

INTEGRATED FODDER AND LIVESTOCK DEVELOPMENT IN UTTARAKHAND: NGO'S INITIATIVES

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ABSTRACT

For years, it has been widely assumed that Non-Governmental Organisations (NGOs) put significant and positive effects on the economy of poor households in developing nations. The Integrated Fodder & Livestock Development Project (IFLDP) implemented through an NGO named Central Himalayan Rural Action Group (CHIRAG) was selected for the study. The project's prime mandate was livestock and fodder development which had been implemented in a phased manner since 2008 and completed in March 2014. This paper examines the impact of this intervention in terms of animal husbandry practices, production and income in a cluster of villages in Uttarakhand State. For the study, a list of all beneficiaries of the NGO was prepared and a sampling frame with all the beneficiaries of the project in each of the three clusters was drawn. Finally 40 beneficiaries were chosen from each of the clusters by simple random sampling, thereby making a total of 120 respondents. The analysis depicted that the technological empowerment through IFLDP was maximum in case of artificial insemination and fodder preservation practices. Green and dry fodder was also found to be increasing in the villages by the initiatives of the project.

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Introduction

Animals are not only current sources of income but also serve as assets for the future. With such an important role to play in the farmers' lives, any positive development in the livestock sector has an impact on the livelihood of these farmers directly. From a national perspective, India has large section of its population living below the poverty line, of which approximately 150 million are livestock keepers (Thornton et al., 2002). The current annual demand for meat in developing countries is 184 million tonnes whereas it is 323 million tonnes for milk (Steinfeld et al., 2006). Such increase in demand potentially presents significant opportunities for poor livestock producers to increase incomes and build assets to improve their livelihoods. India faces a net deficit of 63.5 per cent for green fodder, 23.56 per cent for dry crop residue and 64 per cent for feeds. As per estimates, the deficit of dry fodder and green fodder currently is 10 and 35 per cent, respectively, which by 2020 is likely to be 11 per cent and 45 per cent (Government of India Working Group Report-12th Five Year Plan).

During recent years, the concept of farmer empowerment has been put on the agenda and is now an integral part of many development organisations and NGOs' policies for supporting agriculture and rural development (Danida, 2004). These NGOs often have a relative advantage over government agencies for reaching the very poor, providing low-cost services, building grassroots organisations and adopting or taking up innovative programmes to meet local needs (Brown & Tandon, 2002). In general, the approach of NGOs towards empowerment of livestock farmers can be simplified as being three-pronged viz., targeting

livestock, livelihoods and capacity building.

Uttarakhand is primarily an agricultural State upon which the fortunes of 75-85 per cent population depends and contributes 22.4 per cent (Agriculture Statistics at a Glance, 2007-SGDP). The average landholding in the State is a meagre 0.68 ha and thus there are limited opportunities in crop production. On the other hand, livestock wealth is more equitably distributed compared to land and the expanding demand for animal food products generates significant opportunities for the poor to escape from poverty through diversifying and intensifying livestock production. Due to geographical and infrastructural inequality between plain and hilly areas, development is also not at par. In hilly areas farming and animal husbandry are the main economic activities. These areas also engage in dairy and poultry farming to diversify the sources of earnings of livestock farmers. Moreover, feed and fodder deficit is a major constraint for livestock farmers. According to an estimate, there is a deficiency of about 33.83 per cent in case of green fodder and about 17.48 per cent in case of dry fodder. The main reasons for this shortage are marginal and fragmented agricultural landholdings and shrinkage of pasture lands and forest cover. A number of local and national NGOs are working in the State either individually or in collaboration with the State department or other organisations. Of that, an NGO named Central Himalayan Rural Action Group (CHIRAG) was chosen based on their programme (Livestock) and willingness to cooperate during investigation with an objective to study its impact in terms of empowerment of livestock farmers regarding adoption of scientific animal husbandry practices, production and their income in a cluster of villages in Uttarakhand State.

Methodology

The IFLDP was initiated in the year 2008 by a philanthropic organisation 'Himmothan' in collaboration with different organisations. It was launched in two phases (Phase I: 2008 – 2011 and Phase II: 2011- 2014) by CHIRAG with the goal to promote rural livelihoods and enhance incomes through an environmentally sustainable and farmer-friendly integrated livestock management system. During the implementation of the project CHIRAG worked in 3 clusters of 35 villages (18 villages in Phase I and 17 villages in Phase II) in Almora and Bageshwar districts of Uttarakhand and was considered for the present study.

A list of all beneficiaries from all the three clusters of villages under the IFLDP was prepared and considered as sampling frame. Finally, 40 beneficiaries were chosen from each of the clusters by simple random sampling technique,

thereby making a total of 120 respondents as sample size. To achieve the set objectives, required data were then collected through different sources using diverse strategies. Firstly, information on the project was gathered by engaging in discussions with the coordinators and staff, supported by reports. For better insights into the project activities, interventions and related information, participant observation method was followed. Secondly, data from the selected beneficiaries were collected through a pre-tested semi-structured interview schedule containing different variables. Further, for assessing the impact of IFLDP, respondents were enquired on different parameters / variables under study with information on present and year preceding implementation of the project on recall basis. The data so generated for the preceding year was considered as BEFORE (also referred as baseline) and the present data was considered as AFTER project situation.

Table 1: Variables and Measurement

Variables	Measurement
Technological empowerment through IFLDP	Change in the adoption of scientific animal husbandry and fodder production and preservation practices over the project period through adoption index $\text{Adoption Index} = \frac{\text{Score obtained by Respondent}}{\text{Total possible score}}$
Change in domestic assets	Change in the number of mobile phones, television and vehicles owned
Change in fodder availability	Change in fodder source utilisation, availability of dry and green fodder and time saved in fodder collection
Production and productivity of livestock	Total production and productivity of milch animals owned by respondents
Economic empowerment through IFLDP	Change in income from milk and expenses on fodder and change in land, livestock herd size, number of improved animals over the project period

Variables considered for impact analysis were conceptualised and measured in terms of changes in adoption of scientific animal husbandry practices, changes in assets, sources and availability of fodder, animal production / productivity and level of earnings from animal sources.

Results and Discussion

Technological Empowerment through IFLDP: To assess the impact of the project in terms of technological empowerment of respondents, adoption of selected scientific animal husbandry practices, fodder cultivation and its preservation practices, before implementation and after completion of the project was compared. It is evident from Table 1 that there had been a tremendous increase (93.02 per cent) in the adoption of artificial insemination in the area over the period under study. It may be noted that adoption of deworming and vaccination had gone up by 68.57 and 60 per cent, respectively, while adoption of feeding practices had increased by 40.63 per cent. Table 1 further revealed comparatively less changes in respect of fodder cultivation and preservation practices as compared to other practices. However, significant difference between before and after project was observed in all the practices under this category except use of manure and fertilisers indicating the good impact created by the project. The higher degree (93.02 per cent) of adoption of artificial insemination (AI) in the project villages was reported compared to findings of Letha (2013) who reported 22.73 per cent of AI

adoption. The present results could be achieved due to easy and hassle-free service delivery at doorstep, adequate measures to maximise the conception rate of artificial insemination, enhanced knowledge of farmers, etc., which were found to be major constraints in AI adoption (Butswat & Choji, 1995). Similarly, regular and doorstep delivery of vaccination and deworming services by the government and NGO can be considered for the change. Further, the disease incidences and productivity losses thereof also act as push factors for such higher level of adoption. NGO and dairy cooperatives have also played a pivotal role in this regard by supplying ready to feed concentrate mixture at reasonable prices to the farmers associated with the programme. Besides, the manure application was the most commonly and widely followed practice while the use of fertilisers was very restricted and applied only to vegetable production, if ever used, as observed during data collection and interaction with the respondents.

Change in Domestic Assets: Table 2 depicts the absolute change in possession of domestic assets by respondents before implementation and after completion of the project that was assessed on recall basis. It was found that possession of mobile phones among the respondents had increased from 65 to 94.17 per cent after completion of the project. Further, about 82.5 per cent of the respondents had television after completion of the project against 60.83 per cent of the respondents before implementation of the project as revealed from Table 2.

Table 2: Change in Domestic Assets

S. No.	Category	Number (N=120)	
		Before project	After project
1.	Television	73 (60.83)	99 (82.50)
2.	Mobile	78 (65.00)	113 (94.17)

Note: Figures in parentheses indicate percentages.

Change in Sources of Fodder: The changing trend in fodder source utilisation by the respondents is depicted in Table 3. It may well be noted that while 60.8 per cent of the respondents collected fodder from forest and their own land before implementation of the project, only 10.83 per cent did so after completion of the project. About 30.8 per cent respondents were dependent solely on forest for fodder before implementation of the project, while post completion none of the respondents were dependent on forest for fodder. Production of fodder on own land has led to this shift in fodder source utilisation. Fodder was obtained from own land by 18.83 per cent of the

respondents at the time of data collection and a majority (52.5 per cent) collected fodder from both common (van panchayat) land as well as own land. Before implementation of the project none of the respondents were found to collect fodder either solely from their own land or from both own and common land. Only 3.33 per cent of the respondents were collecting fodder from both forest and common land after completion of the project while none of the respondents were found to utilise these two sources before project implementation. Fodder collection from all the three sources (forest, own and common land) increased to 15 from 8.3 per cent after completion of the project.

Table 3: Distribution of Respondents According to Fodder Source Utilisation

S. No.	Fodder Source	Before Project		After Project	
		N	%	N	%
1.	Forest	37	30.80	-	-
2.	Own land	-	-	22	18.33
3.	Forest + Own land	73	60.80	13	10.83
4.	Forest + Common land	-	-	4	3.33
5.	Own + Common land	-	-	63	52.5
6.	All (Forest + Own+ Common land)	10	08.30	18	15.00

Table 4: Overall Mean Values for Fodder Availability Among Respondents

S. No.	Category	Mean		t
		Before project	After project	
1.	Average amount of green fodder fed to their animals/ per day (in kg)	18.36	21.86	11.62**
2.	Average amount of dry fodder fed to their animals/per day (in kg)	19.74	24.46	14.81**
3.	Average time taken for collection of fodder required per day feeding (in hours)	2.85	1.71	12.99**

* Significance at 5 per cent level ($p < 0.05$), ** Significance at 1 per cent level ($p < 0.01$)

Table 5: Distribution of Respondents According to Change in Fodder Availability & Time Taken for Fodder Collection

S. No.	Category	N=120			
		No changes		Changes	
		No.	%	No.	%
1.	Average amount of green fodder fed to their animals/ per day	41	34.17	79	65.83
2.	Average amount of dry fodder fed to their animals/ per day	27	22.50	93	77.50
3.	Average time taken for collection of fodder required per day feeding	18	15.00	102	85.00

Change in Availability of Green and Dry Fodder and Time Saved in Fodder Collection: Table 4 depicts the mean values for the average amount of green and dry fodder fed to an animal per day and the amount of time saved in collection of fodder required per day. The average amount of green fodder fed to their animals per day at the time of data collection was found to increase to 21.86 kg after completion of the project from 18.36 kg before implementation of the project. Similarly, average amount of dry fodder fed to their animals per day was also found to increase from 19.74 kg to 24.46 kg over the project period. In contrast, the average time spent in daily fodder collection was found to have reduced to 1.71 hours from 2.85 hours after completion of the project. The respondents who perceived changes in the availability of green fodder

comprised 65.83 per cent of the total while 77.5 per cent opined changes in dry fodder availability over the project period. About 85 per cent of the respondents reported that the amount of time they spend daily on fodder collection had reduced since the project implementation. The magnitude of change in the respective categories, however, was found to vary. Table 6 reveals the rate of increase in the amount of green fodder fed to their animals per day. Majority of the respondents (69.6 per cent) reported an increase of less than 25 per cent in the availability of green fodder followed by 15.2 per cent of respondents who perceived the increase between 25 to 50 per cent. Among 10.1 per cent of the respondents, availability increased by 51 to 75 per cent while for 5.1 per cent it was found to increase by more than 75 per cent.

Table 6: Distribution of Respondents According to the Rate of Increase in the Quantity of Green Fodder Fed to An Animal Per Day

S. No.	Percentage Change	Number (N=79)	%
1.	< 25%	55	69.6
2.	25 % - 50%	12	15.2
3.	51% - 75%	8	10.1
4.	> 75%	4	5.1

Similarly, Table 6 depicts the increase in availability of dry fodder over the project period. Majority of the respondents (76.34 per cent) reported an increase ranging between 25 to 50 per cent in the availability, while 11.83 per cent

perceived an increase of less than 25 per cent. For 10.75 per cent of the respondents, the increase varied between 51 to 75 per cent, while only 1.08 per cent of the respondents reported an increase of more than 75 per cent in the availability of dry fodder.

Table 7: Distribution of Respondents According to the Rate of Increase in the Quantity of Dry Fodder Fed to an Animal Per Day

S. No.	Percentage Change	Number (N=93)	%
1.	< 25%	11	11.83
2.	25 % - 50%	71	76.34
3.	51% - 75%	10	10.75
4.	> 75%	1	1.08

Table 8: Distribution of Respondents According to the Amount of Time Saved in Collecting Fodder Required Per Day Feeding

S. No.	Amount of Time Saved (in hours)	Number (N=102)	%
1.	< 1	12	11.76
2.	1 - 3	87	85.29
3.	> 3	3	2.94

Table 8 presents the distribution of respondents according to the amount of time they saved in fodder collection due to the project. Majority of the respondents (85.29 per cent) were found to save about 1 to 3 hours daily after the project was implemented, while 11.76 per cent reported that they saved up to 1 hour daily in fodder collection. About 2.94 per cent of the respondents were found to save more than 3 hours in fodder collection after implementation of the project. Production of grass on own and nearby land decreased the dependency on forest for fodder which further led to spending lesser time in fodder collection than before.

The results revealed remarkable change in the source of fodder either from own land or

combination of forest, own and common lands. Also community protection of forest has led to decrease in the land based feed resources for livestock and compelled the farmers to produce fodder on their own lands. This also resulted in increased amount of green and dry fodder fed to their animals per day with less effort and time. The average time spent before the implementation of the project was 2.85 hours per day as per the findings of Panday (2007), who reported the average amount of time spent for fodder collection daily to be 3.42 hours has reduced to half (1.7 hours per day). He further reported that during summer and rainy season, the time spent was almost twice as compared to winter season due to less quantum of availability of fodder in the winter season in Uttarakhand.

Changes in Production and Productivity of Livestock:

The impact of the project on the production and productivity of the animals has been studied by observing the changes in various parameters viz., total milk production, average daily milk production per animal, average lactation period, calving interval and age at first calving across the project period. It is evident from Table 9 that the total household milk production has increased by 15.61 per cent since the initiation of the project. After project completion, an increase of 28.81 and 3.11 per cent was found in

the average daily milk yield per animal and average lactation period, respectively. Negligible change (0.24 per cent) was reported in calving interval and about 0.94 per cent change was found in the age at first calving. A period of five years is too less to significantly bring about noticeable changes in the calving interval and age at first calving due to the fact that cattle and buffalos have a long generation interval. The t-test value indicates a significant difference between mean values for all the categories, proving a good impact achieved on selected aspects.

Table 9: Change in Production and Productivity of Animals

S. No.	Category	Mean		Percentage Increase/Decrease	t
		Before	After		
1.	Total household milk production/day (in litres)	4.74	5.48	15.61(!)	2.86**
2.	Average daily milk yield per animal/day (in litres)	2.43	3.13	28.81(!)	7.20**
3.	Average Lactation period (in months)	11.57	11.93	3.11(!)	2.26*
4.	Calving interval (in months)	20.70	20.75	0.24(!)	0.33
5.	Age at first calving (in months)	47.82	47.37	0.94(!)	2.27*

*Significance at 5 per cent level ($p < 0.05$), ** Significance at 1 per cent level ($p < 0.01$)

Economic Empowerment of Respondents through IFLDP : For assessing the economic empowerment of livestock farmers through IFLDP, the changes in the income obtained from milk, average expenses on fodder, livestock herd size, number of improved animals and cultivated

area over the project period were studied. Table 10 reveals the change in monthly income from sale of milk from ₹ 1240.67 to ₹ 2145.21 at the completion of the project. Thus, an increase of 72.9 per cent can be noted.

Table 10: Economic Empowerment of Respondents through IFLDP

S. No.	Economic Empowerment Components	Mean Index Values		Percentage Increase / Decrease	t-test value
		Before Project	After Project		
1.	Income from sale of milk per month (in ₹)	1240.67	2145.21	72.9(!)	7.12**
2.	Average expenditure on fodder per year (in ₹)	728.33	3740.58	413.58(!)	9.33**
3.	Herd size (in number)	6.33	5.52	12.80(!)	1.56*
4.	Number of improved animals	0.48	0.76	58.33(!)	3.99**
5.	Area used for crop production (in ha)	0.36	0.35	2.78(!)	1.394*
6.	Area used for fodder grass production (in ha)	0.008	0.014	75(!)	6.593**

* Significance at 5 per cent level ($p < 0.05$), ** Significance at 1 per cent level ($p < 0.01$)

The drastic increase in the annual cost of fodder by 413.58 per cent over the project period is well depicted in Table 10. Livestock census 2007 reported a total of 43.13 per cent fodder deficit in the State while Nainital district alone was reported to face 50.72 per cent of fodder deficit which had since then been continuously increasing. It has been estimated that due to faulty system of feeding of dry fodder to the livestock (without chopping and without trough or mangers), about 40 per cent of the dry fodder goes waste with urine, dung and trampling with animal hooves (ULDB report, 2007). Besides, the production and availability of green fodder is not uniform throughout the year due to shortage of irrigation facilities in hilly areas. Green fodder is available only for 4 months (monsoon), for remaining eight months (winter and summer) green fodder is not available. This has led to purchase of large amount of dry fodder round

the year by the farmers for fulfilling the requirements and thus increased the expenses on fodder manifold. It was also found that the herd size had decreased by 12.8 per cent over the project period while the number of improved animals increased by 58.33 per cent. The decline in the herd size and increase in number of improved animals may be regarded as a positive development as far as livestock management is concerned. The area under crop production (wheat, oat, maize) decreased by 2.78 per cent while area used for fodder grass production increased by 75 per cent. The overall economic status of the farmers has changed due to implementation of the programme which can be seen from the difference between pre and post-project implementation situations.

Enhancement of economic empowerment in terms of income was due to both increase in production as well as change in prices

of milk over the period. Also Sharma et al., (2007) had mentioned in their study on the Uttarakhand Cooperative Dairy Federation Ltd that the average prices of standard milk (Fat 4.5 per cent) to be in the range of 16- 18 per litre which were found to have increased up to 22 - 24 on an average at the time of the study, thus increasing by about 33 to 37 per cent. The prices were found not to have changed by the same proportion as that of the income. This leads to a logical interpretation that increase in milk production over the project period has significantly changed the income of the respondents obtained from sale of milk. An increasing trend of cross-bred high-yielding animal population has been observed in India since many years due to upgradation programme using AI which has also reflected in the project area. Tulachan&Neupane (1999) also opined that keeping fewer animals with more output (milk) by replacing local stock with high-yielding animals and through stall feeding has become an established trend in the middle hills of the Hindu-Kush Himalayan region

Conclusion

Agriculture and animal husbandry that are closely and symbiotically interlinked have long been and still are the primary livelihoods and occupations in Uttarakhand. But due to several drawbacks, the contribution of this major sector is decreasing which can be augmented in many ways with proper planning and its execution. Involvement of NGOs is one such approach as they have maximum accessibility and flexibility to meet the varying needs and demands of the poor livestock farmers as reflected in the present study. The study reveals that the involvement of CHIRAG has increased the adoption of scientific animal husbandry like AI, preventive health measures, availability and management of fodder and animal productivity. It also helped in impacting a better time utilisation and economic empowerment of rural folk, particularly in livestock enterprises. Therefore, involvement of multi-stakeholders, including local bodies having good rapport and accessibility, is of paramount importance in any development strategy.

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