

**Impact Assessment Study on IOCL's CSR Project- Establishment of
Fodder bank and Skill based training facility for Youth and
Farmers at Gannavaram in Andhra Pradesh**

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V. SREEMANNARAYANA MURTHY

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Annexure

1. Introduction

The Indian Oil Corporation, one of the leading commercial enterprises of India executed an ambitious Corporate Social Responsibility (CSR) Project at Livestock Farm Complex, NTR College of Veterinary Science, Gannavarm, Andhra Pradesh. The project was taken up with an objective of fulfilling four cardinal points of schedule VII of Companies' Act, 2013 viz.,

1. promoting employment enhancing vocational skills & livelihood enhancement
2. Empowering women
3. Ensuring environmental sustainability, maintaining quality of soil, air and water, animal welfare and
4. Rural development projects

The main motto of the project is reclamation of waste land to bring out products beneficial to the marginalized sections of the society. In a way this project is in tune with the constitutional mandate of bringing the excluded groups into the developmental process and thereby into the mainstream of the society. About 17 acres of waste land was available in the Livestock Farm complex of the NTR College of Veterinary Science, Gannavaram, in Krishna district of Andhra Pradesh. A survey conducted by the College revealed that there is a shortage of cattle fodder in the State of Andhra Pradesh to the tune of 52 per cent. In order to make up for the shortage, an innovative method is required. It must be noted that vast stretches of green fields are being converted into house sites and such ventures, by the realtors unmindful of the consequences. Despite the fact that a Panchayat resolution is needed to undertake such an exercise, the functionaries of the Panchayat are being easily managed to obtain permissions for real estate ventures. One of the adverse consequences of such activity is the shortage of fodder. Dr. Venkateshaiah, Professor at the College identified the tank bund in the premises to grow the proposed fodder. The area of the land around the tank is about 3.8 acre.

The dream project of Prof. Venkateshaiah began to move towards reality with IOCL stepping in to sponsor the project of waste land reclamation, growth of fodder and imparting

requisite skills for the identified marginalized sections to grow the fodder on leased lands or government lands.

Water logged land was treated; the uneven land was levelled. The land on the tank bund was cleared of thorny bushes and weeds as it is expected to yield a rich crop. This land was up to 3.8 acres and the other non-cultivable land treated is up to 15 acres. After intense research the seeds of high yielding locally adaptable fodder varieties such as Hybrid Napier grass (Super Napier), Guineagrass, COFS 29 and fodder trees like Moringa, Subabul and Sesbania were procured. The distinctive feature of the fodder varieties is that they yield a crop throughout the year. The fodder varieties were tested and developed for eight months. They are found to be high biomass yielding varieties.

Objectives of the Study:

1. Whether silage production is beneficial to the marginalized sections of the village
2. Whether the silage sold to the identified women beneficiaries contributed to women empowerment or would contribute to women empowerment in the near future.
3. Whether the silage fed to the cattle improved the quantity of milk
4. Whether the silage fed to the cattle improved the quality of milk.
5. Whether establishment of Fodder Bank contributed towards environmental sustainability
6. Whether the training imparted to identified beneficiaries vocational skills and livelihood enhancement
7. Whether there is scope for the farmers to produce silage in the near future.
8. Whether the silage production and sale contribute to rural development wherever there is scope for cattle rearing
9. Whether the project in the long run contributes to social mobility with reference to marginalized sections of the society.

2. METHODOLOGY AND APPROACH

The Social and Environmental Impact Assessment is a method of identification and evaluation of potential effects both positive and adverse of the project with regard to environment and socio-economic elements. The impact is in terms of quality of life and environmental benefits.

The following methodology has been adopted to carry out the present study.

Description of the proposed project locations / sites of the project

Site survey of the fodder bank was conducted. Pictures of the site before the launching of the project were collected from the Project In-charge to ascertain the nature of the wasteland before the commencement of the project. Information was also gathered on the execution of clearance work before transforming the non-cultivable land into cultivable one.

Information on Environmental and Social baseline surveys:

It is pertinent to note that the project in-charge Dr. Venkateshaiah has conducted baseline survey on environment and social aspects before the commencement of the project. So in course of interviews with him, necessary information on the baseline survey was gathered. This helps in understanding the pre project conditions or characteristics of the area. The available data from secondary sources is utilized to describe the base line of the study area.

APPROACH

The approach to the study comprises literature review, desk top study, collection of primary data, field visits, consultations, data analysis and preparation of report. The primary and secondary data collection related to the environmental and social attributes are part of the study. Field visits were conducted in the study area.

Selection of Samples and Tools for Data Collection

The four villages studied were located in two mandals of Krishna district of Andhra Pradesh. Data on project area, socio-economic and livelihood profiles of local communities, public consultation with the local communities are completed. Through structured interview schedule, focus group discussions were organized as

part of data collection from the relevant community. The personnel of the Department of Animal Husbandry helped the researcher in identifying the beneficiaries.

The main objective of the study is to find out whether the production of silage is beneficial to the marginalized sections of the society especially women. The study also focused on environmental benefits accruing out of the project. The study also focused on the potential of the project to be replicated elsewhere in the country or in areas with similar geographical features for the overall benefit of the marginalized sections of the society as it is the Constitutional mandate.

3. ESTABLISHMENT OF FODDER BANK

The pre-condition for establishment of Fodder Bank was identification of suitable land. Dr. Venkateshaiah observed that about 2.8 acres of land around the tank was lying waste covered by bushes and thorny plants. Apart from the said land a vast field of about 15 acres was also lying vacant but waterlogged and covered with weed. The idea is to reclaim the waste land for the purpose of growing different varieties of fodder. The Indian Oil Corporation Ltd. came forward to sponsor the project which included

- Heavy machinery and earth movers were used for clearance of bushes on 15 acres of waste land and about 2.8 acres of tank bund and leveling the land.
- De-siltation was carried out wherever there was water logging
- A bore well was drilled and water connectivity is provided to all the fields where different varieties of fodder grass is being grown
- Perennial fodder grass varieties like Super Napier (Napier Pachong-1), Zuri (Guinea grass), Legume fodders (stylo hamata), fodder bushes(desmanthus) and fodder trees like Moringa, Subabul and Sasbania are planted.
- Machinery such as Forage harvester, Chopper, Brush cutter, Chaff cutter, forage harvest, chopping and making of silage bales has been procured.
- A silage storage Shed was constructed.

Fodder bank development on alternate lands – Tank bund fodder production







Fodder production on non cultivable lands



Tank bund fodder production system



Bush clearance





Establishment of fodder fields





Fodder bank species



Silage preparation & Storage shed



Silage packing machine



Chaff Cutter

Brush Cutter

Forage Harvester



Agricultural bore well



Machine harvesting of fodder



Silage bales stored in the fodder bank

REDMI NOTE 8 PRO
AI QUAD CAMERA



Farm complex at NTR College of Veterinary Science



Collected Fodder



Fodder cutting machine



Silage Bale Making



Ingredients for making silage bale



Ingredients mixed with grass



Silage Bale Making



Final Product of Silage Bale



Final product of silage bale (50kg per bale)



Silage Bales are ready for dispatch



Visiting Cultivated Land



Tank Bund view



Birds gathered at Tank Bund



Learning about the difference between fodder and fodder trees



Fodder seeds



Learning Grass Capacity



Visiting all parts of the tank bund



Waste land converted into fodder cultivation land near tank bund



Different Varieties of Fodder



Another variety of Fodder



Super Napier Fodder



Fodder ready for another yield (45 days)



Another Variety of fodder grass



Waste land Converted to fodder cultivation land



Fodder cutting



Visit to Training Centre



Training Centre at farm Complex



Training room at farm complex



Fodder and Skill Development Training Centre in Farm Complex



Prof. Venkata Sesaiah



Researcher with Prof. Venkata Seshaiyah at Farm Complex Office

4. SOCIAL IMPACT ASSESSMENT OF THE PROJECT

Social impact study examines the changes in the quality of life of the beneficiaries after the advent of the project. The distribution of silage bales to the identified beneficiaries and training them towards skill development should improve the quality of their lives. The researcher and his team visited four villages namely Bahubalendrunigudem and Allapuram in Gannavaram Mandal, and Elukapadu and Vempadu villages in Unguturu Mandal of Krishna district.

List of beneficiaries who received/purchased silage bales at Bahubalendrunigudem (B.B.Gudem)- Gannavaram Mandal, Krishna District

S.NO	NAME	SOCIAL CATEGORY (SC/ST/BC/OC)
1	D.USHA RANI	BC
2	CH. RANI	BC
3	C.NAGESWARAMMA	BC
4	B. SIVAPARVATHI	OC
5	K. RAJYALAKSHMI	BC
6	K. DURGAMMA	BC
7	T. SITAMMA	OC
8	T. ANASOOYA	OC
9	CH. NAGALAKSHMI	BC
10	CH. SURESH	BC
11	Y. RAMANA	BC
12	P. SAMBHASIVA RAO	OC
13	T. JYOTHI	OC
14	N. RAJENDRA PRASAD	BC
15	P. SAMBHASIVA RAO	OC
16	M.JYOTHI	BC
17	B. MURALIKRISHNA	OC
18	K. UPENDRA	BC
19	CH. SRINIVASA RAO	BC
20	CH. SURYACHANDRA RAO	BC
21	K. RAMADASU	BC
22	CH. DHANALAKSHMI	BC
23	CH. MALESHWARA RAO	BC
24	D.RAMBABU	BC
25	S. KOBAMMA	SC
26	Y. MAYA	BC
27	A VIJAYAMMA	OC

28	CH. MALAYYA	BC
29	CH. KAMESHWARI	BC
30	CH. REKHA	BC

**List of beneficiaries who received/purchased silage bales at Allapuram- Gannavaram
Mandal, Krishna District**

S. No.	NAME OF THE FARMER	SOCIAL CATEGORY (SC/ST/BC/OC)
1	KORLAGANTI SIVA RANI	OC
2	TADISETTY VENKATESWARAMMA	BC
3	KARAMPUDI KUMARI	OC
4	KADIYALA LAKSHMI	OC
5	BADUGU MADDIMMA	BC
6	VARRE RAMADEVI	SC
7	GURIVINDAPALLI RATNAKUMARI	SC
8	GANTHOTI MERI	SC
9	GUDLA NAGA LASKHMI	SC
10	GANTHOTI INDIRA PRIYADARSHINI	SC
11	GUGULOTHU BABI	ST
12	JANGAM BUJJI	SC
13	SAVARAM LAKSHMI	SC
14	SAVARAM SUSHMA	SC
15	SAVARAM KUMARI	SC
16	SAVARAM CHINNI	SC
17	CHILAKANTI SUJATHA	BC
18	CHILAKANTI JOJAMMA	BC
19	KATRU MANI	SC
20	DEBBALA SARADA	SC
21	TIRIVEEDHI LAKSHMI PRASANNA	SC
22	PULIVARTHI MARTHAMMA	SC
23	DEBBALA LATHA	SC
24	DOKKU SIVAKUMARI	BC
25	VEERLA JYOTHI	BC
26	NAKKA SAMADHANAM	SC
27	DEBBALA KAMALA	SC
28	KURAPATI BUJJI	SC
29	VEERLA LAKSHMI JEEVAMANI	BC
30	DONDUBOINA SAMRAJYAM	BC
31	THOTA SRIVANI	BC
32	VEERLA KANAKA DURGA MAHALAKSHMI	BC
33	VEERLA NAGA KRISHNAVANI	BC

34	VEERLA LAKSHMI NAGAMANI	BC
35	AVUTUPALLI MANGAMMA	BC
36	DEVARAPALLI NAGALAKSHMI	BC
37	DEVARAPALLI RAMADEVI	BC
38	AVUTUPALLI VEERAKUMARI	BC
39	KODALI BHARATHI	OC

**List of beneficiaries who received/purchased silage bales at Vempadu- Unguturu
Mandal, Krishna District**

S. No.	NAME OF THE FARMER	SOCIAL CATEGORY (SC/ST/BC/OC)
1	NAGANABOYINA NAGALAKSHMI	BC
2	NAGANABOYINA RAMYA PAVANI	BC
3	KOLUSU RAJINI	BC
4	NAGANABOYINA JOYTHI	BC
5	NAGANABOYINA GOVARDHANAMMA	BC
6	KESARA RAMANA	OC
7	KESARA KRISHNA KUMARI	OC
8	BOTLA PRAMEELA RANI	OC
9	KESARA SARITHA	OC
10	BOMMAREDDY DHANALAKSHMI	OC
11	THULLIMILLI ANNAMANI	SC
12	ARIKATTLA VANI	SC
13	JANAMALA RAJINI	SC
14	THULIMILLI GOWTHAMI	SC
15	PULIPAKA SOUJANYA	SC
16	BOKINALA VAJRAMMA	SC
17	BOKINALA DHANALAKSHMI	SC
18	BOKINALA SAILAJA	SC
19	BATTHULA RANI	SC
20	IAM SATYAVATHI	SC
21	MERUGU JAYAMMA	SC
22	VEMANDA MANASA	SC
23	IAM KALPANA	SC
24	THULIMILLI MERY SUNITHA	SC
25	MERUGU KALAVATHI	SC

**List of beneficiaries who received/purchased silage bales at Elukapadu- Unguturu
Mandal, Krishna District**

S.No.	NAME OF THE FARMER	SOCIAL STATUS(SC/ST/BC/OC)
1	PILLI PUNYAVATI	BC
2	AKULA INDHRANI	BC
3	CHOUTAPALLI SAMPURNA	SC
4	SRIKAKULAPU KARUNAMMA	SC
5	POGULA PARVATHI	BC
6	SRIKAKULAPU MANI	SC
7	AJMIRU KUMARI	ST

The sale of silage bales and their administration to the cattle is supervised from time to time by the personnel of the Department of Animal Husbandry apart from the Project In-charge Dr. Venkateshaiah. The NTR College of Veterinary Sciences has adopted the village Bahubalendrunigudem (B.B.Gudem). Hence, either the project in-charge or his representatives visit the villages at frequent intervals. Now the team is in the process of identifying Government owned wastelands for reclamation. The researcher and his team have been able to meet all the beneficiaries in their respective villages except in Allapuram where only 17 members out of 39 beneficiaries were available for interaction. The team observed uniformity in the operational process of procuring silage and administering it to the cattle. The responses of the people were the same though expressed in different language. It was found that Dr. Venkateshaiah evinced keen interest in improving the lot of the people. Hence, he conducted awareness programmes in the said villages to impart knowledge in silage administration. Beneficiaries told us that in case of confusion regarding either the quantity of silage or in terms of its usage for limited period once the bale is opened, they always contacted the project in-charge who in order to promote the project responded immediately and also did not hesitate to visit the village to personally interact with the beneficiaries.

Benefits of the fodder:

The various varieties of fodder yield protein rich food which promotes the healthy growth of the calves.

- The fodder varieties stated can grow even without water
- The fodder is preservable. Molasses, salt and lactic acid are used as preservatives.

- The highly nutritious fodder can reduce calf mortality
- The grass grows with every cutting and thus enabling multiple cuts
- The grass is said to grow for ten years or even more.

Owing to shortage of green grass in summer, the milk production usually falls. It is learnt from the milk unions in the Gannavaram mandal that the supply of milk in the summer season is lesser due to the non-availability of green grass especially to the small and marginal farmers.

Economy:

Each silage bale weighs 50 kgs. It is sold at Rs 2/- a kg. It means each silage bale costs Rs. 100/- Comparatively the Government is selling it at a cost of Rs. 4/- a kg by purchasing it from private players. Private companies cost price fluctuates depending up on the demand and supply of the silage. This is not affordable for the small farmers. Hence, in course of the visit in all the four villages, farmers whom the researcher interacted with expressed their satisfaction over the price of the bale.

In order to encourage the farmers, the NTR College made arrangements for distribution of silage bales in the identified villages. Prof. Venkatasashaiah who is the project in-charge stated in course of interaction that in order to popularize the concept of low price-silage bales it is necessary to carry them to the villages in the initial stage. He also stated that once encouraged the farmers are reaching the fodder bank for purchase of bales. The cost of feeding one cow per day which is Rs 30 per day using silage, otherwise it is Rs.105 per day as learnt from the beneficiaries. It has been observed that the news of low price- silage bales has reached far and wide and people from other villages began to flock for silage. But in order to identify the marginal sections of the society, the village volunteers on the request of the officials of Animal Husbandry are involved in identifying the targeted beneficiaries. The list of those who approached for silage is given in the tables.

As Napier grass is nutritiously rich the cattle consume less quantity which is 15 kg as compared to paddy grass which is 20 kgs per day. To meet the demand for silage, 7000 bales are produced after a single cut of the grass.

Boost in milk production:

An enquiry and verification of records in the offices of the milk unions revealed that after the distribution of silage bales, the farmers are able to save time and money. The president of the Milk union at BB Gudem said that earlier they received only two cans of milk in a day (each

can 40 liters) but since the introduction of silage, they are receiving three cans per day. One bale they said once opened lasts for three days. Earlier each farmer used to supply 1.5 litres of milk per day. But after the administration of the nutritious and protein rich silage to the cattle, there has been increase in the quantity of milk. It rose from 1.5 to 2.00 litres i.e., an average increase of 25 per cent.

Improvement in the quality of milk:

The local Milk sellers' society president at B.B. Gudem has shown that the fat content in the milk has improved after the introduction of silage. Earlier the fat content was to the tune of 9.2 per cent and now it has improved to 10 per cent. Now the milk society members are confident that the silage would enable them to sell high quality milk which would fetch them a higher price. Lactometers are being used by the vendors in this village to test the viscosity of the milk. This testing was carried out in all the four villages by the project in-charge. In all the villages where the silage was administered, there was rise in the fat content. Hence, the farmers have increased the price of milk from Rs.60/- a litre to Rs. 70/- a litre. A rise in Rs. 10 /- per litre has conspicuously increased the income of the farmers. Tammiseti Venkatalakshmi of B.B. Gudem who is the president of the Women Cooperative Society said that the farmers are happy with the rise in their incomes which was due to the improvement in the fat content in the milk. She said that some customers possess lactometer to test the quality of milk and hence only after being satisfied with the fat content that they are coming forward pay the increased price. Venkatalakshmi also said that health of the cattle has also improved. Now fewer interventions from the officials of Animal Husbandry is required after the cattle are administered the silage.

Improvement in overall health:

The villagers of B.B. Gudem forthrightly stated that the milk they drank after feeding their cattle with silage was of an improved quality such that none in the village contracted Covid-19 and that the village was free from the pandemic. Though this sounded like exaggeration, the beneficiaries stated this in unison. They also added that there is improvement in the immunity of their children. This is the adopted village of NTR College and the farmers said that the staff of the college are very responsive to their appeals during the time of necessity pertaining to cattle. The beneficiaries in other villages also responded positively to the subject of improvement of health of those drank milk after administration of silage to the cattle.

Reduction in competition and conflict:

Earlier they were moving in and around to locate green pastures and there was competition among themselves to cut grass on a patch of land by paying the owner. Often some people ended up disappointed. But now the farmers/beneficiaries say that ever since the production and distribution of silage bales, they heaved a sigh of relief. Now it is no more a tough competition to identify a patch of green grass. The competition and conflict among the farmers are now considerably reduced. Thus, the readymade silage has saved time and reduced stress among the farmers.

Malnutrition and Calf deaths:

Owing to malnutrition, the calf mortality has been 60 per cent as identified by the NTR College of Veterinary Science. Now the farmers say that calf mortality is considerably reduced. It has now dropped down to about 40 per cent. But if concept of silage bales becomes more popular, the farmers opine that calf mortality can be further reduced. This would certainly boost the dwindling cattle wealth of the country if this formula is replicated across the country. Lack of nutritious fodder is the reason for calf mortality in majority of the cases.

Women Empowerment:

The women beneficiaries stated that though their husbands are the owners of the cattle, the fact that they have been identified as beneficiaries, the benefits accrue to the family in the name of the women. Hence, it not only boosts their confidence in the family and society, it also enables them to contribute to their families. Now women are coming forward to form into Milk procurement and Distribution societies. This development contributes to women empowerment. This is witnessed especially in B.B. Gudem.

Eradication of Poverty:

The production of silage on no-profit, no-loss basis has encouraged the potential farmers of the village to be guaranteed of availability of fodder even in slack season. Farmers at Allapuram stated that green grass is not available in summer season. But even in rainy season due to water logging the grass is not accessible. Even if they procure, it is not fit as fodder. Hence, readymade silage would be useful even in rainy season also. Most of the SCs with one or two cattle stated that they propose to take land on lease and grow the Napier grass collectively. Super Napier has been supplied to some beneficiaries at B.B. Gudem by the NTR College because they adopted the village.

The IOCL sponsored Training Centre

The IOCL and the NTR College of Veterinary Science have identified about 200 beneficiaries owning one or two dairy animals with the help of Society for Elimination of Rural Poverty (SERP) and Animal Husbandry Department. The villages identified were 1. Bahubalendrunigudem, and 2. Allapuram in Gannavaram Mandal and 3. Vempadu and 4. Elukapadu in Ungutur Mandal of Krishna district. Training was imparted on topics such as Profitable dairy animal management; Techniques in clean milk production; Techniques to improve breeding efficiency in cattle; Techniques to improve conception rate in cattle; Techniques in breeding management of cattle; Techniques to use alternate and waste lands for fodder production; Techniques to decrease calf mortality; Feeding management of Dairy animals; and Techniques to improve fat and Solids Not Fat SNF in the milk

List of Trainees who attended various Training programmes at the NTR College with the infrastructure provided by IOCL

TECHNIQUES TO USE ALTERNATE AND WASTE LANDS FOR FODDER PRODUCTION (21.07.2021)			
S.N O	NAME	PLACE	SOCIAL CATEGORY
1	Y. SANTHA MAHESHWAR RAO	KONDURU	OC
2	Y. RAMESH	GANNAVARAM	SC
3	T.K.V. PRASAD	GANNAVARAM	BC
4	V. SRINIVASA RAO	VISANNAPETA	OC
5	K. SUDHAKAR	VISANNAPETA	BC
6	K. CHINNAVEERA VENKAYYA	VISANNAPETA	SC
7	M. CHITAYYA TATTAKONDA	VISANNAPETA	SC
8	A. DANAYYA	VISANNAPETA	SC
9	SK. BHASHA	VISANNAPETA	BC
10	M. RAGHAVULU	VISANNAPETA	SC
11	P. KANTHA RAO	VISANNAPETA	BC
12	B. RAVI MADHAVARAM	A. KONDURU	BC
13	B. RAJA	A. KONDURU	SC
14	B. RAJUGOPAL	A. KONDURU	OC
15	B. SANKAR	A. KONDURU	SC
16	V. VENKATESHWARULU	KHAMMAM	BC
17	E. AGNESI KUNAPARAJA PARAVA	REDDIGUEDEM	ST
18	CH. SRINIVASA RAO	REDDIGUEDEM	OC
19	CH. KRISHNA RAO	REDDIGUEDEM	BC
20	G. MAHESH	REDDIGUEDEM	SC
21	P. BALAKRISHNA	REDDIGUEDEM	SC
22	V. VIKRAM	CHANDRALLAPADU	ST
23	T. BHARGAV	CHANDRALLAPADU	SC
24	C. ANKAMMA RAO	CHANDRALLAPADU	OC
25	V. POTHURAJU	KANCHAKACHARLA	ST
26	B. ASHOK	KANCHAKACHARLA	ST
27	K. BABU RAO	A. KONDURU	BC

28	J, NAGESHAWAR RAO	A. KONDURU	OC
29	SRIN	KHAMMAM	OC
30	R. CHINNI	KANCHAKACHARLA	SC
31	S. SRINIVASA RAO	KANCHAKACHARLA	SC
32	B. MOHAN RADDY	A. KONDURU	OC
33	B. BALAVARDHAN REDDY	A. KONDURU	OC
34	N. RAMACHANDRA RAO	VACHAVAI	OC
35	E.V. JAGANMOHANA RAO	VACHAVAI	BC
36	N. PAPA RAO	VACHAVAI	BC
37	N. ADINARAYANA	VACHAVAI	BC
38	N. GOPAL RAO	VACHAVAI	BC
39	P. VEERAYYA	VACHAVAI	SC
40	D. RAMA MURTHY	VACHAVAI	BC
41	E. JAGADESH	VACHAVAI	BC
42	G. VENKATANARAYANA	VACHAVAI	BC
43	N. NAGESHWAR RAO	VACHAVAI	BC
44	CH. KRISHNA RAO	CHANDARLAPADU	BC
45	R. SUMATHI	KANCHIKACHARLA	BC
46	V. MOUNIKA	VISANNAPETA	OC
47	D. NIKITHA	REDDIGUDEM	OC
48	A. NAGESHWAR RAO	DODDADEVARAPADU	BC
49	M. BABU	VEERULAPADU	BC
50	S. VEERAI AH	VEERULAPADU	SC
51	P. MOORTHAI AH	VEERULAPADU	ST
52	A. PITCHAI AH	VEERULAPADU	BC
53	CH. NAGESHWAR RAO	VEERULAPADU	OC
54	S. RAVI	VEERULAPADU	ST
55	B. DHARMA RAO	VEERULAPADU	OC
56	V. SAMBASIVA RAO	GANNAVARAM	OC
57	T. RAGHU BABU	GANNAVARAM	BC
58	CH. VENKATESHWAR RAO	GANNAVARAM	BC
59	P. SAMBASIVA RAO	GANNAVARAM	BC

TECHNIQUES TO DECREASE CALF MORTALITY (05.12.2021)			
S.NO	NAME	PLACE	SOCIAL CATEGORY
1	CH. PRASANNA KUMARI	OGINALA	SC
2	V. MALLESWARI	GOLLANAPALLI	SC
3	B. RAMAKOTESHWARI	GOLLANAPALLI	SC
4	D. VENKATESHWAR RAO	GOLLANAPALLI	OC
5	P. MADHU	GOLLANAPALLI	BC
6	P. ANIL KUMAR	GOLLANAPALLI	BC
7	Y. GANDHI	GOLLANAPALLI	OC
8	V. SESHAGIRI RAO	KOMMURU	OC
9	A. GURUVIAIAH	RANGANNAGUDEM	BC
10	K. VENKATESHWAR RAO	APPA RAO	OC
11	V. KRISHNA MOHAN	DANTAGUNTLA	OC
12	K. KRISHNAKUMAR	REMALLE	OC
13	D. RAVI CHANDRA	ANANTHASAGAR	OC
14	N. RAMAKRISHNA	MALAVALLI	OC
15	CH. NAGESHWAR RAO	VELERU	BC
16	D. VENKATA RAO	ARISTOTLE	BC
17	M. RAMESH	PEDALINGALA	BC
18	T. SRIVALLI	KAKULAPADU	OC
19	D. YESUBABU	GOLLANAPALLI	SC
20	D. LAKSHMI	GOLLANAPALLI	SC
21	CH. TULASI BHAVANI	KOLLUR	SC
22	P. VIJAYA LAKSHMI	KOYYURU	BC
23	K. SRAVANI	KESARAPALLI	SC
24	SK. BHASHA	VISSANNAPETA	BC
25	V. SRINIVASA RAO	VISSANNAPETA	BC
26	B. RAJU	KUMMARAGUNTA	BC
27	B. RAJUGOPAL	REPALLE	OC
28	B. SANKAR	A. KON DURU	BC
29	CH. KRISHNA RAO	REDDIGUDEM	BC
30	B. MOHAN REDDY	KODURU	OC

FEEDING MANAGEMENT OF DAIRY ANIMALS (23.12.2021)			
S.NO	NAME	PLACE	SOCIAL CATEGORY
1	P. KARAMMA	AJJAMPUDI	SC
2	T. DURGA	AJJAMPUDI	BC
3	K. MASTANAMMA	AJJAMPUDI	BC
4	A. RANGAMMA	AJJAMPUDI	SC
5	M. SANTHAMMA	AJJAMPUDI	SC
6	B. NAGAMANI	AJJAMPUDI	BC
7	D. BAAYAMMA	AJJAMPUDI	OC
8	D. MARIAMMA	AJJAMPUDI	SC
9	K. MARTHAMMA	AJJAMPUDI	SC
10	T. BABU RAO	AJJAMPUDI	SC
11	P. RANGAMMA	AJJAMPUDI	SC
12	J. MARIAMMA	AJJAMPUDI	SC
13	P. BABI	AJJAMPUDI	SC
14	Y. KANAKARATNAM	AJJAMPUDI	OC
15	B. DEVAMATHA	AJJAMPUDI	SC
16	V. SAROJANAMMA	AJJAMPUDI	SC
17	V. MALLESWARI	AJJAMPUDI	SC
18	T. MALLESWARI	AJJAMPUDI	SC
19	D. SANDYA RANI	AJJAMPUDI	SC
20	A. SOORI	AJJAMPUDI	SC
21	K. JHANSI RANI	AJJAMPUDI	SC
22	K. RAJYA LAKSHMI	AJJAMPUDI	SC
23	CH, SUGUNAMMA	AJJAMPUDI	SC
24	K. BUJJI	AJJAMPUDI	SC
25	G. RANI	AJJAMPUDI	BC
26	P. SITAMMA	AJJAMPUDI	BC
27	K. RAMADEVI	ATKURU	BC
28	S. RAKESH	VUYYURU	OC
29	T. RAJESH	VUYYURU	OC
30	P. PAPA	MANTHENA	OC

FEEDING MANAGEMENT OF DAIRY ANIMALS (19.01.2022)			
S.NO	NAME	PLACE	SOCIAL CATEGORY
1	K. SRAVANTHI	KESARAPALLI	SC
2	M. CHINNMAI	KESARAPALLI	SC
3	N. PREETHI	KESARAPALLI	SC
4	K. SUDHARANI	KESARAPALLI	SC
5	P. RANI	KESARAPALLI	BC
6	J. SEREESHA	KESARAPALLI	SC
7	J. MARTHAMMA	KESARAPALLI	SC
8	J. BUJJI	KESARAPALLI	SC
9	G. JHANSI	KESARAPALLI	OC
10	P. CHINNI	KESARAPALLI	SC
11	T. AROGYAM	KESARAPALLI	BC
12	K. PANDU	KESARAPALLI	SC
13	J. SUBAMMA	KESARAPALLI	SC
14	CH. NAMITHA	KESARAPALLI	OC
15	P. SANTHI	KESARAPALLI	SC

The trained beneficiaries at the IOCL- built training centre for skill development though small and marginal farmers expressed confidence that they would soon develop the potential to become entrepreneurs. It is instructive to note that since the news of silage distribution and training on various aspects of cattle farming has spread far and wide, farmers from villages other than the four identified villages started evincing interest in participating in the programme. This is reflected in the tables presented above. Prof Venkataseshaiyah said that now they are encouraged to impart training to more beneficiaries and a project proposal has been submitted to the Government of Andhra Pradesh. The Minister of Animal Husbandry and the Principal Secretary of the Department appreciated the project and were convinced of the considerable reduction in the budget allocated to buy and distribute silage. They promised to take up the project on a larger scale for the benefit of the farmers as it yielded multiple benefits.

Methods of promotion:

Prof Venkateshaiah said that they are printing booklets and brochures to be distributed in villages around Gannavaram to promote the concept of silage bales at the fodder bank. They are now working on the audio- visual methods of promotion of the concept. The Department of Animal Husbandry and the Village Volunteers are also playing a key role in popularizing the yearlong available readymade silage bales. This was witnessed by the researcher in Vempadu village of Ungutur mandal where the Volunteers took the lead role in fetching not only the beneficiaries but also the potential beneficiaries to the Gram Secretariat which was the meeting spot of the researcher with the beneficiaries.



Slage bales distribution by Shri R S S Rao, Executive Director & State Head, TAPSO, IOC Ltd., Hyderabad



Silage bale distribution to landless women dairy farmers



Farmers getting silage bales from the fodder bank





Training to women dairy farmers



Training to women dairy farmers



Training to women dairy farmers

Training to dairy farmers

VISIT TO BBGUEM (BAHUBALENDRUNIGUEM)



Interviewing beneficiaries at the village



Interaction with the beneficiaries



Visited Silage Bales Distribution point along with the beneficiaries





Visited Bahubalendrur milk society centre



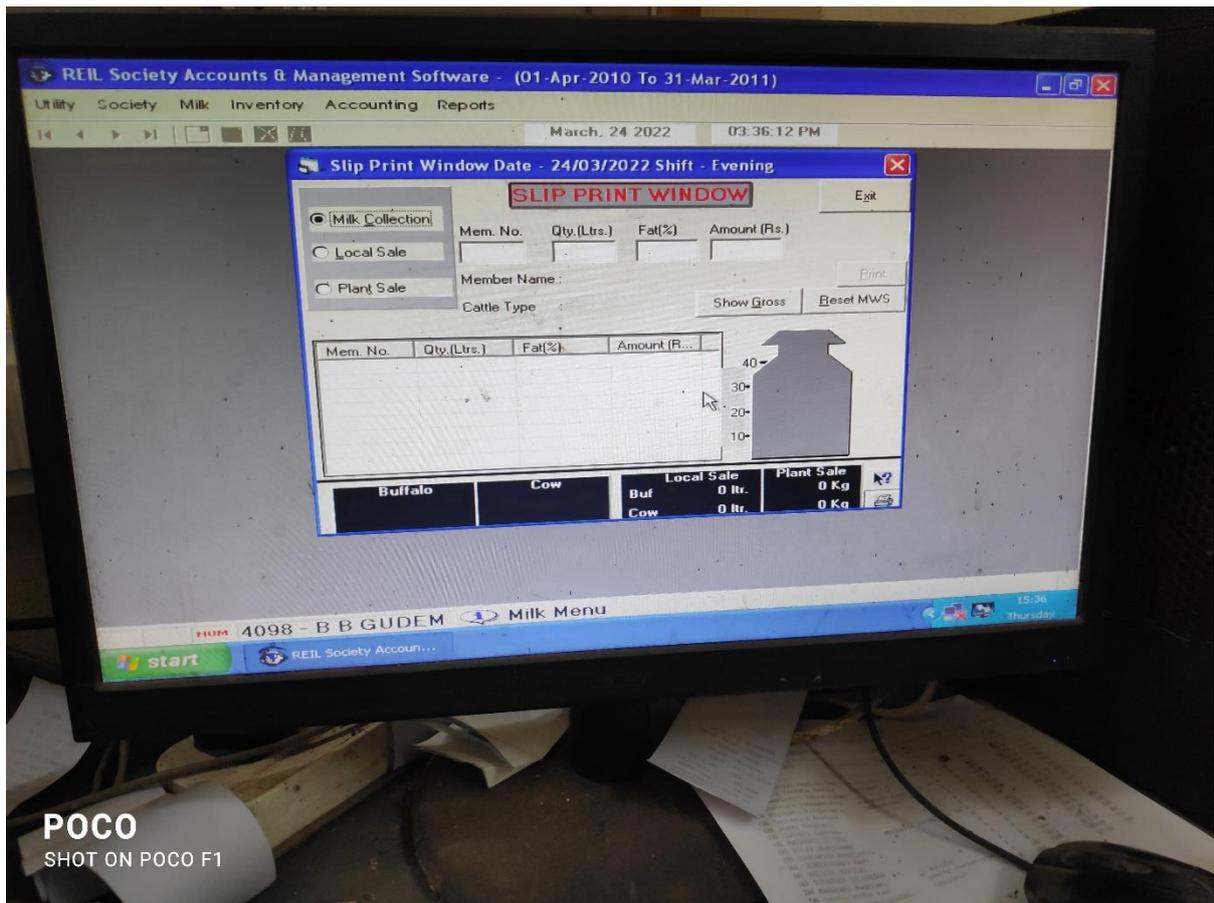
Discussing Milk analysis at Milk society Centre



Milk weighing machine



Milk weighing and quality check machine



Milk Sale, Quality and Quantity Report

VISIT TO ALLAPURAM



Research Assistants along with Prof. Venkata Seshaiah



Interaction with farmers at Allapuram village



Farmers expressing their experiences with the fodder bank



Writing analysis report



Beneficiaries / Farmers



Interaction with farmers



Interaction with farmers and officials of Animal Husbandry



Silage Bales Distribution Point at Allapuram Village





Silage Bales Distribution

VISIT TO ELUKAPADU



Interacting with beneficiaries / farmers at Elukapadu village





Beneficiaries / Famers listening to the questions and answering accordingly



Discussion on the replies of farmers



Interacting with farmers at Elukapdu village





Silage Bales Distribution point at Elukapadu village



Bales ready for Distribution

VISIT TO VEMPADU



Village Secretariat- Vempadu



Interviewing each farmer



Interaction with Beneficiaries/farmers at Vempadu village



Interviewing and filling interview schedule



Asking Questions regarding the social impact





Writing analysis after taking relevant information



Interacting with beneficiaries and farmers



Bales distribution centre at Vempadu village

In all this is a worthy project undertaken by IOCL aiming at long-term benefits for the small farmers of marginalized sections of the society. The news has reached far and wide and there is demand from other villages. The project is worthy of replication elsewhere in the country to accrue multiple benefits for the farmers, environment and society at large

5. ENVIRONMENTAL IMPACT ASSESSMENT

Effect of fodder bank on soil organic carbon sequestration

Table 1: Effect of perennial fodder grass species on soil organic carbon % in fodder bank

Day	SOC (%)						Mean
	1	2	3	4	5	6	
one	0.69	0.71	0.72	0.73	0.7	0.71	0.71
30	0.76	0.77	0.76	0.75	0.75	0.76	0.76
60	0.85	0.83	0.82	0.81	0.82	0.8	0.82
90	1.21	1.2	1.22	1.21	1.22	1.23	1.22
2nd cut	1.32	1.3	1.34	1.32	1.32	1.32	1.32
3rd cut	1.35	1.35	1.35	1.36	1.36	1.38	1.36
4th cut	1.42	1.45	1.42	1.43	1.42	1.43	1.43
5th cut	1.46	1.45	1.47	1.46	1.47	1.48	1.47

Table 2. Effect of perennial fodder grass species on soil bulk density in the fodder bank

Day	SBD (Mg/m ³)						Mean
	1	2	3	4	5	6	
one	0.65	0.68	0.62	0.61	0.62	0.61	0.63
30	0.71	0.73	0.76	0.75	0.75	0.78	0.75
60	0.93	0.97	0.95	0.94	0.98	0.96	0.96
90	1.13	1.12	1.12	1.13	1.15	1.14	1.13
2nd cut	1.28	1.21	1.23	1.26	1.27	1.27	1.25
3rd cut	1.31	1.32	1.3	1.31	1.32	1.33	1.32
4th cut	1.38	1.4	1.37	1.38	1.4	1.39	1.39
5th cut	1.42	1.43	1.41	1.43	1.44	1.46	1.43

Table 3: Effect of perennial fodder grass species on carbon sequestration in the fodder bank

Day	SOC (%)	SBD (Mg/m ³)	Depth	Carbon sequestration (Tons)
one	0.71	0.63	30	13.45
30	0.76	0.75	30	16.99
60	0.82	0.96	30	23.54
90	1.22	1.13	30	41.25
2nd cut	1.32	1.25	30	49.63
3rd cut	1.36	1.32	30	53.59
4th cut	1.43	1.39	30	59.42
5th cut	1.47	1.43	30	62.92

At a time when there are deep concerns on the environmental degradation globally, the environmental consequences of the project need to be assessed in order to ascertain its efficacy. In order to ascertain how the perennial fodder grass species contributed to carbon sequestration, soil tests have been conducted. The percentage of organic carbon in the soil has been measured. Soil as such contains organic matter from 2 to 10 per cent and the soil mass has a key role in the chemical, physical and biological function of soils, especially agricultural soils.

In table 1, **Soil Organic Carbon (SOC)** percentage is calculated. The researcher took six samples of grass and calculated the average of SOC percentage before intervention as 0.71. After 30 days the average of all samples is 0.76. per cent. Similarly, after 60 days the average is 0.82 per cent, while after 90 days the average is 1.22 per cent. Thus, each cut takes 90 days. After the second cut the average of all six samples is 1.32. per cent. Similarly, after the third cut the average stands at 1.36. per cent. After fourth cut the average counts up to 1.43 per cent. Finally, after the fifth cut, the average is 1.47 per cent. By this we can notice that Soil organic carbon percentage in the said samples increased substantially from 0.71 to 1.47 thereby improving the quality of the soil.

Bulk density which is calculated as mg/m^3 indicates soil compaction. It is derived by dividing the dry weight of the soil by its volume. The volume includes the volumes of soil particles and the pores among soil particles.

Table 2 shows the **Soil Bulk Density (SBD)** figures. The researcher took six samples of perennial fodder species, where the average amount of SBD before intervention was 0.63 mg/m^3 . After 30 days the average of SBD of all samples is 0.75 mg/m^3 . Similarly, after 60 days the average SBD of all samples is 0.96 mg/m^3 . After 90 days the average SBD of all samples is 1.13 mg/m^3 . Thus, each cut takes ninety days. After second cut, the average SBD of all samples is 1.25 mg/m^3 . Similarly, after the third cut the average counts to 1.32 mg/m^3 . After the fourth cut, the average stands at 1.39 mg/m^3 . Finally, after the fifth cut the average is 1.43 mg/m^3 . By this we can observe that SBD in the said samples increased considerably from 0.63 mg/m^3 to 1.43 mg/m^3 .

Carbon sequestration means capturing and storing of atmospheric carbon dioxide in soils, vegetation, oceans and geological formations. The process reduces the amount of carbon dioxide in the atmosphere thereby reducing global warming.

Table 3 conveys the amount of **Carbon Sequestration** contributed by the perennial fodder grass species in the project area. In this table the researcher took the average mean of Soil Organic Carbon and Soil Bulk Density. It is to be noted that Soil organic carbon is calculated in percentage while soil bulk density is calculated as mg/m^3 . Carbon Sequestration (CS) is calculated in tons. For all samples the soil was taken from a depth of 30 cm. Before intervention, the CS was 13.45 tons. After 30 days the CS rose to 16.99 tons. Similarly, after 60 days the CS stood at 23.54 tons. After 90 days it rose to 41.25 tons. Thus, each cut takes 90 days. After second cut the CS rose to 49.63 tons. Similarly, after third cut the CS stood at 53.59. After fourth cut, the CS improved to 59.42 tons. Finally, after fifth cut the CS stood at 62.92 tons. By this it is concluded that the CS before intervention was 13.45 tons. But after the fifth cut the CS rose to 62.92 tons. This shows that CS on the whole has increased substantially.

Other environmental benefits of the project:

- The tank water gets cleaned up as the toxins are absorbed by the roots of the grass and the trees
on the bunds thereby reducing water pollution.
- The project improved and further improves the ecosystem. Various species of birds are attracted to the water ecosystem
- It reduces air pollution
- It is helpful in drought prone areas and the Veterinary College at Kadapa is also trying to apply
this formula there as it happens to be a drought prone area
- Water table can be recharged using this kind of a formula
- This helps in balancing the ecology and environment thereby contributing to **environmental sustainability**.
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Birds on the Tank bund.

6. CONCLUSION AND RECOMMENDATIONS

Innovative methods and approaches are the need of the hour to mitigate losses and also to maximize benefits particularly in the realm of agriculture. The project of establishing fodder bank by reclaiming wasteland is innovative. But the credit goes to Indian Oil Corporation Ltd. for coming forward to fund the project to its fruition by way of its Corporate Social Responsibility. State Government loaded with numerous responsibilities may not be forthcoming to fund such projects. Even if the Government evinces interest in funding the project, it would be fraught with inordinate delays and given the room for corruption, there is little possibility of the project reaching its logical conclusion by achieving its intended results. It is here that leading companies should step in to fulfill their social responsibility. This mammoth project was achieved with a total financial outlay of about Rs. 48.00 lakhs. It is instructive to note that if it were a Government funded project the outlay would have been four times more than the fund spent by the Indian Oil Corporation Ltd.

The uniqueness of the project lies in transforming the non-cultivable land into cultivable one. Identifying the fodder species for a relatively quick growth and providing for multiple cuts is highly beneficial. The low-cost production of the fodder enabled the NTR College for Veterinary Sciences to sell the silage bale at a cost of Rs. 2 a Kg. The fodder especially super Napier variety proved to be superior in quality when compared with the native grass. It also proved to be nutritious and rich in protein. It proved to be useful to the marginal farmers especially in the summer season. The study revealed that it was useful even in the rainy season as water logging prevented the farmers from procuring the grass and whatever was procured was rendered useless as the cattle did not like the grass.

The fodder was helpful in the improvement the quantity and quality of milk. The farmers also stated that improvement in the quality of milk in turn improved their health. There was conspicuous rise in the fat content of the milk. As a result, the farmers have increased the price of one litre of milk from Rs.60/- a Kg to Rs. 70/- a Kg. The silage produced at NTR College of Veterinary Science has become so popular that landless farmers from various other villages are reaching the Fodder bank to collect the silage bales. Now the College is seeking the help of Village volunteers to ascertain that the farmers approaching them for silage belong to the "below poverty line" category.

The Training imparted to the farmers towards cattle management and techniques of breeding, etc. has been of immense help in creating awareness among them. The IOCL has

identified a potential area in the form of establishing training infrastructure to disseminate knowledge among farmers.

Project worthy of Replication:

- This project if replicated widely in potential areas would reduce the burden on the government in terms of price and procurement.
- It is helpful in drought prone areas and the Veterinary College at Kadapa is also trying to apply this formula there as it happens to be a drought prone area
- Migration of landless people can be arrested in the long run
- Calf mortality rate can be reduced given the nutritional value of the silage
- It generates self-employment
- Dependence of certain sections of the society on MNREGS can be reduced
- Trees on the bunds purify water and reduce pollution
- In the semi-urban areas there are no green pastures for grazing. In such places silages can be of great help to the farmers.
- It reduces **toxicity** in cattle in the urban and semi-urban areas where assured fodder is not available and where the cattle consume dangerous material out of hunger.
- It helps in the social mobility of the small and marginal farmers as there is a visible change in the income of the beneficiary.
- This addresses the problem of seasonal unemployment due to the yearlong availability of fodder.
- This helps in balancing the ecology and environment thereby contributing to **environmental sustainability**.
- This silage can be fed to not only buffalos and cows but also sheep, horses, camels, donkeys, etc.
- This can be of great use to zoo parks where huge amount is spent on the food of herbivorous animals.
- Water table can be recharged using this kind of a formula.

If leading companies utilize the CSR funds judiciously by identifying innovative projects like this, it would produce recurring benefits. This project accrues a chain of benefits. Apart from distribution of silage to the identified farmers and training them in various aspects of cattle farming, it also contributes to environmental sustainability which is a growing global concern. Satisfaction on the part of each farmer interviewed was palpable. Thus the project richly helps the marginalized farmers in the villages to join the mainstream in the long run thereby fulfilling the Constitutional mandate.

Annexure

INTERVIEW SCHEDULE FOR IMPACT ASSESSMENT STUDY ON IOCL'S CSR PROJECT- ESTABLISHMENT OF FODDER BANK AND SKILL BASED TRAINING FACILITY FOR YOUTH AND FARMERS AT GANNAVARAM IN ANDHRA PRADESH

Background Information:

1. Name
2. Father's /Husband's Name
3. Gender
4. Age
5. Education
6. Name of the Village
7. Social Category
8. Mobile
9. Main source of income
10. Ration card
11. Whether possessing any agriculture land
12. If yes, Ownership status
13. Extent of land
14. Ownership status of cattle
 Owned Loaned from dairy/ rural bank
15. Insurance status of the cattle
16. Whether the individual/ family belong to BPL (Below Poverty Line)
17. Employment

	ender	ale	male
	ge Group (Years)		
mployment	mployed		
	upaid Family Worker		
	lf-employed/small business		
	age / Salaried		
	hers		

Project Information

- a) Are vocational skills helping to improve knowledge and attain any type of employment?
 Yes / No
- b) If yes, status of the individual and type of employment
- c) Women status before training
- d) Women status after training
- e) Opinion of the individual regarding the environment sustainability
- f) Availability of the Veterinary Doctor.
- g) How did the individual know about fodder grass?
- h) Consumption of fodder grass quantity per day

- i) Health status of the livestock before consuming fodder grass
- j) Health status of the livestock after consuming fodder grass
- k) Quality of milk before consuming fodder grass
- l) Quality of milk after consuming fodder grass
- m) Status of calf birth rate before consuming fodder
- n) Status of calf birth rate after consuming fodder
- o) Immunity of the livestock before consuming fodder
- p) Immunity of the livestock after consuming fodder
- q) Individual overall opinion regarding fodder cultivation
- r) Individual satisfied with IOCL training and interested in participating further trainings
- s) Individual satisfaction regarding silage bales distribution.
- t) Any recommendations regarding silage bales.
- u) Income produced due to before fodder consumption
- v) Income produced after silage production
- w) Any other food using external to fodder for milk production
- x) If yes, what is the quantity