

“An Empirical Study on the Impact of Cooperative Development interventions under National Dairy Plan I on the Socio-Economic Status of the Tribal milk producers in Sabarkantha region.”

By

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EXECUTIVE SUMMARY

The study titled “An Empirical Study on the impact of Cooperative Development interventions under National Dairy Plan I on the Socio-Economic Status of the tribal milk producers in Sabarkantha region” was taken up with the following objectives:

- (a) To determine the accessibility and equitability of the tribal households in Sabarkantha region to various programs and benefits of NDP I.
- (b) To evaluate the impact of NDP I on the socio-economic status of tribal households in Sabarkantha region; and
- (c) To identify the bottlenecks and challenges to the accessibility, equitability and benefits (resources, opportunities and economic gains) of NDP I accruing to tribal households in the region and suggest measures to overcome them.

The study was based in three talukas of the Sabarkantha region which are part of two districts, namely Sabarkantha and Aravalli districts of Gujarat which have a significant presence of tribal population.

Methodology & Sources of Data

A sample survey of tribal and non-tribal households in NDP I villages in the aforementioned districts was undertaken. The study involved multi-stage purposive sampling procedure with random sampling at the household level. It involved with and without approach of evaluation. Data was collected from households, Dairy Cooperative Societies and the milk union using semi-structured and pre-tested questionnaires. Secondary data sources like Census 2011, Animal Census 2012 and databases of Sabarkantha Dairy were used for analyses. However, the findings of the study were primarily based on the primary data collected through field survey. The analyses also used statistical and economic tools such as Multiple Linear Regression, Students' T-tests and Lorenz curves etc.

Major Findings & Conclusions

The major findings and conclusions of the study are as follows:

1. The ST beneficiaries and non-beneficiaries were found to differ significantly in terms of land and livestock endowments. The ST non-beneficiaries own more land while ST beneficiaries have more milch animals and livestock assets. As a result, ST non-beneficiaries earn more income from Agriculture while ST beneficiaries earn more from Dairy activities.
2. It was observed that all categories of beneficiaries enrolled under the project had access to all the opportunities and benefits of the project, i.e. enrolment as DCS members, provision of milk cans, enrolment for training and capacity building programmes, pouring milk at the DCS, receiving fair and timely payment based on volume and quality of milk poured etc

3. The equity in distribution of benefits (income equality) of the project was studied with the help of Gini co-efficient ratios and Lorenz curves. It was revealed the ST households participating in the project have more income equality than those not participating in it. It was also found that the income equality effect of the project was more pronounced in case of ST beneficiaries as compared to non-ST beneficiaries.
4. The Multi-linear regression analyses of data showed that the participation in NDP I (irrespective of the caste category of the household) has led to an increase in the number of milch cattle owned (2.848 nos.)
5. Also, the NDP I co-operative interventions have been instrumental in the participation of more women members of the households in dairy related economic activities, especially in the ST households.
6. The study also revealed that the Cooperative development initiatives under NDP I not only provided an additional and reliable income source for tribal dairy farmers, but also improved their overall socio-economic conditions with a special focus on the marginalized and vulnerable sections of the rural community. Formation of DCS in the village has led to increase in livelihood opportunities for all its members, especially the most backward and vulnerable classes like the tribal communities. All the members receive payment for their produce in a fair, transparent and timely manner. This has resulted in better prices for their produce.
7. Training and Capacity building programs conducted by NDP I EIAs for milk pourers as well as functionaries resulted in increased learning opportunities for ST households.

Recommendations

The following two recommendations are made with respect to the present study:

1. Village awareness programmes should be undertaken extensively to make the new members aware about the benefits of the cooperative movement.
2. ST households are generally a small land and livestock holder and they cannot provide security against their loan for purchase of cattle. Hence, they have less credit facilities as compared to the non-ST households. This challenge can be overcome when the DCS extends credit facilities to its members especially economically weaker members like ST members for various activities.

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ABBREVIATIONS

NDP I	National Dairy Plan Phase I
VBMPS	Village-based Milk Procurement System
EIA	End Implementing Agency
DCS	Dairy Co-operative Society
PPS	Probability Proportional to Size
MLR	Multiple Linear Regression
PSM	Propensity Score Matching

1. INTRODUCTION

The National Dairy Plan-1, which is now in its final phase, was conceived with the two-fold objectives:

- To help increase productivity of milch animals and thereby increase milk production to meet the rapidly growing demand for milk
- To help provide rural milk producers with greater access to the organised milk-processing sector

National Dairy Plan Phase I (NDP I) is a Central Sector Scheme for a period of 2011-12 to 2018-19. NDP I was planned to be implemented with a total investment of about ₹ 2242 crore comprising ₹ 1584 crore as International Development Association (IDA) credit, ₹ 176 crore as Government of India share, ₹ 282 crore as share of End Implementing Agencies (EIAs) that will carry out the projects in participating states and ₹ 200 crore contribution by National Dairy Development Board and its subsidiaries for providing technical and implementation support to the project. Funding is through a line of credit from the International Development Association (IDA), which along with the share of the Government of India will flow from DADF to NDDB and in turn to eligible EIAs. NDP I's coverage area focuses on 18 major milk producing states namely Andhra Pradesh, Bihar, Gujarat, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal, Telangana, Uttarakhand, Jharkhand and Chhattisgarh which together account for over 90% of the country's milk production. Coverage of NDP I however is across the country in terms of benefits accruing from the scheme. [1]

One of the key social objectives of NDP I is the empowerment and sustenance of vulnerable sections of the rural community through an inclusive and participatory approach in the implementation areas. The vulnerable sections of the rural community identified under NDP I through SESA study primarily are women, scheduled caste, scheduled tribes and small holders.

1.1 Components of NDP I

NDP I has three broad components with each component consisting of several sub-components and interventions to achieve the desired targets. These components are Village-based Milk Procurement System (VBMPS), Productivity Enhancement and Project Management & Learning. The Cooperative development services are undertaken under VBMPS which is explained in the following paragraph.

The **Village-based Milk Procurement System (VBMPS)**, in a nutshell, involves all the activities for weighing, testing quality of milk received and making payment to milk producers. VBMPS forms the

crux of NDP I's objectives to increase the milk production as well as productivity of milch producers. Setting up VBMPS in villages to collect milk in a fair and transparent manner and ensuring timely payments has been one of the key activities under NDP I. This includes investments made in village-level infrastructure for milk collection and bulking such as milk cans, bulk milk coolers (BMCs) serving village clusters and other associated equipment for weighing, testing as well as IT services.

The main expected results from the interventions proposed under this initiative are an increase in the number of additional villages covered and more milk producers organised into Dairy Cooperative Societies and Milk Producer Institutions. [2]

The various sub-components under this component are:

- Milk weighing, testing and collection
- Milk cooling
- Support for creating institutional structure
- Training & capacity building

This study project, as the title suggests, focuses on the cooperative development initiatives under NDP I which are a subset of the VBMPS component explained above.

1.2 Key Concepts

Various key concepts relevant to the study have been explained in this section.

a. Inclusion, Accessibility & Equity

A key concept that is a pre-cursor to equity is "Inclusion". The World Bank defines Social Inclusion as the process of improving the ability, opportunity and dignity of individuals and groups, vulnerable on the basis of their status, to take part in society. Social inclusion aims to empower poor and marginalized people (women, SC/ST and small holders in case of NDP I) to take advantage of the various global opportunities. The study attempts, to assess whether the program design and implementation are indeed inclusive or not. The inclusion aspect is better understood by the accessibility and equitability of intended beneficiaries to the programme benefits.

These three concepts are inter-related and a major subject of the study which attempts to assess the equity and accessibility of the tribal milk producers to the benefits of the cooperative development interventions under NDP I. Equity derives from a concept of social justice. It represents a belief that there are some things which people should have, that there are basic needs that should be fulfilled, that burdens and rewards should not be spread too divergently across the community, and that policy should be directed with impartiality, fairness and justice towards these ends [3]. Equity as a concept is fundamental to sustainable development. Various definitions of equity exist such as the ones given by Universal Declaration of Human Rights, Reliable Prosperity website & National Academy for Public Administration. In a nutshell, social equity is not based on treating all persons or communities the same. Instead, it is giving the same opportunities to all and though there might be an imbalance in who can receive those benefits (social or economic conditions), it is there for equitable distribution. Thus, while this study attempts to assess the accessibility and equitability of tribal milk producing households to the benefits of NDP I. it is essentially assessing the equity aspect of the program implementation.

b. Socio-Economic Indicators of Well-being

Since the study eventually tries to determine the improvement in the socio-economic status of the target group, various socio-economic indicators have been considered for the purpose of the study. These social and economic indicators act as the guideline for framing the survey tools and questionnaires essential for data collection and analysis. An exhaustive set of socio-economic indicators is presented in the following table:

Table 1.1: Exhaustive list of Socio-Economic Indicators

Category	Sample Indicators
Household Income	Income from Agriculture, Income from dairy activities, Income from Micro enterprises, Size of cultivated land, Number of milch cattle, Milk produced per day etc.
Ownership of Assets	Number of Livestock assets, Number of Productive assets, Number of consumptive assets etc.
Consumption Expenditure	Food Expenditure, Non-food expenditure, Bulk expenditure etc.
Savings, Investment and Debt	Amount saved in Commercial bank, SHGs, MFIs, Saved at home, Chit fund etc. Details of outstanding loans/borrowings.
Education Levels	Female Education levels, Literacy, Dropouts
Health & Nutrition Levels	Access to health facilities
Political and Social Status/Governance	Membership of groups/committees, Frequency of Participation, Nature of participation etc.
Women Empowerment	Participation in Dairying, Say in household decisions, Household Agency/Freedom, Outside the household.

c. Tribal Households

The tribal households in this study refers to those households or members of the household who are officially designated as Scheduled Tribes (STs).

The Scheduled Tribes are historically disadvantaged people in the country who comprise about 8.6% of the population. The Constitution (Scheduled Tribes Order, 1950) lists 744 tribes across 22 states in its First Schedule. The chief tribes in Gujarat are Bhils, Gonds, Barda, Bawcha, Choudhuri etc.

d. Sabarkantha Region

Sabarkantha region consists of two districts namely Sabarkantha and Aravalli. The prominent tribal blocks in these two districts are Vijaynagar, Khedbrahma and Idar in Sabarkantha and Bhiloda and Meghraj in Aravalli.

1.3 Objectives and Scope

- a. The specific objectives of the study were:
- i. To determine the accessibility and equitability of the tribal households in Sabarkantha region to various programs and benefits of NDP I.
 - ii. To evaluate the impact of NDP I on the socio-economic status of tribal households in Sabarkantha region.
 - iii. To identify the bottlenecks and challenges to the accessibility, equitability and benefits (resources, opportunities and economic gains) of NDP I accruing to tribal households in the region and suggest measures to overcome them.

The basic assumption of the study is that a tribal household that has indeed benefited by participation in NDP I is expected to show a positive effect on economic indicators like income and physical assets generated by NDP I interventions. Although, evaluating the economic gains accrued to the tribal households is the chief objective, the study also aims to analyze the entire Results chain. It is expected that increased returns would lead to a change in the pattern of consumption expenditure, savings, investment and debt. These effects would further affect social parameters like Education level, Nutrition level, Political and Social empowerment. For the purpose of the study, the target households were broadly categorized into two broad categories i.e., Tribal (ST) and Others (Non-ST).

b. Scope of the study

The region under consideration for the study was Sabarkantha region which comprises of two districts: Sabarkantha & Aravali. As per the program design, the intervention villages are classified into "New" or "Strengthening" depending on the presence of DCS (Dairy Cooperative Society) in the village prior to NDP I. For the purpose of the study, only the villages in the "New" category were considered so that the socio-economic indicators under consideration are discreet and tangible.

Table 1.2: Differences between "New" and "Strengthening" DCS as per programme design

Benefits/ Infrastructure	DCS classified as "New"	DCS classified as "Strengthening"
Milk Collection & Timely Payment	Yes	Yes
Part of BMC Cluster	Yes	Yes
AMCU (Automated Milk Collection Unit)	Yes (In some DCS)	Yes
DPMCU (Data Processer based Milk Collection Unit)	No	Yes (in some DCS)
Training & Capacity Building	No (mostly)	Yes

2. METHODOLOGY

The study conducted was essentially an impact evaluation study where the cooperative development initiatives under NDP I were the interventions to be evaluated. The Sampling design used in this study was a multi-stage purposive sampling with PPS (Probability Proportional to Size) sampling at the household level. The study used with and without approach since baseline data necessary for before and after approach was not available.

a. Data Collection

The study is based chiefly on primary data. The only secondary data sources used were village-level data of Census 2011 (for shortlisting the intervention and control villages to be covered in the study) and Animal Census 2012 (to determine the number of milch cattle in the village). The data collection was done from three sources, i.e. Household, Village DCS & District level Milk Union on structured and pre-tested questionnaires.

The data collected from each village DCS pertained to its membership milk collection and functioning; particulars about the village, i.e. demography, village amenities etc. On the other hand, the household-level data collected pertained to basic household profile, household endowments, awareness and access to DCS benefits, economic indicators like household expenditure, assets, incomes and savings. In addition, social parameters like Institutional participation and empowerment, especially of women, access to media and extension services and few health and education parameters also constituted the household schedule.

b. Sampling Methodology

The sampling methodology used was purposive and its boundaries defined by the scope of the project. A total of 9 villages were shortlisted for the household survey, out of which 7 were intervention villages and 2 control villages. These villages were present in three Tribal-dominated talukas across the two districts of **Sabarkantha & Aravali**.

The sampling process of villages was as follows:

- i. As defined in the scope of the study, only the new DCS villages covered under NDP I in the three talukas were selected.
- ii. As a result, a list of 40 "New" DCS villages in the two districts were considered.
- iii. The next criteria was to shortlist those villages which are tribal-dominated. The criteria of selection after discussion with the end implementing agency was set at 60% of the

population i.e. only villages having at least 60% tribal population would qualify for the study. This further narrowed down the list of villages to 24.

- iv. Based on the available resources and time constraints, 9 villages out of the total universe of 24 villages were shortlisted for the study. This selection was done using Stratified Random Sampling, with the strata representing the block/taluka.
- v. The sample size of survey households was fixed at a minimum of 30 households per village to ensure statistical significance. The exception was villages with very few households (in the range of 70-100) where the sample size was lesser.
- vi. The intervention and control sample of households selected in each village was in the following proportions:

Table 2.1: Proportion of Intervention and Control Samples

Sl. No.	Category	Beneficiary HH	Non-Beneficiary HH
1	ST	60%	10%
2	Non-ST	20%	10%
	Total	80%	20%

Appendix A may be referred for the shortlist of Intervention and Control villages. Hence, the total number of households selected and surveyed across the nine villages were 228. Table (4) below shows the list of villages and the number of households surveyed in each village.

Table 2.2: Villages Surveyed

Village	Taluka, District	Households Surveyed	Type (Intervention/Control)
<u>Rajpur (Isari)</u>	<u>Meghraj, Aravalli</u>	30	Intervention
<u>Dhandhiya</u>	<u>Meghraj, Aravalli</u>	30	Intervention
<u>Meravada</u>	<u>Bhiloda, Aravalli</u>	30	Intervention
<u>Nava Bhetali</u>	<u>Bhiloda, Aravalli</u>	24	Intervention
<u>Baleta</u>	<u>Vijaynagar, Sabarkantha</u>	24	Intervention
<u>Ajepur</u>	<u>Vijaynagar, Sabarkantha</u>	26	Intervention
<u>Dholivav</u>	<u>Vijaynagar, Sabarkantha</u>	16	Intervention
<u>Kantalu</u>	<u>Meghraj, Aravalli</u>	22	Control
<u>Samaiya</u>	<u>Vijaynagar, Sabarkantha</u>	26	Control
		228	

c. Selection of Control Group villages

A control group village or a non-intervention village is ideally a village which is comparable to an intervention village i.e. similar in characteristics to an intervention village but not having the intervention programme. In other words, the control village and intervention village have similar

baseline indicators. These baseline indicators may be of a wide variety. A robust approach to determine these baseline indicators is to determine those factors which determine or influence participation in the intervention/program. These factors are usually exogenously determined and do not get affected by the intervention itself. The same logic is used in matching methods like Propensity Score Matching which is used to determine the accurate counterfactual in an impact evaluation problem. Thus, the ideal control village in this scenario was characterized as one having a high potential to become a NDP I village but currently is a non-beneficiary village.

Since it was very difficult to account for spill-over effects of NDP I benefits in this region, it became very difficult to narrow down upon the control village using secondary sources alone. Hence, on the basis of detailed dialogue and discussion with the officials of SABAR dairy (EIA of the region) and Monitoring officers of NDP I, the following criteria for selection of control village was followed:

- Does not have a DCS set up under NDP I or any other DCS at present
- Has ST population > 60%
- Has an estimated milk production of about 200L daily. This can be counter-checked with the number of milch cattle in the village. (Animal census, 2012)
- Does not have spill-over effects of NDP I from nearby DCS villages.
- Has reasonably good road connectivity.

Finally, two control villages were short listed using the above selection criteria as well as through field visits to check for the spill-over effects.

d. Tools & Frameworks Used

Various analytical tools were employed for data analyses in order to gain a better understanding of the socio-economic phenomena. The different analytical tools employed were:

- **Tabular Analysis & t-Tests**

One of the primary and basic tools employed in this study were the two-sample t-tests which compared various means between the intervention and control samples. The data analysis was primarily aimed at finding the answer to the following 3 questions:

1. Whether the tribal households have equal access to different programmes of NDP I in the region as compared to non-tribal households?.
2. Whether the distribution of programme benefits is equitable among the tribal and non-tribal households?
3. What are the impacts of NDP I on the socio-economic status of tribal households in the region and whether they are positive and significant?

- **GINI Coefficient & Lorenz Curve**

GINI coefficient & Lorenz curve are useful tools to measure the level of inequality in a population or a sample. Usually, it is a plot of cumulative income against cumulative population. As shown in the figure below, a 45-degree line signifies perfect equality and gives a GINI coefficient of zero. This is not practically possible in real life and the real-life scenarios give a Lorenz curve.

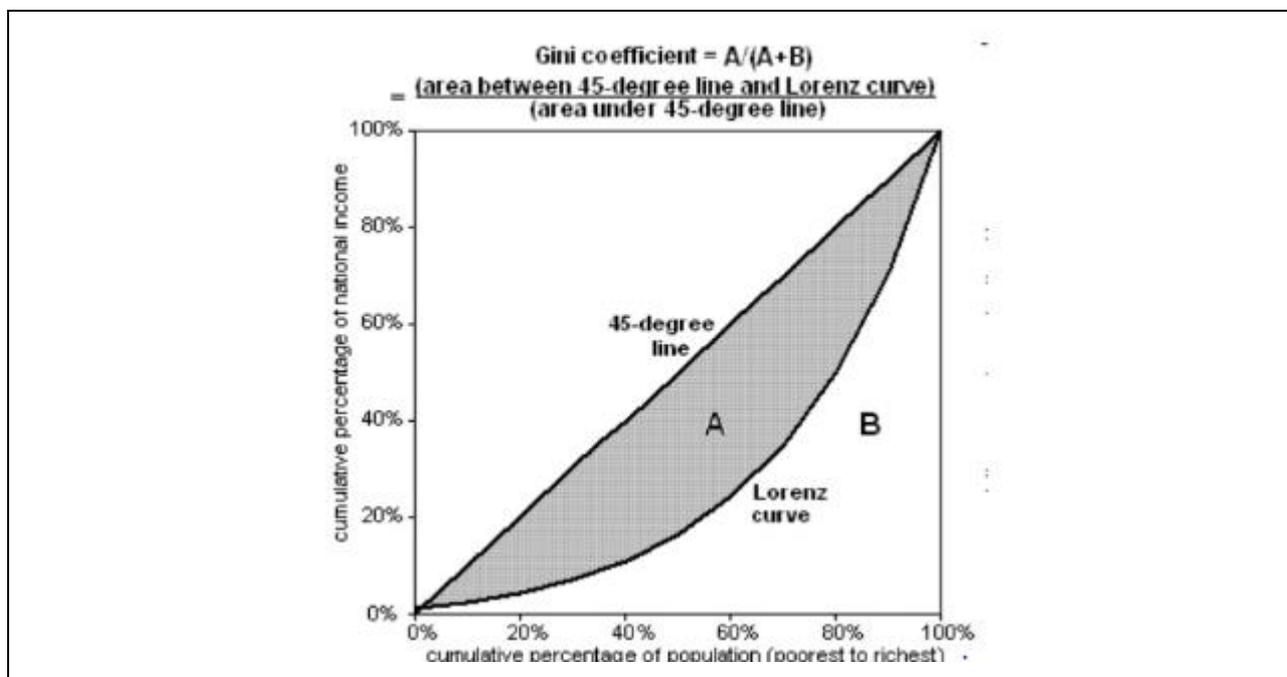


Figure 2.1: GINI Coefficient and Lorenz Curve

Larger the area A, more is the GINI coefficient signifying greater inequality. Usually, the inequality is measured in terms of income. However, other indicators like assets, employment etc. can also be used for measuring inequality.

- **Multiple Linear Regression (MLR)**

The MLR model helps in establishing the causal relationships (together with their measurement through elasticities) between the dependent and independent variables. For building the MLR model, Propensity Score Matching has been used in the study to match the intervention and control samples at the household level. The MLR model also allows us to evaluate the dependent variable (socio-economic indicators) against multiple independent variables as well as interaction variables; thereby giving a much richer analysis.

- **SWOT Analysis**

The SWOT analysis helps to analyze the strengths, weaknesses, opportunities and threats of the NDP I interventions with reference to the Tribals of Sabarkantha region. Thus, it gives a descriptive assessment model for assessing the effectiveness of any intervention/ programme on a sample population so as to decide what should or should not be done for making the intervention/ programme more rationale, effective, efficient and sustainable.

3. RESULTS AND INSIGHTS

This section summarises all the results of the analyses performed using various analytical tools. The insights and interpretations follow in the next chapter.

3.1 Tabular Analysis

Household profile and endowments

- a) Comparison of ST Beneficiaries with ST non-beneficiaries in terms of the identified socio-economic indicators-

Table 3.1: t-test - ST beneficiaries versus ST non-beneficiaries

ST beneficiaries versus ST non-beneficiaries	NDP I		Non-NDP I		2-sample T-test	
	Mean	Std. Err.	Mean	Std. Err.	Coefficient	p-value
SOCIO-ECONOMIC INDICATORS						
Household Composition	5.37	0.13	5.13	0.23	0.24	0.3445
Age of Household head	52.23	0.93	50.4	1.02	1.82	0.2648
Average education level of household head	10.12	0.27	9.66	0.52	0.46	0.3954
Households with toilet facility (%)	91.67	2.69	80	6.03	10.68*	0.0639
Average education level of female adult	5.31	0.49	4.13	0.78	1.18	0.2086
Annual Income from Agriculture	6694.91	965.43	11666.67	1855.92	-4971.75**	0.0112
Monthly Income from Dairy business	9256.78	526.72	2733.33	433.33	6523.44**	0.0004
Monthly Income from Daily wage/Agrilabour	1915.25	256.75	2633.33	386.77	-718.07	0.1363
Net Annual Income	209271.2	12348.61	220266.7	34917.85	-10995.48	0.7085
Size of Cultivated Land (bighas)	3.186	0.209	3.866	0.356	-0.68*	0.0948
Number of Milch Cattle	1.72	0.105	0.98	0.134	0.731**	0.0002
Livestock assets	3.17	0.203	1.53	0.144	1.64**	0
Productive and Consumptive assets	4.06	0.171	4.6	0.369	-0.541	0.1338
Increase in total asset base	2.059	0.115	1.466	0.144	0.592**	0.0047
Food Expenditure	6519.49	559.17	3320	210.71	3199.49**	0.0006
Non-food Expenditure	1156.36	70.36	973.33	123.02	183.02	0.1832
% HHs taking SHG loans	26.27%	0.406	33.33%	0.071	0.0706	0.3736
Borrowings/Loan amt taken (3 yrs)	35635.62	7373.208	22000	5895.556	-13635.2	0.2769
Households with instances of dropout	20.34%	0.037	20%	0.0603	-0.0033	0.9619
Households with access to Medical facilities	73.72%	0.04	100%	0%	26.27%**	0.0001
Households with active participation in Panchayat	40.67%	4.50%	53.33%	7.50%	12.65%	0.1476
Households with active participation in Women's Groups	60.16%	4.50%	60.05%	7.35	-0.17%	0.9844

Note: ** Significant at 5% significance level ; * Significant at 10% significance level

The ST beneficiaries and non-beneficiaries were found to be similar on many socio-economic indicators. However, they differed significantly in terms of land and livestock endowments. The ST non-beneficiaries own more land while ST beneficiaries have more milch animals and livestock assets. As a result, ST non-beneficiaries earn more income from Agriculture while ST beneficiaries earn more from Dairy activities. This indicates a greater dependence on agriculture for ST non-beneficiaries who possess more land. On the other hand, the ST beneficiaries do not have much land, and therefore rear more milch animals and their dependency on livestock is more. The other significant indicators include more expenditure on food and better sanitation facilities for ST beneficiaries while more access to medical facilities by ST non-beneficiaries.

b) Comparison of ST Beneficiaries with non-ST beneficiaries in terms of the identified Socio-Economic indicators

Table 3.2: t-test - ST beneficiaries versus non-ST beneficiaries

ST beneficiaries versus non-ST beneficiaries	ST		non-ST		2-sample T-test	
	Mean	Std. Err.	Mean	Std. Err.	Coefficient	p-value
SOCIO-ECONOMIC INDICATORS						
Household Composition	5.37	0.13	7.1	0.298	-1.72**	0
Age of Household head	52.23	0.93	55.18	1.945	-2.95	0.1238
Average education level of household head	10.12	0.27	10.26	0.39	-0.132	0.7855
Households with toilet facility (%)	91.67%	2.69%	100%	6.03%	-9.32%**	0.0255
Average education level of female adult	5.31	0.49	8.1	0.537	-2.78**	0.0011
Annual Income from Agriculture	6694.91	965.43	16500	3852.51	-9805.085**	0.0009
Monthly Income from Dairy business	9256.78	526.72	28746	7793.737	-19489.22**	0.0002
Monthly Income from Daily wage/Agribour	1915.25	256.75	1520	389.39	395.254	0.4004
Net Annual Income	209271.2	12348.61	542652	95717.89	-333380.8**	0
Size of Cultivated Land (bighas)	3.186	0.209	10.04	2.968	-6.853**	0.0006
Number of Milch Cattle	1.72	0.105	4.84	0.923	-2.642**	0.0001
Livestock assets	3.17	0.203	7.16	0.927	-3.982**	0
Productive and Consumptive assets	4.06	0.171	6	0.442	-1.94**	0
Increase in total asset base	2.059	0.115	2.26	0.248	-0.2	0.4032
Food Expenditure	6519.49	559.17	6960	474.6298	-440.5085	0.6304
Non-food Expenditure	1156.36	70.36	4742	1491.96	-3585.64**	0.0003
% HHs taking SHG loans	26.27%	4.06%	22.00%	5.91%	0.0427	0.5616
Borrowings/Loan amt taken (3 yrs)	35635.62	7373.208	122380	22132.11	86744.38**	0
Households with instances of dropout	20.34%	3.72%	8%	3.87%	12.33*	0.0501
Households with access to Medical facilities	73.72%	4%	68%	6.66%	5.72%**	0.4525
Households with active participation in Panchayat	40.67%	4.50%	46.00%	7.11%	-5.32%	0.526
Households with active participation in Women's Groups	60.16%	4.50%	46.00%	7.12%	14.17%*	0.0918

Note: ** Significant at 5% significance level ; * Significant at 10% significance level

As evident from the table no. 3.2 above, the non-ST beneficiaries fare better significantly in almost all socio-economic parameters, i.e. education, income, assets holding etc. This is primarily due to the endowment effect where the non-ST beneficiaries, i.e. other castes are better off socially as well as economically. The only significant indicators for ST beneficiaries are access to medical facilities and women self-help groups. This may be due to ST households visiting Primary health care centres in the village more often than the non-ST households in the absence of access to better health care facilities. Similarly, ST households tend to form self-help groups more often than the non-ST households due to lack of access to other credit institutions.

c. Inclusion under NDP I

It was observed during the field survey that all categories of beneficiaries enrolled under the project had access to all the benefits of the project, i.e. enrolment as DCS members, provision of milk cans, enrolment for training and capacity building programmes, pouring milk at the DCS, receiving fair and timely payment based on volume and quality of milk poured etc. In case of any problems/ issue, it was resolved by the management committee in timely and fair manner.



Figure 3.1: Milk cans lined up at Nava Bhetali DCS (Taluka: Bhiloda)



Figure 3.2: Milk cans lined up at Meravada DCS (Taluka: Bhiloda)



Figure 3.3: Approach road to Rajpur-Isari DCS



Figure 3.4: DCS Secretary and tester during milk collection

3.2 GINI Co-efficient Ratio & Lorenz Curve

(a) GINI Coefficient of the Sample population (NDP beneficiaries + non-beneficiaries)

Gini co-efficient ratio represents the inequality of distribution of resources across the target population. It varies from 0 to 1 where '0' means complete equality and '1' means complete inequality.

Table 3.3: GINI Coefficient of Sabarkantha region versus India

GINI Coefficient (Sabarkantha region)	GINI Coefficient (India's as of 2016)
0.6157	0.51

As illustrated in table 8 above, the region under study (Sabarkantha and Aravalli districts) show a high level of inequitable income of the population as compared to the whole country.

(b) Lorenz Curve of the Sample population (NDP beneficiaries + non-beneficiaries)

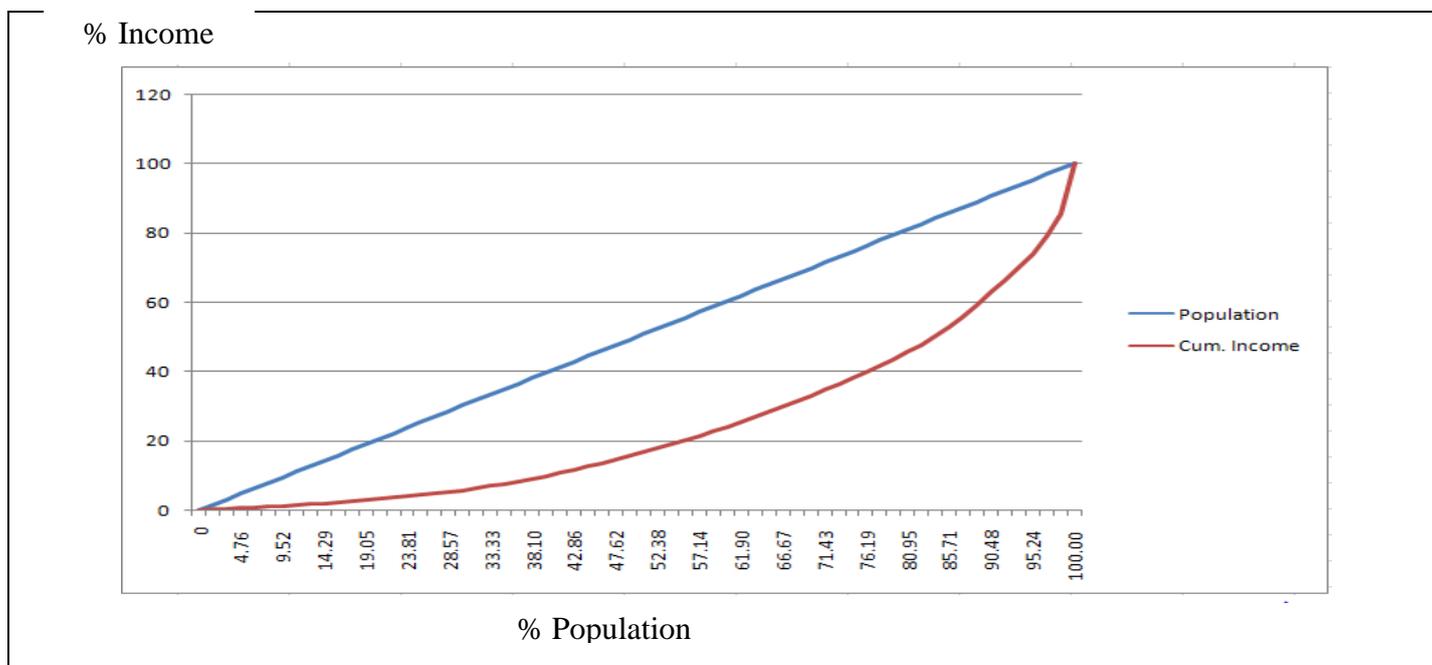


Figure 3.5: Lorenz Curve for Sample population (Sabarkantha region)

The Blue line (45 degree line) in the figure 3.1 above represents complete equality of income whereas the Red Curve (Lorenz Curve) represents the actual income distribution across the sample population. The Lorenz curve indicates the average inequality of income in the sample population.

(c) Comparison of ST beneficiaries with ST non-beneficiaries (Program effect on beneficiaries in terms of income equality)

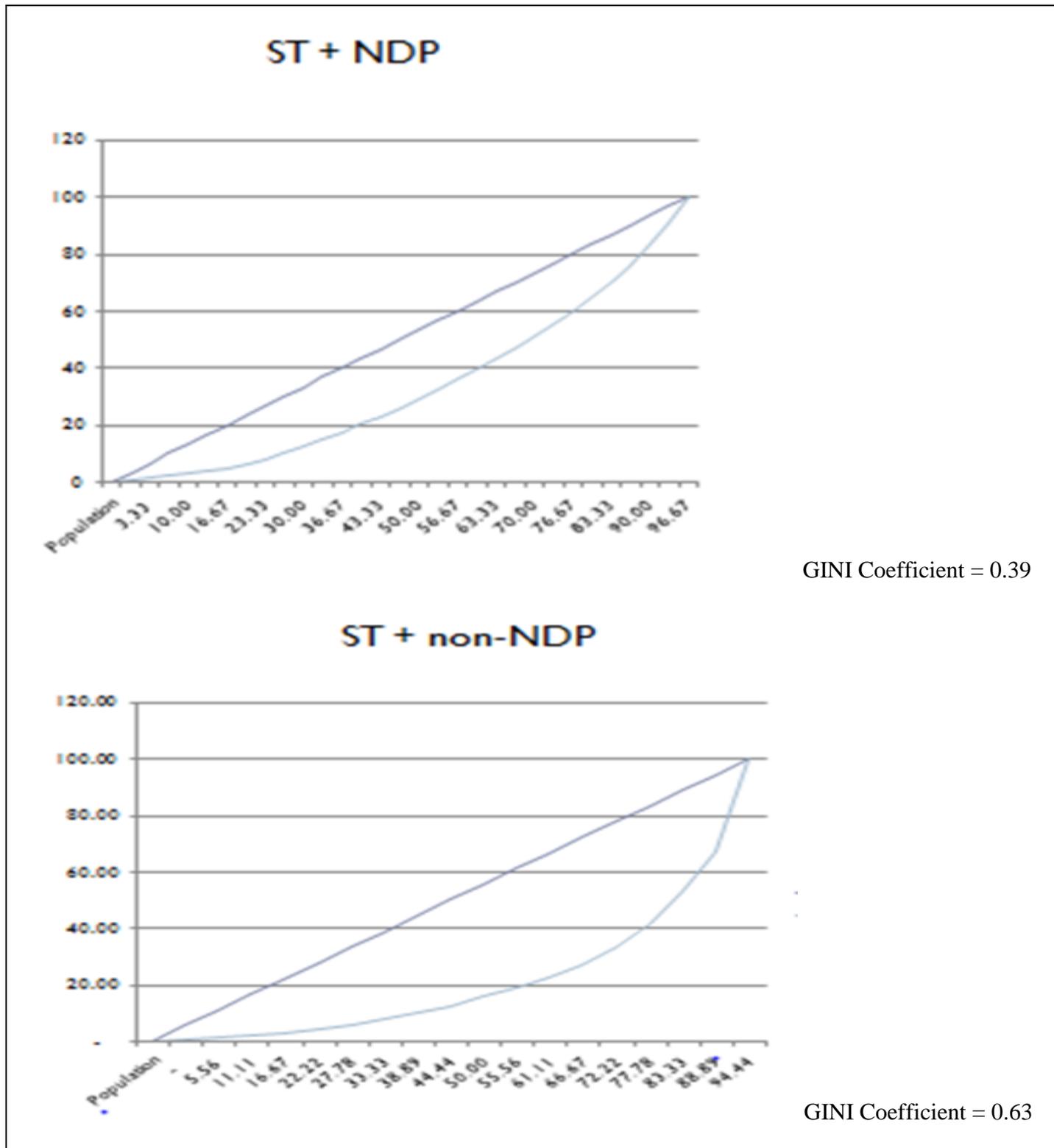
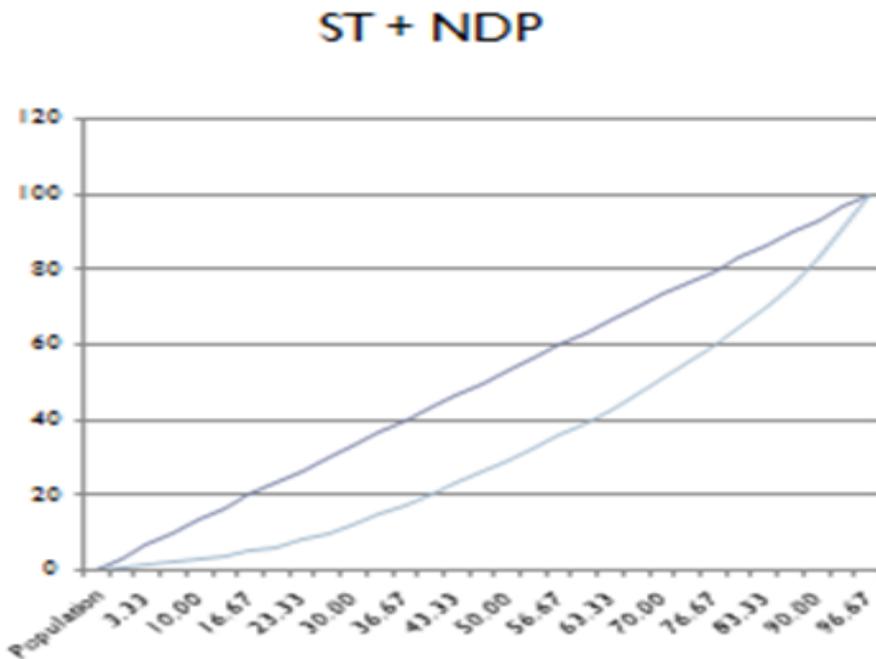


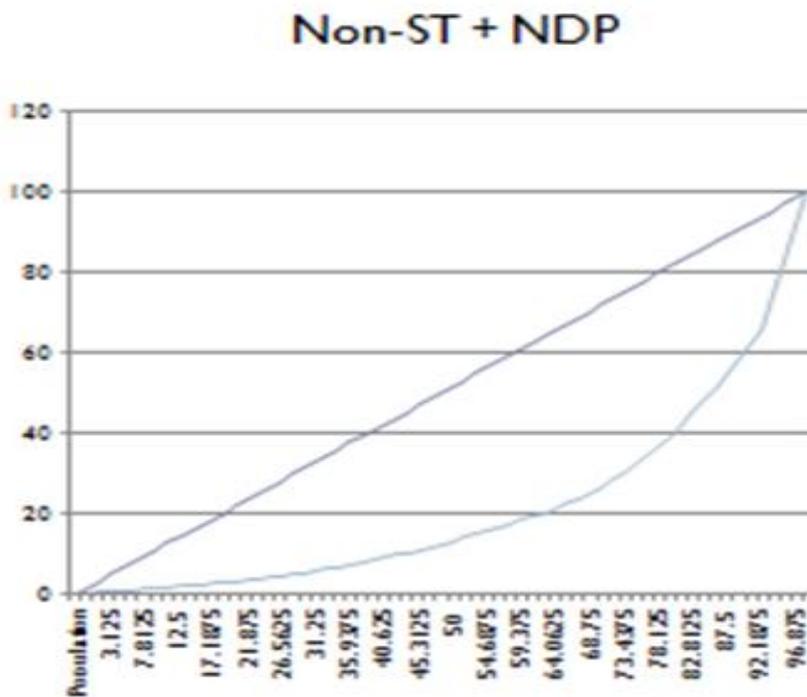
Figure 3.6: Lorenz Curves for NDP versus non-NDP Scheduled Tribes

The above set of Lorenz curves and Gini coefficient ratios clearly show that NDP I project has income distributive effect so that the ST households participating in the project have more income equality than those not participating in it. This indicates increase in equity as one of the impact of the project.

(c) Comparison of ST Beneficiaries with non-ST beneficiaries (Program effect on the ST beneficiaries in terms of income equality)



GINI Coefficient = 0.39



GINI Coefficient = 0.81

Figure 3.7: Lorenz Curves for ST versus non-ST NDP beneficiaries

The above set of Lorenz curves and Gini-coefficient ratios show that the income equality effect of the project is more pronounced in case of ST beneficiaries as compared to non-ST beneficiaries. This means that

the project results into more equitable distribution of income among the ST households as compared to the non-ST households. This may be due to a higher participation of ST households in the project and lower inequality existing among the ST households prior to NDP I as compared to the non-ST households.

3.3 Multiple Linear Regression Model (MLR)

In order to measure the heterogeneous effect of the program interventions on the ST beneficiary households, the following Multiple Linear Regression model was proposed:

$$Y_i = \beta_0 + \beta_1(NDP) + \beta_2(ST) + \delta(NDP * ST) + \gamma(X_i) + u_i$$

Where, Y_i is the outcome variable or dependent variable which could be any of the socio-economic indicators considered for the study. NDP I and ST are dummy variables which determine whether a household is a beneficiary and whether it is a ST household respectively.

An interaction variable NDP I*ST has been introduced to capture the possible effect of caste category, if any on the propensity to participate in NDP I. Hence, accounting for the interaction effect makes the regression model more robust.

X_i represents a vector of exogenous factors which are not directly affected by the interventions but play a role in the household choosing to participate in the program. Thus, X_i is the composite variable which determines the propensity of a household to participate. In fact, X_i is a composite vector of the following exogenous variables: Caste, HH size, HH head gender, HH head age, HH head education, Access to electricity, Access to toilets, Size of cultivable land, Agriculture as a source of livelihood, Income from agriculture, Other sources of livelihood, Income from other sources & govt. schemes, Participation of household members and women in village institutions, Access to common village resources and facilities.

Since this is a propensity score-weighted regression, households in treatment villages were assigned weights equal to 1 and the ones in control villages were assigned weights equivalent to $P(X_i)/(1 - P(X_i))$ where $P(X_i)$ is the estimated probability of treatment/participation conditional on X_i .

Propensity Score Matching (PSM) of Covariates

PSM was used to match the covariates at the household level i.e. between intervention village households and control village households. Although the kernel matching (fig 3.4) did not result into a perfect match, the partial matching validated the selection of the control villages.

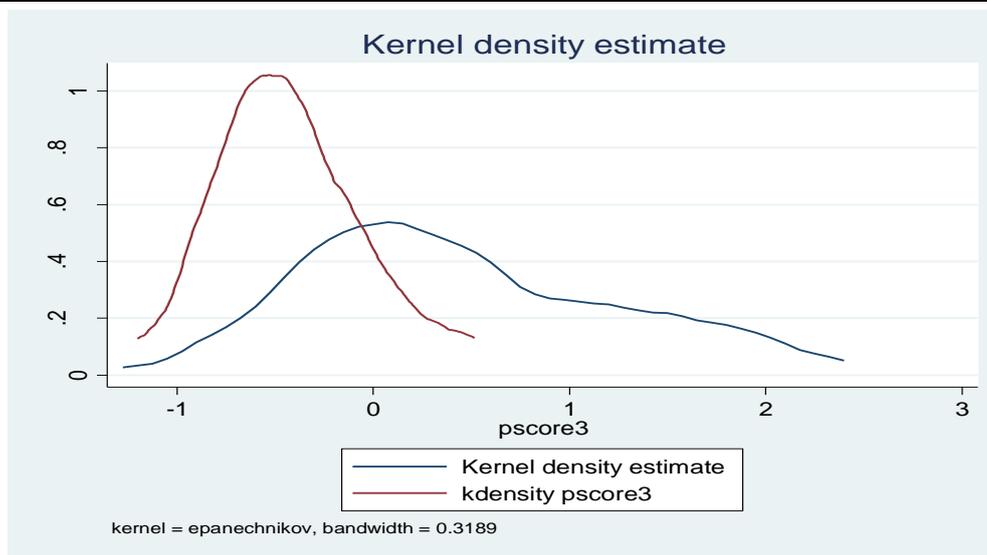


Figure 3.8: Kernel Matching for PSM

Some of the possible measures that could be taken to stabilize the Propensity Score matching results are as follows:

1) A more extensive analysis and selection of co-variates for matching

The co-variates for matching the intervention and control households have to satisfy the criterion that they influence the participation of the household in the intervention but are not directly affected by the intervention itself. The selection of co-variates has to be data-driven i.e. with the help of balancing of co-variates by regressing each co-variate and logit of propensity score on the treatment assignment (attempted on STATA software).

2) Reducing Hidden Bias

Some co-variates which are not selected as a part of the model tend to bias the propensity scores. The hidden bias can probably be removed by including more village-level parameters like distance of household from main road, distance of household from nearest water source etc. The examples suggested above are just indicative and need not influence the probability of a household being a beneficiary. One drawback in using this measure is that it is out of the scope of the survey that was undertaken.

(a) Causal Relationship between inclusion of ST beneficiaries in NDP I and Economic Indicators

Table 3.4: Regression Results - 1

Variable	NDP	NDP + ST
Number of Livelihood sources in the HH	0.236	0.122
Number of <u>Milch</u> Cattle (Nos.)	2.848**	2.42**
Milk Production per day (Litres)	5.496*	4.521*
Increase in asset ownership	0.466	0.1279
Consumption Expenditure (per month) (Rs.)	3690.5	1824.43
HHs taking loans from banks/MFIs/formal sector (%)	3.09%	3.08%

Note: ** Significant at 5% significance level ; * Significant at 10% significance level

From Table 3.4 above, it can be observed that participation in NDP I (irrespective of the caste category of the household) has led to an increase in the number of milch cattle owned (2.848 nos.) This indicates that NDP I co-operative interventions have led to households buying more cattle or new households taking up dairying as a source of income. The milch cattle owned by ST households increased by 2.42, which was found to be significant. Similar effect was noticed for Milk production per day by ST households as well as non-ST households.

(b) Causal Relationship between inclusion of ST beneficiaries in NDP I and Social Indicators

Table 3.5: Regression Results - 2

Variable	NDP	NDP + ST
HHs with dropouts (%)	-6.25%	-10.44%
HHs sending youth for higher studies (%)	10.66%	2.40%
HHs participating in <u>Panchayat</u> / <u>Gram Sabha</u> (%)	4.65%	-2.33%
HHs with women participating in village level institutions (%)	14.67%	6.70%
HHs with active participation of women in dairying (%)	81.29%*	84.27%*

Note: ** Significant at 5% significance level; * Significant at 10% significance level

Table 3.5 shows that the NDP I co-operative interventions have been instrumental in the participation of women members of the households in dairy related activities, especially for the ST households. The participation of women in dairying was 84.27% for ST households and 81.29% for non-ST households.

3.4 SWOT Analysis

Strengths	<ul style="list-style-type: none"> • Inclusion of all categories of households as members of DCS without any discrimination • Equity among all members in terms of access to the benefits of the program/ project • Formation of DCS has led to increase in livelihood opportunities for all the members, especially the most backward and vulnerable classes like the tribal communities
Weaknesses	<ul style="list-style-type: none"> • The newly formed DCS need to be strengthened further so that they can serve their members in a better way.
Opportunities	<ul style="list-style-type: none"> • Training and Capacity building programs conducted by EIAs under NDP I for DCS members as well as functionaries resulted in increased learning opportunities for ST households. • ST households have increased animal holding and thereby more milk production, which they pour at the DCS to augment their earnings. • Increase in milk selling opportunities for tribal producer members, thereby resulting in more household income • All the members receive payment for their produce in a fair, transparent and timely manner. This has resulted in better pricing of their produce.
Threats	<ul style="list-style-type: none"> • Village awareness programmes should be undertaken extensively to make the new members aware about the benefits of the cooperative structure or else the members may fall prey to private intermediaries.

3.5 Bottlenecks and Recommendations

The major bottlenecks for benefits of NDP I interventions to reach the ST households can be summarised as follows:

- a. Low education and awareness level of ST households
 - This may lead to a lower access of the ST households to the project enrolment and benefits. It can be overcome by undertaking extensive village awareness campaigns/ programmes so as to inform the member households about the numerous benefits of the cooperative development programmes. However, it should be noted here that the accessibility of ST households to the project benefits is neither hindered by the project functionaries nor the project design/ implementation.
- b. Less credit facilities for ST households
 - ST households are generally a small land and livestock holder and they cannot provide security against their loan for purchase of cattle. Hence, they have less credit facilities as compared to the non-ST households. This challenge could be overcome by the DCS by extending credit facilities on soft terms to its economically weaker members like ST members for various activities.

3.6 Limitations of the Study

- a. No Control village in true sense could be found in the region since the households from the uncovered villages pour milk at nearby DCS/ BMC, hence there are spill over effects.
- b. Before and After approach could not be employed for the study due to absence of Baseline data for the sample villages.
- c. The sample size of surveyed population for certain villages had to be reduced owing to time constraints

3.7 Conclusion

By developing dairying as an alternative and reliable source of livelihood for the farmers in newly covered villages, NDP I has attempted to uplift the overall social and economic well-being of each beneficiary household, with a special focus on the marginalized and vulnerable sections of the rural community. There is a significant positive impact on the livelihood opportunities for the tribal milk producers of Sabarkantha region with the roll out of cooperative development interventions under NDP I project.

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APPENDIX A - HOUSEHOLD SCHEDULE

DATE: _____

HOUSEHOLD ID: _____ VILLAGE NAME: _____

Greeting and Verbal Consent (Has to be communicated in Gujarati/Hindi)

"Namaste! My name is _____. I am doing a research survey for Rashtriya Dairy Vikas Board (NDDDB) to assess the impact of milk cooperative in your village. The outcome of this study is likely to improve the functioning of milk cooperative in your village. Your responses would be kept entirely confidential. Is it Ok with you or you would like to know anything else?"

If the respondent says "No", proceed with the survey.

If the respondent says "Yes", let the respondent ask his question. In case, he/she is satisfied with the answer, proceed with the survey or else greet him and leave the household.

Ask the qualifying question to the respondent. All respondent households must be pourer households.

Does household own any milch cattle? (Yes/No) (Currently lactating/Will lactate in future/Pregnant etc.):

If answer to question is "No", greet the respondent and leave the household.

If the respondent says "Yes", proceed to "Section 1: Household Profile" to start the survey.

SECTION 1: HOUSEHOLD PROFILE

- a. Name of the respondent :
- b. Relationship with the head of household:
- c. Fala/Hamlet/Ward Name:
- d. Caste category:
(Caste Code: 1=SC; 2=ST; 3=Others; 4=NA)
- e. Number of Milch cattle in the household:
- f. Religion:
(Religion Code: 1=Hindu; 2=Muslim; 3=Christian; 4=Sikh; 5=Jain; 6=Buddhist; 7=Others)
- g. Household Members' Profile (fill the table on the next page)

h. Household Facilities & Land (fill the following table)

Sl. No.	Facilities	Availability in HH (1=Yes, 0=No, NA=Not applicable for Y/N responses)
1	Electricity (Y/N)	
2	Drinking Water (Y/N)	
3	Water for Domestic uses (Y/N)	
4	Toilet (Y/N)	
5	House (1=Own house; 2=Rented or Leased)	
6	Any land other than house (Y/N)	
7	Agricultural/Cultivable land (Y/N)	
8	Irrigated Land (Y/N)	
9	Size of Agricultural Land (in bighas)	
10	Main Source of Irrigation (1=Borewell; 2=Handpump; 3= Tubewell; 4=Canal/Stream; 5=Others)	
11	Other land(Y/N)	
12	Size of Otherland (in bighas)	

SECTION 2: HOUSEHOLD EXPENDITURE

a. Food expenditure in the past one month (fill the following table)

Sl. No.	Consumption Exp heads in last 1 month	Qty Produced	Qty purchased	Value of purchase (Rs)
1	Rice (kg)			
2	Wheat (kg)			
3	Kersone (lt)			
4	Cereals (Jowar, Bajra, Ragi, Maida etc.) (kg)			
5	Pulses (rajma, gram etc) (kg)			
6	Sugar, Salt and Spices (kg)			
7	Edible oil(lt)			
8	Meat, Chicken & Fish(kg)			
9	Eggs (nos.)			
10	Milk (lt)			
11	Milk Products (kg)			
12	Vegetables (kg)			
13	Fruits & Nuts (kg)			
14	Others (Specify)			

b. Non-food expenditure in the past one month (fill the following table)

Sl. No.	Consumption Expenditure heads in last 1 month	Value of purchase (Rs)
1	Fuel and Electricity	
2	Entertainment	
3	Household Needs (Personal care, Appliances, Cosmetics etc.)	
4	Conveyance (Bus, Auto, Railway etc.)	
5	Medical Expenses	
6	Services (Any kind)	
7	Others (Specify)	

SECTION 3: HOUSEHOLD ASSETS, INCOME & SAVINGS

a. Milch Animal Holding and Milk Production

Sl. No.	Livestock Assets	How many are owned now?	How many owned in (year)	In milk/dry/pregnant (1=Yes, 0=No)	Milk production(liters/ day) (as on previous day)
1	Cow (Indigenous)				
2	Cow (cross-breed)				
3	Heifers (Cow)				
4	Bullock				
5	Buffalo (female) (Indigenous)				
6	Buffalo (female) (cross-breed)				
7	Heifers (Buffalo)				
8	Buffalo (male)				

b. Productive & consumptive assets owned: (fill the following table)

Sl. No.	Productive & Consumptive Assets	How many are owned now?	How many owned in (year)
1	Well (Open/Borewell/Tubewell)		
2	Pumpset (Electric/Kerosene/Diesel/Solar)		
3	Irrigation Equipment (Drip/Sprinkler/Others)		
4	Agri-Equipment (Tiller/Cultivator/Bullock cart/Tractor)		
5	Livestock Sheds		
6	Electrical Appliance (Refrigerator/Fan/Computer/AC/Radio/TV/Others)		
7	Almirah		
8	Cooking appliances (Stove/Pressure cooker/LPG cylinder/others)		
9	Bicycle		
10	Motorized Two-wheeler		
11	Car/jeep/tempo/mini-truck/truck		
12	Landline/Mobile Phone		

Sl. No.	Productive & Consumptive Assets	How many are owned now?	How many owned in (year)
13	Other, specify _____		
14	Others, specify _____		

c. Dairy and Livestock business (fill the following table)

Sl. No.	Income-related questions	Livestock Type				
		Dairy	Goat Rearing	Poultry	Fisheries	Others (specify)
1	No. of livestock at present					
2	Total purchase cost in last 12 months (Rs.)					
3	Monthly total maintenance cost					
4						
5						
6	Is a source of income (1=Yes, 0=No)					
7	Mode of income (1=Milk/2=Animal or Meat/3=Eggs/4=Services/5=Others)					
8	Total monthly yield (kg, litres)					
9	Average monthly income (Rs)					

d. Income from Agricultural produce (fill the following table)

Sl. No.	Particulars	Crop 1	Crop 2	Crop 3	Crop 4	Crop 5
1	Major crops grown throughout the year					
2	Total Area under Cultivation					
3	Major costs(Land Preparation, Fertilizer,Water and Labour)					
4	Other costs (mention)					
5	Quantity of produce (in last 12 months) (kg)					
6	Self-consumption (last 12 months) (kg)					
7	Quantity sold (last 12 months) (kg)					
8	Market value per unit (Crop-wise)					
9	Unit (1=kg, 2=quintal, 3=bag, 4=bunch, 5=other(mention))					

e. Livelihood options

Sl. No.	Occupation	Source of Livelihood (Y/N)	Annual income (Rs.)	Annual employment (days)	Remarks
1	Agriculture				
2	Dairying				
3	Other livestock				
4	Collection of NTFPs				
5	Agricultural labour				
6	Business				
7	Service				
8	Others (specify)				

f. Savings, Investment and Debt (fill the following table)

Sl. No.	Savings & Investment options	Have you saved or invested here in last 12 months (Y/N)	Amount saved or invested in last 12 months (Rs.)	Any loans taken in the past 36 months? (Y/N)	Paid Back within stipulated time period (Y/N)
1	Bank/Post Office				
2	SHG				
3	MFI				
4	Relatives/Friends				
5	Money Lender				
6	Saved at Home				
7	Others (Specify)				

SECTION 4: KNOWLEDGE OF NDP I, VBMPS PROGRAMS AND BENEFITS

a. DCS Membership, Awareness & Participation

Sl. No.	Particulars	Response Type*	Response
1	Member of DCS?	Y/N	
2	Duration of DCS membership	Numeric (in months)	
3	Know when DCS started operation in village?	Y/N	
4	Aware of benefits of DCS membership?	Y/N	
5	Quantity of Milk kept for HH consumption	Numeric (in litres)	
6	Quantity of Milk poured at DCS	Numeric (in litres)	
7	Quantity of Milk poured elsewhere (Dudhia/Private/Others)	Numeric (in litres)	

Sl. No.	Particulars	Response Type*	Response
8	Main reason for pouring at DCS	Qualitative	
9	Main reason for pouring elsewhere	Qualitative	
10	Payment received regularly?	Y/N	
11	Aware of fat and SNF quantity of milk poured daily	Y/N	
12	Aware of amount receivable for milk poured daily	Y/N	
13	CHECK: Kindly show last two payment receipts		
14	Milk weighed and tested in your presence?	Y/N	
15	If "NO", what is the reason (1=Trust the DCS employee, 2= Never asked, 3=Refused by DCS employee, 4=others)	Code	
16	Any milch animal fell sick in the last 12 months?	Y/N	
17	Where did you avail support? (1=DCS; 2=Private; 3=Others (mention))		
18	Have received help for breeding (AI/Semen) from DCS	Y/N	
19	If "NO", what is the reason (1=Not aware/2=Never required/3=Never given/4=Delay in benefit/5=others)	Code	
20	Have received help for feeding (fodder seeds/cattle feed/RBP) from DCS	Y/N	
21	If "NO", what is the reason (1=Not aware/2=Never required/3=Never given/4=Delay in benefit/5=others)	Code	
22	Participated in DCS meetings since DCS started	Y/N	
23	Participated in Dairy trainings since DCS started	Y/N	
24	Discussed/asked questions in DCS meeting	Y/N	
25	Time was suitable for DCS meetings	Y/N	
26	Time was suitable for dairy trainings	Y/N	
27	What is the current unit price of milk? (1=Correct answer; 0=Non-response/non-awareness)	Code	

Note: * 1=Yes, 0=No for Y/N questions)/Qualitative/Numeric/Code

SECTION 5: INSTITUTIONAL PARTICIPATION AND EMPOWERMENT

a. Women's Role in Dairying

Sl. No.	Particulars	Response (1=Yes, 0=No)/Numeric	Remarks
1	Women member(s) of HH is a member of DCS		
2	Women member(s) of the household goes to pour milk regularly (Regularly implies more than 50% of the time)		
3	Women member(s) is aware of DCS benefits		
4	Women member(s) has attended at least one DCS meeting in past 12 months		
5	Women member(s) has attended at least one dairy training in past 12 months		
7	Who milks the cows/buffaloes more often? (1=Women; 2=Men/Kids/Others)		
8	Who decides the quantity of milk to be poured at DCS on a daily basis? (1=Women; 2=Men/Kids/Others)		
9	Who takes decisions regarding feeding/breeding and maintenance of cattle? (1=Women; 2=Men/Others)		
10	Time per day women member(s) is engaged in dairying (in minutes)		

b. Household and Women Participation in Community-level institutions

Sl. No.	Community Level Institutions	Exists in Village (Y/N)	Membership of any HH member? (Y/N)	Participation of any HH member in group activities in last 12 months?*	Number of meetings attended in last 12 months**
1	Panchayat/Gram Sabha				
2	MahilaMandal/Women SHG/Other women groups				
3	Water User Groups/Watershed groups/Forest Protection groups				
4	Co-Operatives (other than DCS)				
5	Others (Mention name)				

Note: *1= Only male member; 2= Only female member; 3= Both male and female members; 4=none

**1= Zero; 2= 1 to 2; 3=3 to 5; 4= More than 5

c. Access to Resources, Media and Extension services

Sl. No.	Common Resources	Present in village? (1=Y; 0=N)	HH Member has access to it (1=Y/0=N)	If "No", reason for non-access
1	Grazing Land			
2	Forest Land			
3	Common Well/Borewell/Tubewell/Water body			
4	PHC/Clinic/ASHA worker/Medical facilities			
5	Village school/ college			
6	Agricultural Inputs/Fodder			
7	Primary School/Anganwadi			
8	Newspaper/Newsletters/Magazine			
9	Internet			

SECTION 6: EDUCATION AND HEALTH

a. Education and Health Parameters

Sl. No.	Particulars	Response (1=Yes, 0=No)/Numeric/Qualitative
1	Number of children in household of school-going age	
2	Are all such children attending school? (Y/N)	
3	Has any child dropped out in the past 12 months? (Y/N)	
4	Reason for dropping out: (Qualitative response)	
5	Has any youth from HH gone for higher education (graduation/PG)? (Y/N)	
6	Has any youth from HH migrated to another place (job/business)? (Y/N)	
7	Number of hospital/PHC/clinic visits in past 12 months? (Number)	

SECTION 7: OPINION QUESTIONS

- a. Has the organization of cooperative in your village made any difference to your life or family? How?
- b. Do you want to suggest any changes/ addition to the cooperative development programme in your village to make it more effective?

APPENDIX B: DCS SCHEDULE

-
1. Name of the Respondent:
 2. What is his/her role in the DCS? (1=DCS Secretary; 2= AI worker; 3= Others (specify)
 3. DCS name:
 4. Village name:
 5. Name of DCS secretary:
 6. Name of the DCS Management Committee Chairman:

7. Membership & Milk Collection

Sl. No.	Particulars	Response
1	When was DCS set up? (qualitative)	
2	What is the initial number of milk producer who registered when DCS started? (nos.)	
3	What is the current number of milk producer members registered? (nos.)	
4	Out of this, how many women members are there currently? (nos.)	
5	How many are milk pourers (daily average)?	
6	How many are non-member milk pourers (daily average)?	
7	How many members are from ST community? (nos.)	
8	How many members from SC/OBC communities? (nos.)	
9	How many members are small-holders (own 3 or less than 3 milch animals)? (nos.)	
10	How many new members have registered in the previous 12 months ? (nos.)	
11	How many new women/ST members have registered in the previous 12 months? (nos.)	
12	What is the average per day milk collection now? (litres/day)	
13	What was the average per day milk collection 12 months ago? (litres/day)	
	(Verify from records if available)	
14	What quantity of milk collected is cow's milk? (litres/day)	
15	What quantity of milk collected is buffalo's milk? (litres/day)	
16	How many hours a day does it take to collect milk? (hrs)	
17	What is general fat % of the milk being poured?	
18	What is general SNF % of the milk being poured?	
19	What is the local sale of the DCS (liters per day)?	
20	What is the price of milk sold locally by the DCS?	
21	What is the method of checking fat % in milk at the DCS?	
22	What is the method of checking SNF % in milk at the DCS?	
23	What are the timings allocated for milk pouring? (qualitative)	
24	What are the timings for milk collection by vehicles/ milk tankers? (qualitative)	
25	What is the price per unit milk (unit = fat/litre/others) now? (Rs/unit)	
26	What was the price per unit milk (unit = fat/litre/others) when the DCS was registered ? (Rs/Unit)	

Sl. No.	Particulars	Response
27	When did the last price rise happen? (qualitative)	
28	Which is the fala/ward/hamlet where DCS is located? (Name of fala/ward/hamlet)	
29	Which is the dominant caste in this fala/ward/hamlet? (1=ST; 2=SC/OBC; 3=Gen; 4=Others)	
30	Which is the fala/ward/hamlet farthest away from the DCS? (Name of fala/ward/hamlet)	
31	What is the approximate distance of that fala/ward/hamlet from DCS? (in km)	
32	What is the size of the DCS managing committee? (no. of members)	
33	How many members in the committee are women? (nos.)	
34	How many members in the committee are from ST community? (nos.)	
35	Which community is the chairman from? (1=ST; 2=SC/OBC; 3=Gen; 4=Others)	

8. Village Particulars

Sl. No.	Particulars	Response
1	What is the number of households in the village? (approx no.)	
2	What is the number of ST households in the village? (approx. no.)	
3	What is the number of milch cattle in the village? (approx no.)	
4	Is there an alternative milk market in the village? (1=Yes, 0=No)	
5	If "Yes", which of this is applicable (1=Dudhia; 2=Private Dairy; 3=Spot Market; 4=1&2; 5=1&3; 6=2&3; 7=All 3; 8=Others)	
6	How many villagers sell milk to alternative milk market? (no.)	
7	What is the approximate rate/price offered at alternative milk market? (Rs./unit)	
8	Has setting up of DCS led to greater interaction between caste groups? (1=Yes, 0=No)	
9	If "Yes", Can you mention any particular instance? (Qualitative)	
10	Have DCS members gained positions of power in Gram Panchayat/Samiti/Other bodies)? (1=Yes, 0=No)	
11	Has it happened with a woman/ST member? (1=Yes, 0=No)	
12	If "Yes", Can you mention any particular instance? (Qualitative)	
13	Any major developments in village after set-up of DCS? (1=Yes, 0=No)	
14	If "Yes", Can you mention any particular instance? (Qualitative)	

9. Village Amenities

Sl. No.	Amenities	Availability in Village (1=Yes, 0=No, NA=Not applicable for Y/N responses)
1	Electricity (Y/N)	
2	Drinking Water (Y/N)	
3	Toilets (Y/N)	
4	Agricultural/Cultivable land (Y/N)	
5	Irrigated Land (Y/N)	
6	Main Source of Irrigation (1=Borewell; 2=Handpump; 3= Tubewell; 4=Canal/Stream; 5=Others)	
7	All-weather roads	
8	Grazing Land	
9	Forest Land	
10	Wells/Borewells/Tubewells	
11	Handpumps	
12	PHC/Clinic/ASHA worker	
13	Internet	
14	Village school/college	
15	Primary School	

10. DCS Functioning

Sl. No.	Particulars	Response
1	What is the usual payment cycle? (1=daily; 2=weekly; 3=every 10 days; 4=fortnightly; 5=others)	
2	What is the payment mode? (1=Cash; 2=A/C transfer; 3=Both; 4=Others)	
3	Is DCS equipped with AMCU? (1=Yes, 0=No)	
4	Is DCS equipped with BMC? (1=Yes, 0=No)	
5	Is DCS part of BMC cluster? (1=Yes, 0=No)	
5.1	If Yes, how far is the DCS from the BMC Cluster? (in Kms)	
6	How is hygiene maintained at DCS? (Qualitative response)	
7	Is the following provided by the DCS ?	
7.1	Animal Health Coverage (1=Yes, 0=No)	
7.2	AI (1=Yes, 0=No)	
7.3	Supply of Cattle Feed (1=Yes, 0=No)	
7.4	Mineral mixture & feed supplements (1=Yes, 0=No)	
7.5	Fodder seeds (1=Yes, 0=No)	
7.6	Training & demonstration to producer members (1=Yes, 0=No)	
7.7	Propagation of CMP practices (1=Yes, 0=No)	

8	Has training session been held for Management Committee members? (1=Yes, 0=No)	
8.1	If "Yes", how long ago was it held? (months)	
9	Has training session been held for DCS staff? (1=Yes, 0=No)	
9.1	If "Yes", how long ago was it held? (months)	
9.2	What was the topic discussed in the training session? (Qualitative)	
10	Has training session been held for producer members? (1=Yes, 0=No)	
10.1	If "Yes", how long ago was it held? (months)	
10.2	How many producer members attended the last training session? (no.)	

*Check: Could you show me a weighing & testing of a sample? (if feasible)
Is milk collected and tested in presence of producer members?*

11. Has the organization of cooperative in your village made any difference to the lives or families of people here? How?

12. Do you want to suggest any changes/ addition to the cooperative development programme in your village to make it more effective?