annual expenditure on dairy enterprise 84.44 p.c. are on variable cost of which feed costs accounted 45.41 p.c.. The total fixed costs is worked out at 15.56

including depreciation on animals, cattle sheds, storage and equipment and interest on capital. The analysis showed that the per unit costs of maintenance of indigenous cows possessed by the IDDP beneficiaries, member non-beneficiaries and non-members non-beneficiaries per annum do not have much variations.

The estimated Benefit Cost Ratios (BCR) for non-member non-beneficiary farmers in the sample States are worked out. In Meghalaya BCR for local cow is only 1.03:1. In Arunachal Pradesh the BCR for local cow is 1.06:1 while for cross-breed cows it is found to be 1.13:1 and the overall BCR is worked out at 1.08:1. In Mizoram the BCR for local cow is only 1.10:1 while for cross-breed cows it is found to be 1.22:1 and the overall BCR is worked out at 1.21:1. Similarly in Sikkim also the BCR for local cow is only 0.78:1 while for cross-breed cows it is found to be 1.18:1 and the overall BCR is worked out at 1.00. The overall BCR in the (4) four sample States are also worked out for local cow is only 1.00:1 while for cross-breed cows it is found to be 1.20:1 and the overall BCR is found at 1.12:1.

The analysis sufficiently established that dairy farming provide ample employment opportunity and income to the farmers living in the remote hilly and backward areas. As compared to other economic activities dairy farming is more employment and income generating and it helped to maintain a standard of living.

#### **Constraints and Strategies for Dairy Development in Hilly and Backward Areas :**

The remarkable improvement of livestock sector in India has been due to launching of cross-breeding programme which resulted higher milk production for milch animal. But, there is apprehension regarding susceptibility of the cross-breed stock reared under traditional system of management and under humid climatic condition. However, at present cross-breed cows are doing exceedingly well with higher milk production than the indigenous cows. The N.E. region being a hilly area most of the farmers practice shifting cultivation and in turn it affects the supply of feed and fodder to livestock due to indiscriminate destruction of natural vegetations and grass land available in the wild. Due to scarcity of green fodder and balanced feed the farmers are unable to take up large Scale dairy enterprise on commercial lines to increase production of milk.

The other identified **major constraints** hindering the development of animal husbandry and dairy sector in the study area are :

- Lack of specific State Policy on animal breeding and livestock development in context of dairy farming in the state plan with proper perspective is considered to be a major hindrance in the States under the Study.
- Technology intervention on Artificial Insemination has not been fully put into gear in all the areas of the States under the Study. What has been done at the co-operative member beneficiaries levels are almost exclusively from the Central Sector Scheme IDDP.
- The cross-breed cattle usually give good yield in the first generation, the yield potential of milk apprehended to be diminishes in the subsequent generation unless a new stock is crossed with pure breed i.e. with F<sub>1</sub>S.
- Shortage of green fodder and feed concentrate is one of the root cause of poor performance of dairy sector in general as the genetic milk production potential of cross breed animals could not be exploited fully in absence of proper nutrition.
- Stall feeding of animals is not an acceptable. Proposition for the people living in the hill areas due to non-availability of animal feed and green fodder within easy reach. There is no provision for development of fodder cultivation under the IDDP.
- Lack of perception of the farmers to the research focus on animal husbandry and poor linkages between the veterinary research, extension and planning. Moreover, the poor linkages between the concerned State government department and the research focus in the field of veterinary and dairy created a void in the research focus and planning.
- Non-availability of compound feed manufacturer in the sample States covered by the study is one of the major snags for which feed concentrates and balanced feed are not available within easy reach of the dairy farmers.
- Due to lack of proper extension support, lack of marketing facilities there is also poor perception of the farmers towards commercial dairy enterprise as a viable alternative to other occupation in the hill areas.
- Due to inadequate demand for milk and milk products in the neighbourhood of co-operative dairy farms in the study area and States under the Study, the beneficiary farmers had to sale the milk in the milk booth of the society at a lower rate than the



market prices. Lack of access to urban markets for remunerative prices of milk and milk products are the major constraints affecting the development of dairy farming in the hilly areas.

- Payment for supply of milk to the society is not only lower also irregular in payment which caused great concern to the members of the Society and to the member-non-beneficiaries who supplied milk in the 'Milk Booth' of the society.
- Lack of surveillance and monitoring of infectious and contagious diseases and inadequate facility of Artificial Insemination and pregnancy diagnosis at the farmers doorstep is another major handicap reported by the sample dairy farmers.
- Unorganised and fragmented market for all livestock products and milk in particular involved a chain of middlemen who reap the actual benefit depriving the producers from their due share.
- Small holding of farm size limiting the cultivation of fodder. The available culturable land is put under crop cultivation for human consumption and not allocated any part to grow fodder crop for dairy animals.

**Suggestions:**

During the field study, observations and discussions with the beneficiaries, member, non-beneficiaries, opinion of the non-member non-beneficiaries the following suggestions are offered for the improvement of dairy farming in non-OF, hilly and backward areas especially in North-Eastern region.

- The concerned State Government should prioritized the strategies of dairy development in the State Plan to make a real breakthrough in the dairy sector (**Attention : Planning and Development Department and Animal Husbandry & Veterinary Department of concerned States**).
- There is need to evolve a comprehensive dairy development policy in the concerned North-Eastern States through the genetic improvement of indigenous milch animals through cross breeding with superior germ plasm and subsequent inter-se crossing with FIS for better result (**Attention : State Animal Husbandry & Veterinary Department of concerned State Govts.**).
- The State govt. agencies dealing with dairy sector and the IDDP must work together in order to work out a feasible arrangement to provide green and dry fodder in adequate

quantities and at a reasonable rate to the dairy farmers (**Attention : State Animal Husbandry & Veterinary Department of concerned States of N.E. regions**).

- In order to overcome the fodder deficit the Animal Husbandry and Veterinary Department of the concerned States should take up the programme for enhancement of fodder production and preservation of green fodder by increase in the area under fodder crop for the milch cattle (**Attention : State Animal Husbandry & Veterinary Department in collaboration with State Agriculture Department**).
- There is necessity to expand the net work of the village level milk co-operatives to all the potential villages falling under the jurisdiction of the IDDP; infact, it should be extended to other potential areas in the region (**Attention : Co-operative Societies of State Veterinary Department and IDDP**).
- There is need to educate and assist the milk producers in respect of breeding, feeding, animal management technique and marketing of milk and milk products in a cost effective manner (**Attention: The Extension Wing of the State Veterinary & Animal Husbandry Department of concerned States**).
- The village level dairy co-operative society should revise the milk procurement price at par with the prevailing market rate as it is linked with the cost variation and due importance should be given to pay the prices of milk on the spot (**Attention : Co-operative Societies of the respective States of N.E. region**).
- Some infrastructural development like road communication and transport is needed for transportation of fodder, feed concentrates, veterinary medicines and transportation of milk to the consuming Centres round the year (**Attention: State P.W.D. and the DRDA of the respective State Govts.**).
- With the improvement of livestock through cross-breeding the susceptibility of the livestock to various diseases may increase. In order to reduce the mortality of livestock efforts should be made to control the animal diseases though health care and disease control measures. It requires timely prophylactic measures and emergency services for treatment of livestock (**Attention: State Animal Husbandry & Veterinary Department of the respective States of N.E. region**).

- Intensive epidemiological studies of diseases, particularly infectious diseases should be undertaken to control and eradication (**Attention: State Animal Husbandry & Veterinary Department of the respective State Govt. of the N.E. States**).
- The concerned State Governments should encourage establishment of compound feed milk at Private Sector for exploiting the non-conventional feed resources in the State, which would be beneficial for the dairy farmers (**Attention: Concerned State Govt. Department of N.E. States**).
- Utilization of straw of cereals and other food crops with proper treatment can bridge the requirement of feed for the dairy animals (**Attention: State Animal Husbandry & Veterinary Department of the respective State Govts.**).
- Suitable plan and Strategies for cultivation of green fodder in the follow land should be evolved to meet the crisis of green fodder (**Attention : State Animal Husbandry & Veterinary Department to take up in collaboration with revenue Department of the State**).
- Facility for Artificial Insemination and Pregnancy test at the doorstep of the dairy farmers needs to be facilitated (**Attention: State Animal Husbandry & Veterinary Department of respective N.E. States**).
- There is necessity of establishment of organised networks of market so that the dairy farmers get due share for their produce (**Attention: Concerned State Animal Husbandry & Veterinary Department of the respective State Govt. of N.E. States**).

#### **Conclusions :**

The analysis in the study clearly highlighted that livestock rearing in the hilly and backward region depends upon the natural resource endowments such as grazing land, forest, pastures and other uncultivated land. In a nut shell to develop milch bovine resources into income generating enterprise, the productivity of milch cattle by adopting appropriate breeding policies along with supply of balance feed and feed-concentrates to facilitate development of livestock sector. It may be stated that the key to better livestock production is the availability of quality animals, quality feed and fodder and effective disease control measures along with development of marketing facilities. Major expenditure involved in dairy farming is on feed, fodder and feed concentrates followed by

on human labour. For improvement of milk production the innovative technique has to be adopted by the dairy farmers. The commercial production of milk can be increased only if the dairy farmers get a price which will cover the cost of production of milk and some margin that too in a cost effective manner. The adoption of proper system of milk marketing at remunerative prices is one of the key factors to increase the production of milk.

The findings of the study sufficiently established that the composition of livestock population with adequate number of crossbreed animals can boost up milk production. Keeping in view the hill agro-ecosystem the farmers in the study area found to have using their wisdom to exploit the resource substantially in a sustainable manner. After the introduction of IDDP and adoption of co-operative system of dairy farming for distribution of inputs and marketing of milk through co-operative milk booths opened up a new vistas of milk marketing and processing in the back ward hilly areas. The sustainable development of dairy farming in the hill areas through optimum utilization of natural resources followed by health-care of livestock, improvement of breeding through Artificial Insemination, timely vaccination can go a long way in the field of animal husbandry in general and dairy development in particular.

The economic analysis of cross-breed cows established that the income over the annual recurring expenditure are much higher than the indigenous cows. This has sufficiently established that the cross breeding programme through Artificial Insemination have been able to make a real break-through in genetic improvement of breedable milch animal for improvement of milk production and productivity per animal. The dairy enterprises in the Study area have been able to improve the economic condition and standard of living of the beneficiaries of IDDP and member non-beneficiaries. The dairy farming in the hill areas can be instrumental for generation of employment, income and in changing the life style of the hill people provided the support services are made available by the respective State Governments, Animal Husbandry and Veterinary Department.

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