DIMORIA COLLEGE, KHETRI

Report of the ICSSR Sponsored National Seminar on

Present Status of Agriculture & Allied Activities in India: Problems & Prospects

Date: 24th & 25th February, 2023

Organized by

PG Department of Economics

in collaboration with

Internal Quality Assurance Cell, Dimoria College, Khetri

Submitted By

Dr. Bipul Kumar Das

Convener & Assistant Professor

Department of Economics

Dimoria college, Khetri

Acknowledgement

Organizing a National Seminar harder than I thought and more rewarding than I could have ever imagined. None of this would have been possible without the support and encouragement of our Principal Sir Dr. Biman Kumar Bhatta. I am eternally grateful to Dr. Minkshi Bayan Borah, Head, Department of Economics, and other faculty members of the department Mr. Kapil Rahang, Mr. Sahadev Mili, Dr. Lakhimi Nath, Ms. Masuma Ahmed and Dr. Jahidul Haque for their constant help, support and hardwork in successfully organizing the seminar.

I'm grateful to IQAC Coordinator for collaborating with the PG department of economics in organizing the seminar. I would also like to thank all the faculty members of Dimoria college for their help, support and suggestions for organizing the seminar. Additionally, I would like to thank all the non-teaching staff of the college for their help and support.

I'm grateful to the chief guest Dr. Biren Das, Registrar, Tezpur University, all the resource persons Professor M. P. Bezbaruah, Professor Saundarjya Borbora, Professor Joydeep Baruah and Dr. Hem Chandra Deka. I would also like to thank the rapporteurs and participants from different universities and colleges. Moreover, I would like to thank the students of Dimoria college for their help & participation.

Finally, to all those who have been a part of my getting there: Dr. Anek lal Barman, Mr. Diganta Daimary, Mr. Sourav Chetia, Dr. Jashodhara Bora, Dr. Snigdha Kataky, Dr. Anjan Kumar Rabha, Dr. Nishigandha Talukdar, Mrs. Rashmi Rekha Rabha and Ms. Minakshee Baruah and others.

Last but not the least, I would like to thank the ICSSR for sponsoring the national seminar, without which, the seminar would not have been possible. Finally, I would like to thank everyone who has directly and indirectly associated with the successful completion of the National Seminar.

Bipul Kumar Das

Dr. Bipul Kumar Das

Contents

1. Introduction:

Seminar is an important platform to discuss about various contemporary issues and their solutions. It provides opportunities to researchers, academicians and administrators to exchange their opinions and debate about the possible solutions. Seminar also helps the students to gain information about the issues and how things take place. Students feel encouraged and motivated by learning about new topics and meeting leaders in their field. Keeping these things in Mind, Dimoria College, Khetri allowed the PG Department of Economics to organize a National Seminar on the broad theme of "Present Status of Agriculture and Allied Activities in India: Problems & Prospects". The topic is important in the sense that agriculture is the future, particularly for backward states like Assam and agriculture has been contributing to income, employment and exports significantly. The seminar is organized with the financial assistance from Indian Council of Social Science Research (ICSSR), New Delhi.

Articles and research papers were invited for the seminar on the theme of "**Present Status of Agriculture & allied activities in India: Problems & Prospects**". Additional sub-themes related to the main theme are:

- Agricultural diversification
- Cooperative farming
- Corporatization of agriculture and allied activities
- Post-harvest management, storage and marketing.
- Crop insurance
- Agricultural credit.
- Dairy farming
- Organic Farming
- Sustainable Agriculture
- Farm industry linkage
- Farm Size and income
- Investments in Agriculture
- Mechanization and Agricultural technology.
- Agriculture marketing & APMCs
- Farm Laws
- Horticulture
- Agriculture and exports
- COVID-19 pandemic & Agriculture and Allied Activities.
- Any other issues related to the main theme.

Organizing Committee:

The organizing committee of the aforementioned national seminar was formed through a meeting with IQAC members and faculty members of the department of economics. The meeting was chaired by the Principal, Dimoria College, Khetri. The details of the organizing committee are given below:

President: Dr. Biman Kumar Bhatta, Pricipal, Dimoria College, Khetri.

Convener: Dr. Bipul Kumar Das, Assistant Professor, Dimoria College.

Organizing Secretary: Dr. Minakshi B. Borah, Head, Department of Economics.

Assistant Secretaries: Mr. Kapil Rahang, Mr. Sahadev Mili, Dr. lakhimi Nath, Dr. Jahidul Haque, and Ms. Masuma Ahmed.

2. List of Actual Participants:

2.1. Resource Person

Sl No	Name	Designation	Institute
1	Prof. M. P. Bezbaruah	Professor, Department of Economics	Gauhati University
2	Dr. Biren Das	Registrar	Tezpur University
3	Prof. Soundarjya Borbora	Professor, HSS	IIT, Guwahati
4	Prof. Joydeep Baruah	Professor, School of Social Science	KKH State Open University
5	Dr. Hem Chandra Deka	Associate Professor	Dimoria College, Khetri

2.2. Discussants

Sl No	Name	Designation	Institute
1	Mr. Sahadev Mili	Assistant Professor	Dimoria College, Khetri
2	Dr. jahidul Haque	Assistant Professor	Dimoria College, Khetri
3	Dr. Lakhimi Nath	Assistant Professor	Dimoria College, Khetri
4	Mr. Kapil Rahang	Assistant Professor	Dimoria College, Khetri

2.3. Faculty, Students and Other Participants

Sl No	Name	Designation	Institute
1.	Dr. Minakshi B. Borah	Assistant Professor	Dimoria College, Khetri
2.	Ms. Masuma Ahmed	Assistant Professor	Dimoria College, Khetri
3.	Mr. Manabjyoti Barkakaty	Associate Professor	Dimoria College, Khetri
4.	Dr. Apurba Kumar Bujarbaruah	Associate Professor	Dimoria College, Khetri
5.	Mr. Himangshu Maral	Associate Professor	Dimoria College, Khetri
6.	Dr. Pratima Dutta	Associate Professor	Dimoria College, Khetri
7.	Mr. Bhaskarjyoti Deka	Associate Professor	Dimoria College, Khetri
8.	Mr. Diganta Daimary	Assistant Professor	Dimoria College, Khetri
9.	Dr. Aneklal Barman	Assistant Professor	Dimoria College, Khetri
10.	Dr. Nishigandha Talukdar	Assistant Professor	Dimoria College, Khetri
11.	Dr. Jashdhara Bora	Assistant Professor	Dimoria College, Khetri
12.	Dr. Keemee Das	Assistant Professor	Dimoria College, Khetri
13.	Dr. Anjan Kumar Rabha	Assistant Professor	Dimoria College, Khetri
14.	Dr. Snigdha Kataki	Assistant Professor	Dimoria College, Khetri
15.	Ms. Minakshee Baruah	Assistant Professor	Dimoria College, Khetri
16.	Dr. Alee Sarma	Associate Professor	Dimoria College, Khetri
17.	Dr. Jharna Choudhury	Assistant Professor	Dimoria College, Khetri
18.	Ms. Banani Das	Librarian	Dimoria College, Khetri
19.	Ms. Sanchita Chetia	Assistant Professor	Dimoria College, Khetri
20.	Dr. Manjuri Dutta	Assistant Professor	Dimoria College, Khetri

2.3. Faculty, Students and Other Participants

Sl No	Name	Designation	Institute
21.	Mr. Biren Bhuyan	Associate Professor	Dimoria College, Khetri
22.	Ms. Rashmi Rekha Rabha	Assistant Professor	Dimoria College, Khetri
23.	Mr. Dewan S. Rahman	Associate Professor	Dimoria College, Khetri
24.	Dr. Alakananda Saikia	Assistant Professor	Dimoria College, Khetri
25.	Mr. Mohini Mohan Deka	Associate Professor	Dimoria College, Khetri
26.	Dr. S.A.I. Choudhury	Associate Professor	Dimoria College, Khetri
27.	Dr. Siva P.K. Chetry	Assistant Professor	Dimoria College, Khetri
28.	Mr. Junu Rahang	Assistant Professor	Dimoria College, Khetri
29.	Dr. Kakoli Das	Assistant Professor	Dimoria College, Khetri
30.	Mr. Himangshu Sarma	Assistant Professor	Dimoria College, Khetri
31.	Dr. Pankaj Namasudra	Assistant Professor	Dimoria College, Khetri
32.	Mr. Ankur Gogoi	Research Scholar	ARGUCOM
33.	Dr. Rashida Taahira Noorain	Assistant Professor	ARGUCOM
34.	Dr. Rimjim Bordoloi	Assistant Professor	Govt Model College, Kazianga
35.	Afrin Nahar	Associate Professor	Dimoria College
36.	Dr. Biman Kumar Bhatta	Principal	Dimoria College
37.	Anup Dutta Baruah	Assistant Professor	Dimoria College
38.	Anju Devi	Associate Professor	Dimoria College
39.	Manas Pratim Baruah	Assistant Teacher	Rajabari HS school, Golaghat
40.	Ashok Pradhan	Student	Pragjyotish College
41.	Palashjyoti das	Student	Pandu College
42.	Masum Ahmed	Assistant Professor	Pragjyotish College
43.	Ipsita Kaushik	Assistant Professor	ARGUCOM
44.	Archana Saharia	Associate Professor	Dimoria College
45.	K. Neisi Singson	Assistant Professor	Dimoria College
46.	Bhanushree Baishya	Research Scholar	Gauhati University
47.	Papri Barman	Research Scholar	Gauhati University
48.	Dr. Namita Das	Associate Professor	Pragjyotish College
49.	Kritika Das	Research Scholar	KKHSOU
50.	Subham Thakur	Student	Pandu College
51.	Jahanara Khatun	Student	Pandu College
52.	Bidyut Bikash baishya	Assistant Professor	Pragjyotish College
53.	Farhana Mafiz	Student	Pandu College
54.	Wahida parbin	Student	Pragjyotish College
55.	Nilakshi kalita	Student	Pragjyotish College
56.	Raghu Tamang	Research Scholar	CSIR-NEIST
57.	Dulumoni Talukdar	Assitant Professor	Dimoria College
58.	Surabhi Kaushik	Student	Jagiroad College

2.3. Faculty, Students and Other Participants

Sl No	Name	Designation	Institute
59.	Ratumoni Das	Assistant Professor	Jagiroad College
60.	Dr. Priyanka Borah	Assistant Professor	Guwahati Commerce College
61.	Areefa Ahmed	Student	Guwahati Commerce College
62.	Dr. Dhriti das deka	Assistant Professor	Guwahati Commerce College
63.	Parijat Bhatt	Student	Guwahati Commerce College
64.	Sourav Chetia	Assistant Professor	Dimoria College
65.	Sujata Medhi	Assistant Professor	Raha College
66.	Jyotish Engti	Assistant Professor	Panigaon OPD College
67.	Dr. Manjuri dutta	Assistant Professor	Dimoria College
68.	Dr. Shivanee Borpatra Gohain	Assistant Professor	Dimoria College
69.	Maudud Shakique Ahmed	Student	NEF Law College
70.	Dr. Bidyut Jyoti Kalita	Assistant Professor	JDSH College
71.	Rintu Deka	Assistant Professor	Nalbari College
72.	Sunil Kumar Deka	Associate Professor	Dimoria College
73.	Dr. Kalpana Choudhury	Associate Professor	Dimoria College
74.	Subham Rabha	Student	Dimoria College
75.	Sanjay Phangcho	Student	Dimoria College
76.	Mousumi Saikia	Student	Dimoria College
77.	Sangita Chakraborty	Student	Dimoria College
78.	Jintu Jyoti Sarania	Student	Dimoria College
79.	Samir Das	Student	Dimoria College
80.	Halima Seikh	Student	Dimoria College
81.	Priyamoni Deka	Student	Dimoria College
82.	Jesmin Sultana Ahmed	Student	Dimoria College
83.	Anita Chetri	Student	Dimoria College
84.	Nabanita Kalita	Student	Dimoria College
85.	Sagarika Saikia	Student	Dimoria College
86.	Kanika Mandal	Student	Dimoria College
87.	Shushanka Dihingia	Student	Dimoria College
88.	Biki Thapa	Student	Dimoria College
89.	Pollabee das	Student	Dimoria College
90.	Smrita Rabha	Student	Dimoria College
91.	Trishna Mahanta	Student	Dimoria College
92.	Pinki devi	Student	Dimoria College
93.	Shusmita Boro	Student	Dimoria College
94.	Dimpi Boro	Student	Dimoria College
95.	Nikita Chetri	Student	Dimoria College
96.	Namita devnath	Student	Dimoria College

2.3. Faculty, Students and Other Participants

Sl No	Name	Designation	Institute
97.	Smita Injal	Student	Dimoria College
98.	Shikha Bordoloi	Student	Dimoria College
99.	Monisha deka	Student	Dimoria College
100.	Utpal Rahang	Student	Dimoria College
101.	Jirina Deka	Student	Dimoria College
102.	Eliza Bordoloi	Student	Dimoria College
103.	Namita Devi	Student	Dimoria College
104.	Arup deka	Student	Dimoria College
105.	Rintu kro	Student	Dimoria College
106.	Dhanjit daimary	Student	Dimoria College
107.	Parinita Rahang	Student	Dimoria College
108.	Licha Bora	Student	Dimoria College
109.	Rukhsar Khanam	Student	Dimoria College
110.	Wahida Sultana	Student	Dimoria College
111.	Jiban Das	Student	Dimoria College
112.	Hima Devi	Student	Dimoria College
113.	Trishna ronghangpi	Student	Dimoria College
114.	Ujjal nandan Kakati	Student	Dimoria College
115.	Tribeni Mahanta	Student	Dimoria College
116.	Abriti Krishna Engti	Student	Dimoria College
117.	Gitanjali Daimary	Student	Dimoria College
118.	Joyshri deka	Student	Dimoria College
119.	Mrial Basumatary	Student	Dimoria College
120.	Diganta Sarma	Student	Dimoria College
121.	Ranjumoni Darphang	Student	Dimoria College
122.	Chitrali bangthai	Student	Dimoria College
123.	Jayanta Nath	Student	Dimoria College
124.	Girish Panging	Student	Dimoria College
125.	Binod Doloi	Student	Dimoria College
126.	Taralin kalita	Student	Dimoria College
127.	Tanu Ghosh	Student	Dimoria College
128.	Nijara Rahang	Student	Dimoria College
129.	Kriti Darphang	Student	Dimoria College
130.	Purabi Thakuria	Student	Dimoria College
131.	Shusma Kumari	Student	Dimoria College
132.	Puspa Biswas	Student	Dimoria College
133.	Nilakshi kalita	Student	Dimoria College
134.	Sarbeswar deka	Student	Dimoria College

2.3. Faculty, Students and Other Participants

135.	Nabajit kalita	Student	Dimoria College
136.	Suman Rai	Student	Dimoria College
137.	Darshana Sarma	Student	Dimoria College
138.	Kritika Bora	Student	Dimoria College
139.	Rumashree Biswakarma	Student	Dimoria College
140.	Himcharan Biswas	Student	Dimoria College
141.	Ankit timung	Student	Dimoria College
142.	Mehbuba Afruj	Student	Dimoria College
143.	Khadija begum	Student	Dimoria College
144.	Nitumoni Chouhan	Student	Dimoria College

2.4. Rapporteurs

Sl No	Name	Designation	Institute
1	Dr. Keemee Das	Assistant Professor	Dimoria College, Khetri
2	Dr. Jharna Choudhury	Assistant Professor	Dimoria College, Khetri
3	Dr. Kakoli Das	Assistant Professor	Dimoria College, Khetri
4	Dr. Shivanee Borpatra Gohai	Assistant Professor	Dimoria College, Khetri
5	Mrs. Rashmi Rekha Rabha	Assistant Professor	Dimoria College, Khetri
6	Mrs. Sanchita Chetia	Assistant Professor	Dimoria College, Khetri
7	Ms. Banani Das	Librarian	Dimoria College

3. The Exact tiles & Presenters of Each of the Technical Session:

Day 1: 24th February, 2023.

Technical Session 1
24 February, 2023
Time: 11.30-1.00 pm
Venue: Digital Room
Chairperson: Prof. M. P. Bezbaruah
Discussant: Mr. Sahadev Mili
Rapporteurs: Dr. Jharna Choudhury & Banani Das

Sl No	Title of the Paper	Name, Designation & Address of the presenter
1.	Present Status of Small Tea Growers of Assam – Problems & Prospects	Mr. Ankur Gogoi, Research Scholar, ARGUCOM
2.	Agricultural Marketing in India: Challenges and Suggestions	Mr Manash Pratim Baruah, Assistant Teacher, Rajabari H.S. School
3.	Development of Income and Productivity in Potato Cultivation: A Study in Brahmaputra Valley of Assam, India	Dr. Rimjim Bordoloi Assistant Professor, Government Model College, Kaziranga
4.	Problems of Tomato and Potato Growers: A study on Paneri, Barbhag and Sontali areas of Assam	Farhana Mafiz, Student, M.A. 4th Semester (Economics), Pandu College, Guwahati,
5.	What an Untapped Opportunity! Pisciculture in Assam: A Study of South Kamrup and Gohpur	Masum Ahmed, Assistant Professor, Pragjyotish College, Guwahati
6.	Dairy Farming and Rural Livelihood: A case study in Amlighat, Morigaon, Assam	Suravi Kaushik, Student, Jagiroad College.
7.	Determinants of the development of women's labour force participation in Golaghat District,Assam	Bhumika Bori, Research Scholar, MSS Vishwavidyalay, Nagaon

Technical Session 2

24 February, 2023
Time: 2.00-3.30 pm
Venue: Digital Room
Chairperson: Prof. S. Borbora
Discussant: Dr. Jahidul Haque
Rapporteur: Dr. Keemee Das & Dr. Shivanee Borpatra Gohain

Sl. No	Title of Paper	Name of Paper Presenter
1.	A Study on Inventory Management Practices At Purabi Diary	Areefa Ahmed, Student, Guwahati Commerce College
2.	Agrarian Crisis and Rural Distress in Flood Affected Areas: A case study on the River Island District of Assam, India	Miss Mondira Tamuli, Research Scholar, OKD Institute of Social Change and Development
3.	Study on Socio Economic Status of Dairy Farmers and Its Impact on Environment at Topatoli Village of Kamrup Metropolitan District of Assam, India	Raghu Tamang, Research Scholar, Department of Environment Management, Dimoria College
4.	An overview of agricultural finance in Assam	Bhanushree Baishya. Research Scholar, Gauhati University
5.	Mahila Kisan Sashaktikaran Pariyojana (MKSP): Its importance and performances	Dr. Jyotisikha Dutta, Employee, Gauhati Unversity
6.	Agricultural Diversification in Morigaon district: A case from Mayong Revenue Circle, Morigaon, Assam	Ratumoni Das, Assistant Professor, Jagiroad College
7.	Agro-based Clusters: A Tool for Effective Management for Regional Development	Parijat Bhatt, Student, Guwahati Commerce College
8.	A Journey by NEDFi Towards Sustainability on Water Hyacinth	Daisy Das, Assistant Professor, Guwahati Commerce College
9.	Sustainable Agriculture: It's much needed implementation presently for a better living and the challenges ahead	Siva P.K. Chetri, Assistant Professor, Dimoria College, Khetri
10.	Farm Laws 2020: Problems and Prospects in Indian Agriculture	Junu Rahang, Assistant Professor, Dimoria College, Khetri

Day 2: 25th February, 2023

Technical Session 3

25 February, 2023

Time:10:00-11:30 pm, Venue: Digital Room

Chairperson: Dr. Joydeep Baruah

Discussant: Dr. Lakhimi Nath

Rapporteur: Rashmi Rekha Rabha & Dr. Kakali Das

Sl No	Title of the Paper	Name, Designation & Address of the presenter
1.	A study on Pradhan Mantri FasalBimaYojana (PMFBY) in Kamrup district of Assam	Subham Thakur, Student, Pandu College
2.	Agricultural Marketing in Assam: A Descriptive Analysis	Maudud Shakique Ahmed, Student, NEF Law college.
3.	The Role of Muga Silk GIIN the Sustainable Development of Assam and Its Related Challenges	Ms. Ipsita Kaushik, Assistant Professor, ARGUCOM
4.	Determinants of Informal Dairy Value Chain: A case study in Kamrup district of Assam	Reshminara Begum, Research Scholar, Dibrugargh University
5.	Rate of Return in Paddy Cultivation in Assam	Rintu Deka, Assistant Professr, Nalbari college, Nalbari
6.	A Comparative Study on the Profitability of Traditional Crops and Horticulture: Evidence from Assam	Dr. Jahidul Haque, Assistant Professor, Dimoria College, Khetri
7.	Current status and trend of Organic farming: Evidence from India	Jyotish Engti, Assistant Professor, Panigaon OPD College
8.	Economics of Marigold Cultivation in Assam	Dipali Baishya, Assistant Professor, NN Saikia College.
9.	Food Processing & Organic farming: A study of Policies and Challenges of MSME units of Sikkim	Dr. Tulika Devi, Research Associate, NEDFi
10.	Organic Farming: A Sustainable Approach to Agriculture in North Eastern India	ParimitaTalukdar, Assistant Teacher, VKV Nalbari, Assam.

4. About The Seminar Topic

4.1 Present Status of Agriculture & allied Activities in India: Problems & Prospects

India has witnessed a silent revolution evolving from food deficient and import dependent nation during the early nineteen sixties to a global agricultural powerhouse today. India has emerged as the world's largest producer of milk, pulses, jute and spices, and has the world's largest cattle herd (buffaloes). It is the second largest producer of rice, wheat, cotton, sugarcane, tea, groundnut, fruits, vegetables and goat meat. Although the share of agriculture and allied activities has been declining in overall gross value added (GVA) of India, it continues to grow in absolute terms and employs almost 49 per cent of the total households (PLFS, 2020). The production and productivity centered approach of India is not only to become self-sufficient in foodgrain and non-foodgrain production but to become an exporting country of the same. There has always been a varying degree of increase in the production and productivity of food crop and various non-food crops. The increase in the production of foodgrains and other crops, however, did not result in a commensurate increase in farmers' income which is seen from their low level of income and incidence of poverty as compared to those employed in the non-farm sector of the economy. Indian agriculture and allied activities faces issues associated with adaptation to climate change disturbances, fragmented landholdings, low farm productivity and high food price volatility, insufficient credit, absence of organized marketing facilities and crop insurance which call for next generation reforms like adoption of environmentally sustainable and climate resistant new farm technology, development of market for land consolidation, strengthening institutional credit and improvement in post-harvest practices.

In this context, the seminar aims at discussing present status of agriculture in India in general and Assam in particular, and how to improve its production, productivity and its contributions to income, employment and exports.

Along with the main theme, the seminar tried to cover various sub-themes such as diversification of agriculture, Cooperative farming, Corporatization of agriculture and allied activities, Post-harvest management, storage and marketing, Crop insurance, Agricultural credit, Dairy farming , Organic Farming, Sustainable Agriculture, Farm industry linkage, Farm Size and income, Investments in Agriculture, Mechanization and Agricultural technology, Agriculture marketing & APMCs, Farm Laws, Horticulture, Agriculture and exports, COVID-19 pandemic & Agriculture and Allied Activities, Any other issues related to the main theme etc.

The proposed seminar is expected to discuss the backwardness of agriculture in India and in Assam and how it can be improved. The seminar is expected to discuss various issues associated with agriculture as it is mentioned in the theme and attempted to solve these issues by incorporating various agricultural policy, laws, initiatives and technological developments as these are mentioned in the sub-themes. It is expected that the seminar will contribute to the society by providing solutions to the problems associated with agriculture.

The seminar will contribute to the policymakers as well, which are mentioned in the following points:

1. It will find out the root causes of agricultural backwardness.
2. It will suggest solutions to these causes and it will also suggest whether the government or the community can itself solve the problem.
3. The seminar is expected to provide suggestions to the policy makers about how to increase the contributions of agriculture to income, employment & exports and it will also provide suggestions about how to increase farmers' income

5. Proceedings of the Seminar

The National Seminar on the Present Status of Agriculture and Allied Activities in India: Problems & Prospects sponsored by ICSSR was organized by the PG Department of Economics in collaboration with Internal Quality Assurance Cell (IQAC) Dimoria College, Khetri in the college premises on 24th and 25th February, 2023. Around 150 participants including academicians, faculties, teachers, research scholars and students have actively participated in the seminar. Altogether, 27 Papers on various topics related to the theme were presented by the participants.

5.1. Inaugural Session:

The inaugural session and two technical sessions were held on the first day of the National seminar on 24th February, 2023. At the outset of the inaugural session, all the dignitaries Professor M. P. Bezbaruah, Dr. Biren Das and IQAC coordinator were introduced and felicitated by the seminar organizing committee. The seminar was inaugurated with the lighting of the lamp by all the dignitaries and teachers of Dimoria College participated. After the lamp lighting ceremony, Coordinator, IQAC has delivered the welcome speech on behalf of the Principal, Dimoria College. IQAC Coordinator has chaired the inaugural session. After the welcome speech, Professor M. P. Bezbaruah delivered his keynote speech on "India's Agriculture through the 75 years of Independence and the Outlook Ahead." In his keynote speech, Professor Bezbaruah has talked about the journey of the agricultural sector since independence. In his speech, Prof. Bezboruah in addition to giving a brief history of the revolutionary phase that Indian agriculture has gone through to achieve the current status but also emphasized the need for further technological innovation to push the limitation on production due to the diminishing or in some cases negative returns from factors of production. He emphasized technological innovation need to be focused on the non-traditional crops for there is change in the dietary habits of the consumers and there is huge export potential for such crops. Additionally, he talked about restructuring the policy frameworks of the government to make them farmer friendly and in favor of development of agriculture.

After the Keynote speech, the Chief Guest of the seminar Dr. Biren Das of Tezpur University delivered his address on the importance of agriculture, challenges facing by the sector and probable solutions of these challenges and the role of government and communities. Prof. Biren Das in his speech emphasized on improving the factors like physical and human capital to aid the development of the agriculture sector. He also emphasized that as India has already achieved self-sufficiency in the production of certain crops, the focus needs to be shifted to other crops in demand. The inaugural session was ended with the vote of Thanks by Dr. Minakshi B. Borah, Head of the PG department of Economics. Before proceeding to the first technical session, a brief tea break was announced.

5.2. Technical Session 1:

The first Technical Session was started around 11.30 am after the tea break in the Digital Room of Dimoria College. Professor M.P. Bezbaruah of Gauhati University acted as the Resource Person and Mr. Sahadev Mili of Dimoria College was the Discussant of the session. Dr. Jharna Choudhury from the English Department & Banani Das, Librarian worked as the rapporteurs of the session. Altogether seven (7) papers were presented in the session by

faculties, research scholars and students of various institutions. These papers were on small tea growers, potato cultivation, pisciculture, women labour force participation and on agricultural marketing. Discussant Mr. Sahadev Mili discussed the papers presented in the session and Prof. M. P. Bezbaruah gave his valuable inputs to the paper presenters for improvement of their research work. The participants have interacted with the presenters and all questions, confusions and doubt were discussed and answered.

5.3. Technical Session 2:

The second technical session was started after the lunch break in the Digital room. Prof. Saundarjya Borbora of IIT, Guwahati has been invited to conduct the second technical session. Dr. Jahidul Haque of Dimoria College acted as the Discussant of the session. Dr. Keemee Das of Geography Department, Dr. Shivanee Borpatra Gohain of department of Chemistry and Ms. Sanchita Chetia of mathematics Department were given the responsibility of rapporteurs of the session. A total of ten (10) research papers were presented in the second technical session of various topics such as Agrarian crisis and rural distress, dairy farming and sustainable agriculture. In his speech, Professor Borbora appreciated the researchers' take on a wide range of issues related to Agriculture and encouraged the researcher to explore the sophisticated and advanced methodology in their research and appreciated the researchers' diverse interest of work.

5.4. Technical Session 3:

The third technical session was on the second day of the seminar, i.e, on 25th February, 2023. Professor Joydeep Baruah of K.K.H. State Open University was the chairman of the session and Dr. Lakhimi Nath had the onus of discussant of the session. Mrs. Rashmi Rekha Rabha from the Education Department and Dr. Kakoli Das of Political Science Department worked as the rapporteurs of the session. A total of ten (10) research papers were presented in the session on various topics such as PMFBY, agricultural marketing, muga silk, dairy farming and organic farming. Professor Baruah has given suggestions for the improvements of the papers and the presenters had interacted with the participants as well.

5.5. Special Lecture:

Prof. Joydeep Boruah talked about issues underlying the structural transformation within agriculture. He systematically explained the practical issues faced by the farmers and how the traditional system of agriculture is facing a wide range of challenges. He has pointed out the issues related with agricultural research and education, provision of extension services, land development, provision of credit, utilization of inputs of agriculture in practice. In addition to that, he highlighted that the shift from traditional crops to high value crops is not being done in a systematic and sustainable way by the farmers. He also pointed out the several problems underlying the factors pushing farmers out of traditional crops and the also the issues in adopting the production of new crop (s).

5.6. Valedictory Session:

Valedictory session of the seminar was commenced after the Special Lecture. Dr. Biman Kumar Bhatta, Principal, Dimoria College chaired the session where Dr. Hem Chandra Deka, retred Associate Professor of Dimoria College was invited for the valedictory speech. Professor Joydeep Baruah and Dr. Bhaskar Sharma of K.K.H. State Open University were also present in the valedictory session. Mr. Sahadev Mili presented the summary of the seminar and

feedback from the participants was taken about the seminar. Principal, Dimoria College had given the concluding speech after the distribution of the participation certificates. With this, the seminar was declared ended.

5.7. Conclusion & Way forward:

Papers presented in the seminar covered a wide array of topics reflecting the growing diversification in agriculture and a shift in farmers' preferences towards the production of non-traditional crops. Moreover, the seminar has brought light to many new areas of research that need attention of the researchers and academicians which are also crucial for the development of the Agriculture and allied sector due to the forward and backward linkages it share with other sectors and industries. The seminar highlighted how the development of the food processing industries and proper marketing and distribution channels can be crucial for sustaining the agriculture. To conclude, Agriculture is like an insurance for the country as mentioned by Prof. M.P. Bezboruah for the development of the other sectors in particular and the economy in general. As long as this sector has a good growth, the rest of the economy will flourish and can achieve higher growth.

6. Contributions of the Seminar

In the seminar, altogether 27 research papers have been presented by the faculties and research scholars. Some of the outcomes from the presentations are mentioned below:

1. **Small Tea Growers:** To address the problems faced by the small tea growers proper infrastructures should be facilitated along with organic tea farming, and adopt environment friendly technology which are easily accessible.
2. **Agricultural Marketing:** To improve the agricultural marketing in India, government should provide adequate processing units, marketing strategy, storage facility, public distribution system. Additionally, models of enhancing producer-buyer linkage, direct sale, farmers marketing should also be adopted.
3. **Tomato & Potato Growers:** The main problems faced by the tomato and potato growers in Assam are lack of agricultural crop insurance, non-availability of loans, and distance from field to the market. To solve these problems, special crop insurance should introduce, public private partnership should initiated and agricultural technology & online marketing should be adopted.
4. **Pisciculture in Assam:** Assam has been emerging as a major fish producer in India. The main advantages of pisciculture are that it's a male dominated sector and less child labor is visible. Moreover, profit margin is very high. Commercializing pisciculture can solve the unemployment problem in the state.
5. **Dairy Industry:** Another emerging sector of agriculture in Assam is its dairy industry. Dairy industry is generating many employment opportunities to the people of Assam. But the industry is facing the problems of lack of veterinary services and high cattle food prices.
6. **Agricultural Finances:** Despite impressive growth of formal agricultural credit, farmers still prefer informal sources leading to debt-trap. Short term loans are also problematic.
7. **Mahilaa Kisan Sashaktikarn Pariyojna:** Mahilaa Kisan Sashaktikarn Pariyojna focuses on women in agriculture and female labor. Rural women are reported to be less educated and skills with lesser financial and technological knowledge. Moreover, it is found in the paper that female farmers face high degree of economics, legal and institutional uncertainties. The scheme has been able to increase in women in agriculture, improved skill levels and providing marketing knowledge to women.
8. **Agricultural Diversification:** Indian agriculture has undergone a radical transition from traditional crops to high value crops, especially horticultural crops. Horticultural crops' profitability is higher than the traditional crops.
9. **GI on Muga silk:** After the introduction of GI on Muga silk, it is observed that the production of muga silk is on the rise. GI also provides protection to the muga silk and it also protects the social-cultural identity of the Assamese people. GI tag on Muga silk help in sustainable development the sector in Assam. Moreover, GI also provides authenticity to the seller as well as to the consumers.

10. **The present situation of agriculture:** It is observed that there is engagement of people in Assam in wide range of economic activities. Agriculture in Assam is associated with increasing vulnerabilities due to flood, migration, erosion, animal attacks & other natural hazards besides small land holdings, inadequate irrigation vis-à-vis lower prices and lack of adequate market & logistics. Due to these reasons, farmers in Assam shifted from agricultural to non-agricultural activities.

These are the main outcomes from the National Seminar on Present Status of Agriculture and Allied Activities in India: Problems and Prospects. From these deliberations, it is expected that the seminar will help in addressing the problems of small tea growers, dairy farmers and farmers associated with other agricultural and horticultural activities. Moreover, it is also expected that people will engage more in agriculture and will increase its share in the State's GSDP.

Dr. Biman Kumar Bhatta
Principal
Dimoria College, Khetri

Dr. Bipul Kumar Das
Convener
National Seminar

Present Status of Small Tea Growers of Assam – Problems & Prospects

Mr. Ankur Gogoi, Research Scholar,
School of Entrepreneurship and Management, Assam Rajiv Gandhi University of Cooperative Management (ARGUCOM)
&
Dr. Rashida Taahira Noorain, Assistant Professor & HoD, School of Entrepreneurship and Management, Assam Rajiv Gandhi University of Cooperative Management (ARGUCOM)

Abstract
Perceived as the quintessential drink, tea it has a long and complex history with its roots deeply tied to ancient Chinese culture. Owing to favourable soil and climatic conditions, tea has become one of the most important cash crops and plays a significant role in rural development of Assam. Nevertheless the small tea grower (STG) sectors of Assam has experienced a tremendous growth in the last four decades covering an area of 105291 ha and contributing to more than 50% of the total tea production of the state. However, the sector is not free from challenges. Small and marginal farmers in across the globe have been facing various challenges in tea production which contributes to about 65% of the global tea production are more or less very similar to each other. This paper attempts to identify the various prospects and issues faced by the small tea growers of Assam from the existing literatures available and preliminary investigation at grassroots level.

Origin of Tea

The origin of tea has many tales associated with it without any substantial evidences to prove these. An anecdote about the origin of tea in the world dates back to 2737 BC, when the troops of *Emperor Shen Nung* of China took shelter under the *Camellia Sinensis* tree from which few leaves twitched by the wind and fell into a vessel of boiling water, thus the world encountered with the first cup of tea. The discovery of tea as a medicated drink has an association with the *Shang Dynasty* during the period 1500 BC–1046 BC in China. A grisly story of origin of tea relates to the germination of the tea bushes from the eyelids of the monk *Bodhidharma* (Dey, 2019). The discovery of tea saplings in Assam by *Robert Bruce* and *Maniram Dewan* in the year 1823 is considered to be the origin of tea in India. A well-known folklore tale among the *Singpho* tribes of Margherita which describes two tired and hungry brothers plucking few leaves from a tree and chew them to quench their thirst and hunger relates the discovery of tea in India (R. Gupta, 2016). Uncertainty of these legends still persists, but the fact of the matter is that tea has become the most widely consumed beverage in the world, after water (Valavanidis, 2019).

World Tea Scenario

The world is bless with 62 tea producing countries offering exciting and attractive varieties of tea (Chamberlain, n.d.) with China (2799 million kg.), India (1390 million kg.), Kenya (459 million kg.) and Sri Lanka (300 million kg.) occupying the prime positions in terms of made tea production (*Tea Board of India - 66th Annual Report 2019-2020,* 2020). Kenya is the largest exporter of tea in the world with a share of 26%, followed by China, Sri Lanka and

India with 20%, 15% and 13% share respectively in the year 2019. In 2020, global consumption of tea amounted to about 6.3 billion kilograms and is estimated to reach to 7.4 billion kilograms by 2025. The largest consumer of tea is China with approximately 1.6 billion pounds consumed per year, and Turkey accounts for the highest annual average per capita consumption of tea with approximately 6.96 lb per person in the year 2016. In 2019, tea revenue globally is about US$214,761m and is expected to grow each year by 6.9% until 2023 (*Tea Consumption by Country | Statista*, n.d.).

Indian Tea Scenario

India is the second largest producer of tea amounting to about 1,329.04 million kg of annual production of made tea in the calendar year 2021 with an annual growth rate of 5.38% after the impact of imposition of lockdown during the Covid – 19 pandemic in the previous year (Sundar, 2022). The country produces world's finest teas like Darjeeling, Assam, Sikkim, Nilgiris and Kangra which are famous for their delicate flavor, strength and brightness. This crop is cultivated in 15 states of the nation of which Assam, West Bengal, Tamil Nadu and Kerala are the major tea growing states embraces a whopping area of 636557.7 ha (*State Wise Tea Growers - Area*, 2018). India produces a mainly three (3) variety of made tea *viz.*, CTC (crush, tear, tear), orthodox and green tea. With 91.01 % share of the total production, the CTC variety occupy the superior position of the industry, followed by orthodox and green variant with 7.56 % and 1.43 % respectively in the financial year 2020 - 21. The country domestically consumed about 89.24% of its total production in the financial year 2021, with an annual growth of 7.23% with respect to the previous financial year. The country exported around 148.58 million kg of tea in the financial year 2021-22 (April – December), out of which around 25.77 million kg of worth US$ 61.08 million value was exported to Russia, followed by 21.60 million kg of worth US$ 73.87 million value was exported to Iran (*Destination Wise Tea Exports from India*, 2022). Around 19.45 million kg of worth US$ 38.70 million CIF value was imported into India in the financial year 2021-22 (April – December) (*Import of Tea Into India*, 2022). This 200 year old labour intensive industry in India requires abundant, cheap and skilled labour, thus offering direct employment to 1.2 million people, with 50% of the employment comprising of women. The industry supports around 3 million people, which are dependent on the tea garden workers (Special Correspondent, 2019). There is no doubt about the fact that this industry has an important and a special position in the Indian economy, but it still faces numerous challenges despite its spectacular growth in the recent years.

Tea and Assam

The best quality tea in India flows predominantly from Assam (Sarma, 2013). The discovery of tea in India dates back to the year 1823, when Robert Bruce, a merchant and soldier, first noticed the tea plant in Assam and this eventually led to East-India Company developing a trade in it. Among the Indians, it was, however, Maniram Dutta Barma, an Assamese noble man, popularly known as Maniram Dewan, who initiated planting tea leading many others, mostly Assamese, to follow in his footsteps. By engaging people from China ('*Cinna*' in Assamese) to make tea ('*mora*' in Assamese), he established the first tea garden of Assam, Cinnamora Tea Estate in 1850, hence the word '*Cinnamora*' evolved (Baruah, 2021). The tea growers of Assam comprising of both small and big cover a massive area of 337690.35 ha across the state, as surveyed in the year 2018 (*State Wise Tea Growers - Area*, 2018). The state's total tea production is 660.45 million kg, which constituted around 49.69% of the

country's total production of 1329.04 million kg in the calendar year 2021 (*Provisional Crop Estimates*, 2022). This was around 42.25 million kg increase in production as compared to the previous year's 618.20 million kg, as the state's production was hit by the Covid-19 lockdown impositions. There exist a wide variety of tea in Assam with varying quality and grades. The price of orthodox teas from this region are higher than that of CTC (crush, tear, tear) and green variants. It is noteworthy that amid pandemic, Assam's specialty orthodox tea from Manohari Tea Estate in Dibrugarh was auctioned for a record price of 99,999 per kg at Guwahati Tea Auction Centre (GTAC) in December, 2021 (Special Correspondent, 2021).

Small Tea Growers - Notion

The idea of agri-business entrepreneurship in the form cultivating tea in small plots of land got conceptualized for the first time in the world when Kenya had decided to produce tea for export in 1950s. The complete tea production in Japan comes from small tea holders with average size ranging between 0.01 ha to 2 ha. The practice of cultivating tea in small plots is also adopted in some other countries like Malawi, Turkey, Vietnam, Tanzania, Bangladesh, Pakistan, Nepal, etc. The concept of cultivating tea in small landholdings started in Nilgiris of Tamil Nadu in 1920's, with encouragement from big estates who purchased their green leaf (GL) produce (Gam & Deka, 2020). But as per official records, the trend of small tea plantation started in India since early 1960s, which was initially confined to the South Indian states of Tamil Nadu, Kerala and Karnataka. In the late 1980s the small tea plantations emerged in Northeastern States and got speeded to West Bengal in 1990s (*Small-Tea-Growers-in-Other-States-of-India : Tea World - An Initiative of KKHSOU*, 2018). The tea cultivators in India with operational land holding size less than 10.12 hectares are categorized as STGs (*Tea Board of India - 66th Annual Report 2019-2020*, 2020).

Emergence of Small Tea Growers in Assam

The STGs are a new phenomenon in the state, which contributes to around 51.22 % of the total tea production in the state, amounting to about 680.73 million kg in the calendar year 2021 (*Provisional Crop Break-up for Big Growers (BG) & Small Growers (SG) (M Kg) : December 2021*, 2022). The emergence of this sector in Assam was due to primarily due to two reasons, as follows (A. Gogoi, 2018):

<u>The decline in quantity and quality of tea production in the estate sector</u>:

The stagnant productivity from the estate sector due to the caducity of the tea bushes in these plantations. The threshold age of tea bushes is considered to be of 40 years and most of the plantations in the estate sector had crossed this limit. Moreover, the re-plantation rate in these farms was reported to be 0.4% of the aggregate acreage in a year, which is below the prescribed annual norms of 2 %;

<u>Transformation of socio-economic life of rural Assam</u>:

In the year 1978, with the objective of promoting local entrepreneurship, *Late Sonaswar Borah*, erstwhile Minister of Agriculture & Co-operative of Government of Assam (GoA), encouraged the unemployed youths from districts like Golaghat, Tinsukia, Dibrugarh, Jorhat and Sivsagar to plant tea in their private land and even in Public Grazing Range (PGR) lands, which hitherto would have been either lying vacant or utilized for cultivation of some other low yielding crops. These establishments were created by the local youths primarily for their self expression and increase in their material well-being.

This sector has experienced a tremendous growth in the last four decades. It started with merely 16 units, covering an area of 60.836 ha in the conceptualization year (K. Borah, 2013) and has rapidly increased its numbers to 1, 44,222 units, getting stretched out across the state in 22 districts and covering a mammoth area of 80,948 ha (*Present-Status-of-Small-Scale-Tea-Cultivation-in-Assam- : Tea World - An Initiative of KKHSOU*, 2018). The major concentration of small tea growers is found upper Assam districts like Tinsukia, Dibrugarh, Sivasagar, Golaghat and Jorhat. This sector occupies a vital space in the economy of Assam as it provides direct employment to 0.3 million labour force (*Present-Status-of-Small-Scale-Tea-Cultivation-in-Assam- : Tea World - An Initiative of KKHSOU*, 2018) and nearly 1.5 million families (Singh, 2020) are dependent on them. The increase in the production of GL in the state has paved a way for the creation of new manufacturing units like Bought Leaf Factories (BLFs) to aid processing the GL in the tea cluster (K. Borah, 2013). There are over 260 BLFs in the state which purchase about 50 % of the GL produced by STGs (*Tea Board of India - 66th Annual Report 2019-2020*, 2020), with engagement of 20-25 workers in each processing plant (K. Borah, 2013).

Problems faced by Small Tea Grower of Assam

Despite of owing to the blessings of sound climatic and soil characteristics favourable for the cultivation of this crop, the sector has been facing some acute problems which need to be diagnosed with proper research and investigation. The common problems encountered by STGs are almost similar in nature either at global or national or local level (Sarkar, 2016). This unorganized sector has experienced an unregulated growth (K. Das, 2019), which has resulted in production of heterogeneous quality of GL from the farms (K. Hazarika & Borah, 2013). Some of the significant problems encountered by this sector are poor economic condition of the growers, lack of technical, managerial and scientific knowledge on tea cultivation, financial exclusion, lack of formal education (P. Borah, 2016) and lack of awareness about government support (*CEC India - Small Tea Growers*, n.d.). Since the STGs do not have processing units of their own, they are dependent on other sources for sale of their GL. At this juncture, the STGs face lot of challenges like lack of coordination between them and the buyers of their produce (K. Hazarika & Borah, 2013). There is lack of infrastructures facilities for storage of the produce and transportation of GL to processors which compel the STGs to sale their produce through agents (Mano Raj, 2020). It is noteworthy to mention that there has been initiatives from the government agencies to set up processing units by the STGs in cooperative forms but reason for the closure of this factory (Lahdoi Tea Factory under Lahdoi Small Tea Growers Co-operative) since 2004 still remains a mystery (*Tea Board of India North Eastern Zonal Office - SEALED TENDER BASED AUCTION SALE NOTICE*, 2015). Apart from these, some major challenges faced by this sector is the threat from the emergence of global company, non-availability of workers in the peak plucking season, fetching a lower price for their produce and high price fluctuation of GL (Das & Mishra, 2019). The other crucial challenges faced by the small farmers are non-registration of their tea gardens with Tea Board of India (TBI), land ownership related matters (S. B. Saikia, 2019) and politicization of government policies (A. Gogoi, 2018), which has deprived them from availing the benefits of government agencies. The scanty use of improved technology by the farmers has complemented to low productivity (crop yield per ha) from their farms. In his research paper (Ganguli, 2014) pointed out the environmental problems associated with this sector like utilization of land which was earlier

used for cultivation of food crops and traditional crops for tea cultivation; depletion of bamboo plant which has a unique socio-cultural significance, besides being an important raw material for the furniture industry in Assam due to cut down; depletion of orchards, which was a more lucrative proposition and utilization of government land or common village property which earlier served as grazing land. Erratic weather events particularly in temperature and rainfall patterns have not just affected Assam's tea-growing seasons but also resulted in crop loss, reduced productivity and low income of the STGs in particular ("Climate Change Impacting Assam's Tea Production to Great Extent," 2022). Apart from this, pest attacks (looper, helopeltis and red spider caterpillars), inadequate infrastructure support (Pradhan Mantri Krishi Senchai Yojana - PMKSY[1]) and multiple lockdown phases has severely hit production of STGs in upper Assam, who have been contributing to about half of the state's tea production (Kalita, 2021). The increase in cost of production (CoP) of GL due to hike in wages and inputs and lowering of price realization in made tea prices has adversely affected the income generation of the STGs from their farms (Singh, 2021). Moreover, the existing price sharing formula (PSF)[2] for determining the price of GL is not appropriate for the STGs, as either the BLFs or the STGs have no role in determining the price of the CTC in auction system of tea (Somwanshi, 2020). At many a times, the BLFs have violated the rules of PSF (C. K. Sharma & Barua, 2017). A critical issue faced by this sector was pointed out by (Hannan, 2019) was lack of institutional backing. This was justified by the CAG Report of 2012, where it stated that even after five decades of existence of STGs, the TBI has failed to discharge its basic regulatory role effectively and more than 80 percent of them continue to exist outside the ambit of regulations of the agency.

Prospect of Small Tea Cultivation in Assam

Owing to the growth potential of tea market globally (reached a value of US$ 22 Billion in 2021 and to reach US$ 30.3 Billion by 2027, exhibiting a CAGR of 5.6% during 2022-2027) and locally (CAGR of 4.7% during 2022-2027) (*Tea Market: Global Industry Trends, Share, Size, Growth, Opportunity and Forecast 2022-2027*, 2022), the people of Assam can focus on cultivation of tea in small landholdings to cater these needs as tea plantation is a profitable investment (S. K. Sharma, 2019). The STGs of Assam are facilitated with all ready available infrastructures like technology, processing units/factory, skilled workers and market (A. Gogoi, 2018). It provides ample avenue for rural educated unemployed habitants in the form of self-employment, family labour (K. Hazarika & Borah, 2013), commission agents (CA)[3], sound & strategic communicative service, easily accessible financial services, and improvement in intra and inter trade services (A. Gogoi, 2018). This sector has also opened up scope for establishment of BLFs which accounts for 25 % of the total tea production of Assam (K. Hazarika & Borah, 2013). With the abolition of Tea (Marketing) Control Order 1984 and introduction of 'Special Purpose Tea Fund' for ease of selling the tea by these processors through the channel of their choice and enhance productivity of the tea (L. Gupta, 2018).

[1] PMKSY is being implemented to expand cultivated area with assured irrigation, reduce wastage of water and improve water use efficiency (*OPERATIONAL GUIDELINES OF PRADHAN MANTRI KRISHI SINCHAYEE YOJANA (PMKSY)*, 2015).

[2] The PSF designed by Tea Board of India is as follows (R. Hazarika, 2020):

*Minimum Price of Green Leaf for Current Month = (Previous Month Average Auction Price of CTC)*0.65*C*
where, C = 0.2165 is the Outturn Ratio,

⇨ *0.2165 unit of CTC is processed per unit of GL in case of Assam*

[3] CAs have played a pivotal role in facilitating the STGs of Assam in providing services like marketing and transportation of GL, credit, labourers, agricultural inputs and supervision of tea gardens by charging a commission (P. Gogoi, 2023).

Branding of GL through collectivization of STGs has also enhanced the market competitiveness of these farmers (Mano Raj, 2021). The self-help groups (SHGs) among STGs are used as innovative functioning systems to access markets, obtain fair price and gain knowledge and information (Saha, 2020). The *Rangagora Small Tea Growers Society* in Tinsukia district of Assam, which was established in 2011 with aid from TBI, sold GL of their members as well as of other STGs in nearby to Nalani Tea Estate at a remunerative price in 2022. The members of the SHG availed the extension services from the processor on cultivation practices. They were able to collective sell a quantity of about 3, 50,000 kg of GL in the year 2022 by using the common infrastructure facilities like GL storage warehouse and vehicle for transportation (Paul, 2023). Mutual ownership of the manufacturing units along with establishing close relations with capital and individual landholding not only empower the STGs but also help them in moving upward in the value chain and provide them with the identity as rural entrepreneurs (Saha, 2020). The *Rwdwmsha Tea Producer Company Limited*, registered in 2016, comprising of 69 STGs with landholding size below 1 acre has initiated a processing unit at Dimakuchi, Udalguri of Assam with financial assistance from NABARD Financial Services Limited (NABFINS) and TBI. The unit which produces both orthodox and green tea got commissioned in 2020, now sells orthodox in GTAC and green tea in open market and has fetched an average price of 250/ - per kg and 260/- per kg respectively in 2022. Apart from profit share, the company was able to give an average remunerative price of 25/- for per kg of GL to its member STGs in 2022 (Boro, 2023). There is a scope of highlighting the uniqueness of the tea produced in a particular region by the STGs of Assam in the global market (e.g., Kangra tea had received the Indian GI tag in 2005 and is likely to win European Union's GI tag) through GI registration (TNN, 2022). The demand for organic tea in European countries, change in consumer preference (shift towards less health hazards, use of no chemicals, aesthetic sense associated with organic tea, eco-friendly product), readily available market (EU, USA & Japan), availability of natural & health food stores in foreign countries, availability of super markets & specialist shops in foreign countries meant for exclusive sale of organic products may attract the STGs of this reason to either shift their cultivation to organic or carry out tea cultivation in organic form (D. N. Saikia, 2014). The high cost of shifting to organic mode of cultivation by the STGs can be compensated by the increase in price of organic black tea over non-organic ones (57.8% - 200%). There is a prospect for better price realization of GL and greater acceptability in the global market through organic certification (Selvaraj & Ganesh, 2017). It was also revealed from a study carried out by (M. Gogoi & Buragohain, 2019) that the organic STGs have more ability to increase production of GL by 15 % through effective utilization of the available resources than that of conventional STGs, which opened by the scope to increase the extent of organic tea cultivation and production by STGs in this region. During the last few years, the Government agencies are implementing several welfare schemes for the STGs to re-vitalize this sector and to improve their economic conditions. Government of India (GoI) has developed several instruments under Tea Development & Promotion Scheme (*Tea Board of India - 66th Annual Report 2019-2020*, 2020) for increasing the production, productivity and quality of the STGs and has spent a significant amount of resources to achieve this objective. This has been justified not only from an economic efficiency standpoint, but also from an income distribution perspective, because this group of farms is a very important source of employment, in the economy. Identification of

tea cluster in Assam[4] by GoI, which will be used for export promotion under the Agriculture Export Policy (AEP) with the prime focus to develop export – oriented infrastructure in the identified cluster areas where integrated post harvest, processing facilities and laboratories would be set up with support from other agencies ("Centre Picks Assam's Tea and Meghalaya's Turmeric Cluster for Export Promotion," 2018). Significantly, Rampur Tea Cluster in Tinsukia district has been selected by Ministry of Micro, Small & Medium Enterprises (M/o MSME), GoI under Scheme of Fund for Regeneration of Traditional Industries (SFURTI), with *Chaoloong Sukapha Small Tea Growers' Samittee*, a primary producers' society (PPS) promoted by TBI, as implementing agency. They are in a process of establishing a Farmers' Producer Company (FPC), under the aegis of the group with the corporate entity name *Chaoloong Sukapha Tea Producers' Company Limited*, which will directly or indirectly benefit 530 artisans in the tea cluster, with an aid of 424.88 lakhs from GoI. Interestingly, this group has existed as different entities since 2003 for its survival (Upadhaya, 2020). GoI has also taken various steps to support the STGs, such as implementation of online licensing system, auto-renewal of 3 types of licenses, exporter license, tea waste license and tea warehouse license and development of Chai Sahyog mobile app (Luthra, 2022). Recently, to ensure price realization of GL provided by STGs and to maintain the quality of the tea manufactured by BLFs, the Assam Bought Leaf Tea Manufacturers Association (ABLTMA) has decided to pay minimum benchmark price for GL and accept only the fine quality leaves, as per stipulations laid down by TBI (PTI, 2021). The GoA has declared a policy called "Cess Utilization (Amendment) Policy, 2015" for development and welfare of STGs in the state on 30th May, 2015 (*CESS Utilization Policy*, n.d.). The GoA has initiated the settlement of the allotted land to STGs, which may be done after realizing a premium @ 33 % of the existing market value of land. The STGs encroaching upon government land shall be imposed encroachment penalty of 200/- per *bigha* till the finalization of settlement of the encroached land with them (Directorate of Land Acquisition Requisition and Reforms, Department of Revenue & Disaster Management, n.d.). The STGs of Assam has attained technological boost to combat terrible impacts of climate change through Smart Agri app, which provides farmers with satellite-based data on rainfall, temperature, humidity and other weather-related information via their mobile phones ("Assam Small Tea Cultivators Attain Technological Boost to Combat Grave Impacts of Climate Change," 2022). In addition to this, the Assam Cabinet has approved the Assam State Action Plan for climate change between the years 2021-2030. This project will revolve around ways and measures on to how to make state more immune to changing climate ("Assam: Tea Production Adversely Affected By Climate Change - Sentinel Assam," 2022).

Future Directions

As rightly pointed out by Shri. Pijush Goyal, Hon'ble Minister of Commerce and Industry, GoI, in order to make this sector profitable, viable and sustainable, we must enhance the *'AROMA'* of tea (Luthra, 2022). It is the abbreviation for the following strategy:

A- Assistance: Support small growers to improve quality with sustainability, increase production to meet domestic and international demand;

[4] It comprises Tinsukia, Sivasagar and Dibrugarh districts, which produce the highest quantity of tea in the state.

R- Re-energize: Create infrastructure to augment exports and focus on high value markets such as EU, Canada, South America & Middle East;

O- Organic: Promote organic and GI tea through brand promotion and marketing;

M- Modernization: To enable tea farmers to become self-reliant and strengthen local supply chains;

Adaptability: Focus on the importance of a risk proof ecosystem, that is, the need for sustainable solutions to make tea plantations meet the challenges of climate change.

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The Role of Muga Silk Gi in the Sustainable Development of Assam and its Related Challenges

Ms. Ipsita Kaushik
Assistant Professor
Assam Rajiv Gandhi University of Cooperative Management, Sivasagar
Research Scholar
Department of Law, Gauhati University
Email: ipsita.kaushik.3@gmail.com, Phn-9706649680

Abstract

The Muga Silk is one of nature's gifts to Assam which is endemic to Assam. Since time immemorial people of Assam have been producing Muga Silk which contributes 95% of India's total Muga Production. Since Muga Silk is historically closely associated with the state of Assam due to its ecological requirements and it is non-replicable elsewhere it acquired Geographical Indication (GI) in the year 2007 under the Geographical Indication Act 1999. The Geographical Indication is a unique form of Intellectual Property Right that gives the producer community an exclusive right to become an authorized user, which enables him to use the GI tag as well as initiate actions against infringement.

The Muga silk GI of Assam can play a significant role in the sustainable development of Assam if is properly institutionalized. The Muga Silk GI of Assam has the potential to become an effective marketing tool as it enables local producers to stand out and differentiate their products in the market. Moreover, GI provides a competitive advantage to the authorized users because of the trust of the customers they acquire regarding quality, origin, and other related attributes which give them a better price. Moreover, the Muga Silk GI also contributes to the protection of the 'traditional knowledge' of the local indigenous people of Assam which they have adopted while producing Muga Silk to get a better result. Traditional knowledge is an intangible asset for the producer community which requires protection and GI can be an effective mechanism to protect the same. The Muga silk GI also helps in the protection of the environment and the socio-cultural identity of the Assamese people.

However, the registration of Muga Silk as a Geographical Indication is only a means to achieve the benefits of Geographical Indication, not an end. Post-GI mechanisms are equally important to unfold the benefits of Geographical Indication.

[Key Words: Muga Silk, Geographical Indication, local producers, sustainable development]

Introduction:

Silk "The Queen of Textile" has always been an integral part of the life and culture of India. The Silk Industry of India occupies a predominant position in the world being the second-largest producer of silk after China. India produces four varieties of silk: Mulberry, Eri, Muga, and Tasar silks. Out of these four silks, India has the monopoly in the Muga Silk production which is produced only in the Bramhaputra Valley of Assam(Chowdhury, 2019).

Sericulture activities have been practiced in Assam since time immemorial. Assam contributes 95% and 65% of the country's total Muga and Eri production respectively. Muga Silk is one of the many nature gifts to Assam which is endemic to Assam. Muga silk has various unique features such as colour stability, durability, UV Ray resistance, acid resistance (resistant to

concentrated Sulfuric acid), eco-friendly, etc. The Muga Silk of Assam received Geographical Indication in the year 2007 and the "Muga Silk of Assam" Logo was registered in 2013.

The Geographical Indication (GI) is a form of intellectual property right that indicate the product's geographical origin and designates the quality, reputation, and other characteristics of the product derived from its geographical environment. In order to obtain Geographical Indication, there must be a close triple association among the product, place of origin and quality, reputation, and other characteristics-related attributes. The Geographical Act, 1999 of India has classified "Goods" into three categories which are covered under the protection of Geographical Indication; which are-

- Agricultural goods
- Natural goods &
- Manufactured goods

A product originating from a particular geographical region acquires quality, reputation, and other characteristics essentially attributable to its geographical origin, and because of the close association with its geographical place of origin, the product eventually becomes "Exotic". A particular product acquires exoticness primarily because of its non-replicable quality, reputation, or other characteristic attributes derived from its place of origin. Products may also acquire exoticness from the history and tradition associated with the production processes used in the specific geographical areas from which the products originate. Over time, these geographical indications become valuable assets for the local producer community because they enable the producers to obtain a premium price for the products. Moreover, Geographical Indication enables the local communities to translate their long-standing, collective, and patrimonial knowledge into livelihood and income. Geographical indications can thus be key in developing strong collective brands for origin-linked quality products. Geographical Indication can also bring competitive advantage, added value to the product, niche market for local producers, and increased export opportunities. Thus, Geographical Indication becomes an intangible asset for the producer community (Buch & Trivedi, 2022).

MUGA Silk of Assam: The First Geographical Indication of State

The term MUGA is a purely Assamese term that represents a particular natural golden or brown colour. As this silk is Golden Yellow it was named as "Muga Silk". Muga Silk produced by *Antheraea Assama* silkworm is produced only in Assam. The people of Assam have been carrying out the production of Muga Silk since time immemorial which finds mention in the *Arthashastra* by Kautilya dating back to 321 B.C. The scientific name of Muga silk (Antheraea assama) also shows its origin. The Muga silkworm is fed on the leaves of food plants, particularly on *Som* (Machilus odoratissama) and *Soalu* (Teranthera monopetala). There are five stages involved in the production of Muga Silk which includes the Degumming of fiber with alkali extracted from the seeded banana tree (Bheem kol) typical to Assam, hand reeling, winding, warping, and weaving. Almost 4500-6000 standard-size Muga Silk cacoons give about 1 Kg. Muga Silk yarns and 1 kg. of Muga Silk yarn give about 12 meters of Muga Silk fabric of 36-inch width. (*GI Journal 52*, 2013).

The pride of Assam Muga Silk received Geographical Indication in the year 2007 with the initiative of the Patent Information Centre, Assam Science, Technology and Environment Council (ASTEC), Department of Science & Technology. The Assam Science, Technology and

Environment Council became the registered proprietor of Muga Silk GI of Assam who represented the common interest of the producer community of Muga Silk of Assam. The Muga Silk GI is granted in respect of the following classes of goods: Class 23 (Raw silk yarns and threads for textile use), Class 24 (Textile and Textile goods including Mekhela-Chadar, Shawls, dress materials, sarees, and Wall hanging), Class 25 (Clothing /Garments, Footwears, Head gear, made-ups, Ties, Motifs, fashion wears), Class 27 (furnishings & upholstery) and Class 31 (Cocoon)(*GI Journal 52*, 2013).

Muga Silk GI gives exclusive community right to the "Authorised Users" i.e registered producers under Geographical Indication Act, 1999 to use the Geographical Indication. Under the system of GI, over and above the registered proprietor any individual who is a producer, manufacturer, dealer, trader or exporter can apply for the status of an authorized user, which enables him to make use of the GI tag as well as initiate actions against infringement.

Geographical Indication plays an important role in the sustainable development of designated region. The concept of sustainable development was described by the 1987 Bruntland Commission Report as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." There are four dimensions to sustainable development: "Society", "Environment", "Culture" and "Economy" which are intertwined and not separate. Sustainability is a paradigm for thinking about the future in which environmental, societal, and economic considerations are balanced in the pursuit of improved quality of life.

Muga Silk of Assam plays an important role in the sustainable development of Assam. Muga Silk GI has potential to become an effective marketing tool as it enables the local producers to stand out and differentiate their products in the market. Since Muga Silk is endemic to Assam and its ecological requirements are found only in its natural abode and hence it is non-replicable.

Role of Muga Silk in Sustainable Development of Assam: An Analysis

The role of Muga Silk in the sustainable development of Assam can be discussed hereunder-

Contribution in Rural Economy:

In various studies conducted across Europe, some interesting consumer behaviours came to light, chief among them being that consumers were willing to pay a premium price for Geographical Indication designated products because of the elimination of uncertainty on the quality and origin of the product(Rout & Majhi, 2014).

Geographical Indication has many beneficial results both for producers and consumers. Once protected, a geographical indication has multiple advantages- such as it protects the interest of honest producers and traders, generally the economically backward traditional craftsman by preventing unfair competition, commercial abuses, and specifically unauthorised use. Moreover, Geographical Indication helps the local producers to acquire trust of the consumers because of assurance regarding quality, origin and other related attributes which gives them better price. Geographical Indication also helps consumers by serving as market differentiation tool and could also curtail market failure arising out of information asymmetry between buyers and sellers.

In order to understand the performance of Muga Silk industry after receiving the GI status in the year 2007, the researcher has collected some data from the Directorate of Sericulture.

Table 1: The Annual turnover (in lakh) of Muga Silk

Year	Annual Turnover (Projected) in Lakh	Growth
2005-2006	3715.00	
2006-2007	3638.00	-2%
2007-2008	3718.00	2%
2008-2009	4873.25	31%
2009-2010	6675.00	37%
2010-2011	9204.00	38%
2011-2012	11742.40	28%
2012-2013	10716.35	-9%
2013-2014	4992.75	-53%
2014-2015	5626.50	13%
2015-2016	5926.72	5%
2016-2017	17247.30	191%
2017-2018	20267.50	18%
2018-2019	29359.00	45%
2019-2020	31590.12	8%
2020-2021	33396.70	6%
2021-2022	37525.04	12%

Source: Directorate of Sericulture

An upward trend has been observed over the years with a CAGR of 14.57%. 13 out of 16 years have seen a positive Y-o-Y growth which indicates an encouraging impact of GI in the sales and turnover.

Table 2**:** Income trend of Muga Silk producers

Year	Income of Producers	Growth
2005-2006	13,080	
2006-2007	12,750	-2.5%
2007-2008	13,080	2.6%
2008-2009	17,300	32.3%
2009-2010	20,533	18.7%
2010-2011	28,125	37.0%
2011-2012	30,400	8.1%
2012-2013	38,600	27.0%
2013-2014	35,800	-7.3%
2014-2015	39,900	11.5%
2015-2016	49,000	22.8%
2016-2017	49,600	1.2%
2017-2018	58,100	17.1%
2018-2019	66,580	14.6%
2019-2020	87,000	30.7%
2020-2021	87,750	0.9%
2021-2022	100,600	14.6%

Source: Directorate of Sericulture

Income of the producers has also seen a steady growth barring a few years. A CAGR of 12.75% has been observed over the years with a positive Y-o-Y in 14 out of 16 years. This also indicates a positive impact of GI in the income of producers.

Table 3: Direct employment generated by Muga Silk Industry

Year	Direct Employment	Growth
2005-2006	745500	
2006-2007	770400	3%
2007-2008	724200	-6%
2008-2009	676000	-7%
2009-2010	640800	-5%
2010-2011	763740	19%
2011-2012	822240	8%
2012-2013	785750	-4%
2013-2014	318750	-59%
2014-2015	275740	-13%
2015-2016	321824	17%
2016-2017	801540	149%
2017-2018	764870	-5%
2018-2019	990660	30%
2019-2020	1013270	2%
2020-2021	1026000	1%
2021-2022	1063050	4%

Source: Directorate of Sericulture

Though the number of direct employments has seen peaks and valleys, the overall CAGR has been 2.11% showing improvement over the years.

Protection of 'Traditional Knowledge':

Traditional Knowledge deserves recognition and protection as an economic asset because they have great monetary value and the potentials to improve the economy of developing countries. 'Traditional knowledge' refers to the knowledge and traditional practices of the indigenous or local community evolved over the course of time, passed from generations to generations and are continuously practiced within the community. Geographical Indication has evolved as a possible mechanism to protect traditional knowledge because geographical indication protects age old knowledge and practices in existence and gives the entire community rights over the knowledge.

Muga Silk production is an age-old traditional practice associated with the indigenous people of Assam. The Local indigenous Muga producers adopt different traditional practices and methods which play a crucial role in Muga sericulture. For example- Muga farmers apply their traditional knowledge to identify suitable host plant for muga silkworm rearing. Based on the shape of leaf local muga farmers have classified the *som* plants into four categories locally known as *Naharpatia, Ampatia, Jamupatia and Kathalpatia* of which Naharpatia is considered as the best. Experienced muga farmers use to identify the preferred variety of *som* plants by

chewing the leaves. According to the farmers, taste of the suitable leaves is sweet(Sharma et al., 2010).

There are also some traditional beliefs and practices which Muga silk rearers adopt at the time of seed selection. In Assamese there is a proverb *Namonir sonch ujanir goch* that means, seed cocoon from lower Brahmaputra valley reared in upper Braphmaputra valley always ensures successful harvest of cocoon. The traditional rearers usually select seeds by seeing the larval colour, size of the larvae and cacoon, movement, by touching the tubercles of the larvae etc. Larvae and cocoons of larger sizes are believed to indicate a greater propensity for adaptiveness than smaller ones do. The cocoons formed by male larvae are smaller and smoother than those made by female larvae. It is noteworthy that the superior seed cocoons produce a more audible sound than inferior ones when they are kept in *chokori pera* (a kind of bamboo cage) after collection (Chakravorty et al., 2015). There are several examples of traditional knowledge and practices which Muga producer exercise at every stage of Muga Silk production. Muga silk GI can be an effective tool to protect the traditional knowledge associated with the Muga silk production, as GI will give community right to producers over the traditional knowledge.

Protection of Environment:

A GI identifies a product that originates from a special geographical location; and the associated quality, reputation or characteristics of that product are intrinsically linked and essentially attributable to that geographical origin. The strong link that GI-branded goods have with their terroir i.e the location in which they are produced (including natural and human factors) creates a responsibility for producers and other stakeholders to maintain the integrity of the natural resources responsible for producing them (Blakeney, 2017).

The European olive oil industry, which is characterized by extensive use of Geographical Indications, is a good example of agriculture with many associated positive environmental impacts such as lower rates of soil erosion, improved fire-risk control, water efficiency, lower pollution, and higher levels of biodiversity and genetic diversity in olive-tree varieties (Belletti et al., 2015).

The Muga culture has very close relationship with the environment. Muga culture broadly comprises interlinked activities such as food plant cultivation, silkworm rearing, reeling the cocoons for unwinding the silk filament, yarn making, weaving and processing of fabric. In Assam '*Som*' and '*Soalu'* trees provide the principal food for muga silkworms which produce the golden coloured silk. Few other food plants for mug silkworm are Digloti, Mejankari, Bogori or ber, Champa, Bhomloti, Patihonda, Gamar, Panchapa, Katholua, Gansarai, Bojramoni etc. These species are broadly classified into primary, secondary and tertiary food plants on basis of feeding preference of silkworms. Muga silkworms' food plants grow well in high rain fall, humid and warm climatic conditions in Assam (Das, 2021).

As environment has direct impact on Muga Silk production, it creates environmental stewardship among the policy makers, local producers, and government. Sustainable use of natural resources and genetic resources, and conservation becomes the responsibility of local producers and other stakeholders to preserve the biophysical attributes of the *terroir* which is associated with the unique characteristics of products.

Massive plantation of *Som* tree and other secondary host plant can improve the biodiversity in the area and prevent afforestation.

Table 4: Plantation of Host Plant of Muga over the years

Year	No. of Host plant	Growth
2005-2006	4390750	
2006-2007	4735476	8%
2007-2008	4737476	0%
2008-2009	4748100	0%
2009-2010	5869360	24%
2010-2011	5897096	0%
2011-2012	6026400	2%
2012-2013	6326264	5%
2013-2014	6539400	3%
2014-2015	6405120	-2%
2015-2016	6565428	3%
2016-2017	6500450	-1%
2017-2018	7063750	9%
2018-2019	5859000	-17%
2019-2020	5427090	-7%
2020-2021	5978500	10%
2021-2022	6177600	3%

Source: Directorate of Sericulture

The above table shows that plantation of host plant of Muga silk are increasing with a CAGR of 2.03% which will have positive impact on the environment and the overall production of Muga Silk.

Protection of 'Cultural Integrity':

The 'traditional cultural expressions' or 'expressions of folklore' and 'traditional know-how' expressed in tangible form such as art, drawings, designs, paintings, carvings, sculptures, pottery, terracotta, mosaic, woodwork, metalware, jewellery, needlework, textiles, carpets, costumes, handicrafts, musical instruments etc. may qualify for geographical indication protection if there is an association between the product and cultural practices of community that influences its creation. Geographical Indication protects long standing tradition and culture of a community which may lose its identity over time.

Assam is the meeting ground of diverse cultures and traditions. The state has a large number of tribes, each unique in its tradition, culture, dress and exotic way of life. Muga silk of Assam is a cultural heritage of Assam. The women of Assam wear "Mekela-Chador" a two pieces traditional attire made from Muga silk on their wedding, Bihu festival or on other special occasions. Even the male member of the society wear dress wears made from Muga silk during Bihu festival or on other special occasions. Even during Ahom kind muga attires were worn by the king and other government officials and used it as their status symbol. Thus, the protection of Muga silk as a geographical indication of Assam shall also protect the cultural rights of the people of Assam. Geographical Indication of Muga Silk of Assam will indicate its close relationship with the culture of Assam which may lose its identity if not protected.

Problems and Constrains:

The Muga Silk GI of Assam in spite of all its qualities has failed to acquire right place in the national as well as the international market. Some of the major challenges are:

Lack of awareness about GI:

Producers of Muga Silk are not aware about the GI registration and its associated benefits which is evident from the fact that the number of registered authorised users of Muga Silk GI till 2022 is 287 which is negligible as compared to the total number of Muga Silk producers of Assam.

Fake Muga Silk:

The golden Muga Silk is adulterated to a large extent by mixing muga yarn with local and Chinese tassar silk or tassar-like polyester during weaving thereby camouflaging the product as original muga silk. In the markets of Delhi, Jharkhand, Bihar, UP and others a silk Known as 'Moonga' silk is floating. Further in many websites 'Moonga' silk is advertised by using pictures of traditional Muga silk attires and misguiding the customer to believe it as authentic Muga silk. These practices are affecting the image of Muga silk.

Unorganized Market:

Muga Silk industry of Assam is not well organized and hence marketing agencies are also diverse. The primary producers have no direct access to market or market information resulting in mismatch of production and market demand (Khakhlari, 2020). The weavers sell their product either through cooperatives, middleman, traders, and sometimes through government agencies (such as ARTFED, AGMC, NEDFi, Ministry of handloom and textile etc.). Due to the absence of proper supply-chain management system in Muga silk industry and existence of large number middle man in marketing, it is observed that often primary producers and weavers do not get their due profits (Baruah, 2016).

Less emphasis on Post GI Initiatives:

Registration of GI is a mean not an end. The success of GI depends equally on the post GI initiatives which seems to be negligible in respect of Muga Silk of Assam. Creating awareness among stakeholders, branding, promotion and advertisement, product diversification, skill upgradation, design upgradation, quality monitoring, watch dog mechanism, fighting legal battles etc., plays vital role in the success of a particular GI.

Production is not as per Demand:

Muga Silk worm is very sensitive towards climate change. Muga silkworm is semi-domesticated and rearing is conducted in outdoor condition; they may not be able to adjust to the new changing environment. During the last few decades air pollution, global warming along with abnormal rainfall pattern, flood, drought has caused continuous failure of the crop or low crop yield. Besides abnormal increase in temperature, the other reasons enlisted for the heavy loss of Muga silkworm are air pollution caused by rampant use of pesticides in neighbouring tea gardens, pollution from the brick kilns and burning of natural gases emitting from oil wells etc. (Saikia et al., 2016).

Conclusion:

Geographical Indication can bring sustainable development to the designated geographical region with proper enforcement mechanism. Being a collective right Geographical Indication enables the producer's community to use the tag as a marketing tool to differentiate their

product in the market, assure origin and guarantee the quality, reputation and other characteristics of the product which it has derived from its place of origin.

Muga Silk GI can be a legal vehicle for the rural development in the region. As it provides local producers competitive advantage and niche market, protection of consumers, environment, traditional knowledge and cultural integrity of the community. However, in order to achieve the desired outcome equal emphasis on post GI initiatives is important.

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Development of Income and Productivity in Potato Cultivation: A Study in Brahmaputra Valley of Assam, India

Dr. Rimjim Bordoloi
Assistant Professor
Department of Economics,
Government Model College, Kaziranga

Abstract:

The paper tries to examine the Production and development of Income of the potato growers and its contribution towards the sustainable income of rural people in the Brahmaputra Valley of Assam, based on household level data collected from 400 potato growers. The multi-stage random sampling technique was adopted and the data were collected by using a well-structured questionnaire through personal interview method. The descriptive statistics and the regression analysis were employed to analyze the data. The average Gross Profit Ratio was found to be 31.54 which implied that potato cultivation is profitable and the mean productivity was about 3676 kg per bigha. The results of the regression analysis showed that yield rate, age of the farmers, planting season, and literacy level were positively affecting the Gross profit ratio and each of these variables were significant at 1 per cent level. The labour cost was found to negatively affect the gross profit ratio and it was significant at 1 per cent level. Though irrigation, literacy level, proportion of area under HYV seeds had positive impact on profitability but they were not significant at any level. The study found that potato cultivation is profitable and it is a source of sustainable income for farmers. Hence, potato cultivation needs to be encouraged to promote sustainable rural development in the State. However, there are certain problems like inadequate cold storage facility, inadequate availability of HYV seeds, lack of credit facility, high cost of inputs, price fluctuations etc. which need to be addressed to encourage potato cultivation in the State.

Key Words: Potato, Productivity, Profitability, Sustainable income, Assam

Introduction

Potato is considered as the most important and highly used vegetables in all over the world. Potato which scientific name is *Solanum Tuberosum*, is the most important crop after rice and wheat in respect of production and consumption (Sujan et. al, 2017). Potato is the crop to address food insecurity in the country. It is highly nutritious food which consists of high starch (16.1/100g), protein(2.1/100g), vitamin (17.1 mg/100g), potassium(443mg/100g) and essential amino acids (Subedi et. al, 2019).It plays a vital role in improving health and nutrition factors of the people in the rural areas of developing countries. Potato production is profitable and it can provide cash income to the farmers (Sujan et. al, 2017). This is mainly because of the fact that potato production does not require much care and attention. The yield and gross return of potato are higher than the other competitive crops (Akhter et. al, 2001). Thus, potato has its own potentialities to generate income to the rural people of a developing country like India. It generates not only income, but also provides employment facilities to the rural people as it is a labour intensive crop (Singh et.al, 2019). India occupies a prominent position in the world in terms of potato production (Rana et. al, 2018).

Agriculture sector plays a very important role in the economy of the north-east region. The diverse agro-climatic condition of the region is highly suitable for the cultivation of tuber crops (potato, sweet potato, carrot etc.). Among the various crops grown in the region, Potato occupies an important place. The tuber crops provide food and nutritional security to many people of this region. In fact, the tribal of this region are already in the habit of growing these crops. These are not only cultivated in the hilly areas but also in the plain areas mainly in Assam and Tripura. These crops do not require much attention or care and no serious disease or insect damages are observed, they get preference as risk aversion crops in this difficult region. Tuber crops has multiple uses, they are used as human food, animal food, industrial, medicinal use etc. Therefore these crops are highly produced in all the states of the region. The crop is grown throughout the year in one or the other part of the North Eastern region contributing about 10 percent of the total area under potato in the country. Among of all the eight states of the region, the production of potato is very high in Assam and Meghalaya. Potato is considered as the most important crop in north eastern region of India which comprises of eight States namely Assam, Arunachal Pradesh, Mizoram, Nagaland, Manipur, Meghalaya, Sikkim and Tripura. These States together accounts for about 10 per cent of potato acreage and 4 per cent of the total production of potato in India (Gupta V.K, 2004). Among the North Eastern States, Assam has the highest area under potato (Yadav S.K. et. al, 2014). The State has 77.83 thousand hectares of area under potato followed by Meghalaya (18.20 thousand hectare) and

Sikkim (6.80 thousand hectare). Though area and production were found to be highest in Assam but the yield rate of potato was 7.009 MT/Hectare, 2017-18 (Statistical Handbook of Assam, 2017-18) which was much lower than the national average yield rate i.e. 24 MT/Hectare in 2017-18 (Horticulture Statistics at a glance, 2018).

In this background, this paper analyses the recent trend and growth in the production and yield of potato in Assam. It also examines the determinants of potato productivity and returns to scale to potato cultivation.

STUDY AREA

The state of Assam is popularly known as the land of the mighty river Brahmaputra, hills and valleys. It is the gateway to the North-East India and it shares international borders with like Bhutan in the North) and Bangladesh in the South. Assam is divided into 35 administrative districts. It has a total geographical area of 78,438 sq. km accounting for about 2.4 percent of the country's total landmass. The State is broadly divided into six agro-climatic zones, they are Lower Brahmaputra Valley Zone, North Bank Plain Zone, Upper Brahmaputra Valley Zone, Central Brahmaputra Valley Zone, Hills Zone and the Barak Valley Zone. The economy of Assam is highly predominated by Agriculture. Agricultural sector contributes 17.93 % to the Gross State Domestic Product (GSDP) (Statistical Hand Book of Assam, 2018). In this study, four districts of Assam were selected namely Sonitpur, Biswanath, Nagaon and Barpeta. In these districts, potato is abundantly grown and together they account for about 24.77 percentage of total production of potato in the state (Statistical Handbook of Assam, 2017).

MATERIALS AND METHODS

The study is mainly based on primary data. However, secondary data were also used to analyze the trend and growth in potato production in the State. Secondary data were collected from various sources like Statistical Handbook of Assam, Economic Survey of Assam, Pocket Books of Agriculture statistics etc. Primary data were collected by conducting field survey in the study area. The survey was conducted with the help of a structured questionnaire. The survey was based on multi-stage random sampling technique. In the first Stage, four districts of Assam were selected viz. Barpeta, Nagaon, Biswanath and Sonitpur. The districts were selected on the basis of their contribution to potato production. In the Second Stage, two blocks were selected from each district on the basis of distance from the district headquarter. One block located near the head quarter and other block located away from head quarter were selected. In the Third Stage, from each block two villages were selected on the basis of the distance from the block headquarter. However, random sampling technique was used to select the farmers. In total sixteen villages were selected and sample size was determined by using the Yamane's sample selection criteria. The sample size was 400 farm households.

The data were analysed using descriptive statistical methods, regression analysis, cardiograms etc. In order to examine determinants of potato productivity, Cobb-Douglas type production Function was applied. The model used is specified as follows: $Y = A.X_1^{b1}.X_2^{b2}.X_3^{b3}.X_4^{b4}$……

Taking log to both sides, the function becomes;

$\text{Log } Y = a + b_1 \log X_1 + b_2 \log X_2 + b_3 \log X_3 + b_4 \log X_4 + b_5 \log X_5 + b_6 \log X_6 + b_7 \log X_7 + \mu$

Where,

Y stands for output (per bigha)

A stands for technological parameter

b_1, b_2 ….. b_7 are regression coefficient representing output elasticity

X_1 X_2 …. X_7 are inputs used and μ is the disturbance term.

The Cobb-Douglas type production function has been widely used in analysis of agricultural production for its simplicity and reliability (Dutta, 2003). The data were processed by using the statistical packages *MS Excel* and *SPSS*.

RESULT AND DISCUSSION

Analysis of growth of area, production and productivity of Potato in Assam

The growth in area, production and yield of potato in the State is given in the Table 1. The analysis of growth of area, production and yield of potato showed that the area under potato cultivation has increased from 81 thousand hectares in 2000-01 to 102 thousand hectares in 2017-18. The compound annual growth rate (CAGR) of area was 2.34 per cent during the period 2000-01 to 2017-18. During the period 2000-01 to 2008-09 the area under potato declined in the State. The CAGR of area during this period was -0.62 per cent. But during the period 2009-10 to 2017-18, the area under potato registered high growth of CAGR of 2.66 per cent (table 1).

The production of potato increased from 677 thousand tonnes in 2000-01 to 720 thousand tonnes in 2017-18. The CAGR of potato production during the whole period was 2.12per cent. The potato production during the period 2000-01 to 2008-09 declined sharply. The CAGR of potato production during this period was -3.84per cent. However, during the period 2009-10 to 2017-18 production of potato in the State increased with CAGR of 2.07per cent.

Table 1: Trend and Growth in Area, Production and Yield of Potato in Assam (Area in '000 Hectares; Production in '000 Tonnes &Yield in Kg/Hectare)

Year	Area	Production	Yield
2000-01	81	677	8254
2001-02	80	621	7752
2002-03	75	590	7815
2003-04	78	543	6972
2004-05	73	589	8058
2005-06	70	354	5079
2006-07	78	505	6493
2007-08	75	521	6926
2008-09	78	516	6585
2009-10	83	600	7263
2010-11	85	658	7735
2011-12	98	683	6978
2012-13	105	806	7675
2013-14	97	700	7148

2014-15	104	783	7499
2015-16	103	693	6685
2016-17	106	777	7308
2017-18	102	720	7009
CAGR (2000-01 to 2017-18) in percent	2.34	2.12	-0.24
CAGR (2000-01 to 2008-09) in percent	-0.62	-3.84	-3.16
CAGR (2009-10 to 2017-18)in percent	2.66	2.07	-0.70

Source: Statistical Handbook of Assam (2001-02 to 2017-18)

It was observed that during the period 2000-01 to 2017-18 productivity of potato in the state has shown declining tendency. It declined from 8254 kg per hectare to 7009 kg per hectare in 2017-18. The CAGR of productivity during the period 2000-01 to 2017-18 was -0.24 per cent. This was on account of sharp fall in productivity during the period 2000-01 to 2008-09. During this period CAGR of potato productivity was -3.16 per cent. But in the recent period 2009-10 to 2017-18, potato productivity slight improved with CAGR of -0.70 per cent.

The decline in productivity of potato is a cause of concern and calls for attention of the policy makers. There is a need to identify the causes of declining productivity of potato in the state and make necessary efforts to improve productivity to improve well-being of farmers.

Regarding the level of input use in potato cultivation in the study area , it was found that the major inputs are seed (HYV and Local), human labour day (both family labour day and hired labour day), fertiliser, manure, chemical, machinery. Among of all the inputs, seed cost was found to be the highest in all the four districts followed by chemical cost and machinery cost.

The productivity of potato by the size of holdings the four districts has been analysed to examine the inter-district variation in productivity and to assess the effect of land size on productivity. The details are given in the table 2.

Table 2: Productivity of potato by size of holdings in four districts (in quintals/hectare)

District	Marginal	Small	Semi-medium	Medium	Large	All Holdings
Barpeta	315.92	323.49	---	---	---	318.09
Nagaon	332.53	298.80	---	---	---	331.89
Sonitpur	184.96	174.43	---	---	---	176.66
Biswanath	137.25	309.03	355.63	332.78	336.15	319.00
All districts	264.33	259.88	355.63	332.78	336.15	305.34

Source: Field Survey, 2019

The table 2 shows that the mean productivity of potato among the surveyed farmers was 305 quintals per hectare. The productivity of potato was found to be highest in Nagaon district (331.89 quintals per hectare) followed by Biswanath district. It was the lowest in Sonitpur district (176.66 quintals per hectare). The analysis of productivity by size of holdings showed that semi-medium was the most productive followed by large and medium holdings. Small holding was the least productive one. This indicated that extensive cultivation is more productive in case of potato. The larger farms are more productive in case of potato cultivation. Productivity of potato by size of holdings in four districts showed that in Barpeta, Nagaon and Sonitpur districts marginal holding was more productive than other holdings. In these three districts there were no farmers in semi-medium, medium and large categories. But in Biswanath district large holding was the most productive followed by semi-medium and medium. The productivity of marginal holding in Biswanath and Sonitpur was lower compared to other districts. This was due the fact that majority of marginal and small farmers in these districts used to cultivate local seed due to limited ability to invest in HYV seeds. It was observed that the productivity of local seeds was lower than that of the HYV seeds. Semi-medium, medium and large holdings in potato cultivation were found only in Biswanath district.

Determinants of Potato Productivity

There are various factors affecting the productivity of potato. The major factors are seed, Labour Day, fertilizer, manure, chemical, machinery, and size of holdings. The study examined the relative importance of these factors by applying Cobb-Douglas type production function. The log-linear model was used to derive the coefficients which give the elasticity of output to various inputs. The production function used is specified as follows:

$$\text{Log } Y = a + b_1 \log X_1 + b_2 \log X_2 + b_3 \log X_3 + b_4 \log X_4 + b_5 \log X_5 + b_6 \log X_6 + b_7 \log X_7 + \mu$$

Where,

Y stands for output per bigha

A stands for technological parameter

b_1, b_2 ….. $b_7$are regression coefficient representing output elasticity

X_1= Seed cost in rupees per bigha

X_2= Human labour day per bigha

X_3 = Fertiliser in kg per bigha

X_4 = Chemical cost in rupees per bigha

X_5 = Manure cost in rupees per bigha

X_6 = Machinery cost in rupees per bigha

X_7 = Size of holdings

μ = disturbance term.

The log-linear functional form is applied and the function was estimated by using the Ordinary Least Square method.

The results of the regression analysis for determinants of potato productivity are presented in the table 3

Table 3**:** Results of regression analysis for determinants of potato productivity

(Dependent Variable: Yield (in kg per bigha)

Variables	Coefficient	Std. Error	t-value	p-value
Constant	1.518	.251	6.048	.000
Seed cost	.417*	.022	18.616	.000
Labour	-.075	.121	-.624	.533
Fertiliser*	.176	.036	4.842	.000*
Chemical	.023	.039	.601	.548
Manure*	.020	.005	3.695	.000*
Machinery	.061	.048	1.258	.209
Size of holdings	.011	.020	.522	.602
R^2	0.558			
F-statistic	70.589			0.000

Note: (* Significant at 1 percent level)

The results show that F-statistic (F=70.589) was significant at 1 % level of significance which indicated good fit of the model. The R-square was 0.558 which showed that 56 percent of the variation in dependent variable is explained by the explanatory variables. Among the various variables, Seed cost was found to be positively affecting the potato yield and it was significant at 1 percent level. This implied that higher expenditure on seed leads to higher productivity. Since the HYV seeds are costlier, it indicated that the use of HYV seeds leads to higher yield. Labour Day was found to be negative but not significant at any level. The main reason behind the negative labour day was that cultivation of local seed needs more labour than HYV seed, but productivity was higher in case HYV than to the Local one. This could be the reason for negative coefficient of labour. The coefficient of fertilizer was positive and significant at 1 per cent level which implied that higher use of fertilizer higher enhanced the productivity. Again, coefficient of chemical was positive and but it was not significant. Manure was found to be positive and significant at 1 per cent level. This indicates that there is a need to promote use of manure to realize better yield. The coefficient of machinery cost and size of holdings were found to be positive but they were not statistically significant at any level. This meant that machinery is not an important factor in determining potato yield. Further, the study could not find any clear cut relationship between farm size and productivity. The sum of the coefficients in Cobb-Douglas production function gives the returns to scale. The sum of the coefficients was found to be 0.622 which indicated decreasing returns to scale in potato production.

Thus, the above analysis showed that seed cost, fertilizer, manure cost were the main determinants of potato productivity.

Policy Implications

The above findings and discussions lead to the following policy implications:

1. There is need to encourage the use of quality seed and measures should be taken to ensure availability of quality seed at an affordable rate.
2. The judicious use of fertilizer should be encouraged through proper training as its indiscriminate use can cause health hazard.
3. There is a need to provide minimum support price for potato in line with rice and wheat so as to safeguard the farmers against price fluctuations.
4. The credit facilities should be provided to farmers on easy terms and at cheap rate to enable them to make required investment.

5. Potato is cultivated as winter crop in Assam. So irrigation is important to get better yield. The farmers were found to use pump irrigation facility which involve high cost. Hence, there is need to provide canal irrigation facility for more intensive irrigation.
6. There is need to develop cold storage facilities as due to inadequate storage facility farmers had to resort to distress sale leading to low return.
7. There is need to improve marketing of potato.

Conclusion

Potato is extensively cultivated in Assam and production of potato has been increased over the years. However, the increase in production was mainly on account of area expansion as the yield rate has grown very slowly. The important inputs used in potato cultivation were found to be seed, manure, fertilizer, labour, machinery. The productivity of potato among the surveyed farmers was found to be 305 quintals per hectare. The result of the regression for determinants of potato productivity showed that seed cost, manure and fertilizer had positive and significant impact on potato yield. It indicated that there is need to invest in quality seed and plant nutrients to realize better yield. The study showed that potato cultivation can emerge as an important source of income and employment as well as means of reducing poverty in rural Assam. However, there is a need to ensure supply of quality seed, plant nutrients at affordable prices and provide credit facility, canal irrigation, cold storage facility, support price and promote cooperative marketing to increase returns to the farmers.

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Determinants of the development of women's labour force participation in Golaghat District, Assam

Bhumika Bori
Research scholar
Department of Economics
Mahapurusha Srimanta Sankardeva Viswavidyalay, Nagaon , Assam
Email- bhumika255@gmail.com

Abstract:
This study is based on primary data gathered at random from 334 households in eight Mising tribe villages from two blocks using a well-structured questionnaire of Golaghat district Assam. This paper examines the relationship between the level of economic development or income (proxied with MPCE) and women's labour force participation rates (FLPR) in rural India across agro-climatic regions, based on primary data. We used in Linear Regression Analysis on development status of Mising women, and variables are like ***Female contribution to the household, FPA, Education, Indebted, Marital status, LH, MPCE, OHH, Sex Ratio, DR, Female MPCI , Household Status,*** *are significant for labour force participation rate.*

Keywords: ***Primary data, 334 household, Mising tribe, women labour force, levels of development, Golaghat district.***

Introduction

The labour force participation rate of women greatly determines the character of socioeconomic development of an area, as also the quality of life of a society. Participation of tribal women in the workforce brings in two positive effects in their society–it raises the quality of living and exerts an effective control on family size. Women of tribal communities are very active in their household and agricultural activities. But it is seen that the process of their activities is primitive due to their illiteracy, indifferent attitude in their work. Among employed women, 85 per cent are engage in vulnerable employment, including around two thirds who work in the agricultural sector. They are drawn from the socially and economically backward classes and constitute the poorest section of rural society. They are also a less articulate section of the workers mainly due to lack of organization and low levels of education. Assam is a melting pot of many ethnic groups, sub-ethnic groups, castes, tribes and different communities. The missing tribe are the second-largest communities in Assam. According to the 2011 census, the women workforce participation rate among the scheduled tribes of Assam is 43.99 per cent as against the corresponding figure of 48.71 per cent for all schedule tribes of India.

About Mising Tribe

The Misings are the second-largest scheduled tribe (Plain) community of Assam. They belong to the Tibeto-Burman family of the great Mongoloid race. Their concentrations have been found mainly in the districts of Dhemaji, Lakhimpur, Jorhat, Golaghat, Sonitpur, Sivasagar, Tinsukia, and Dibrugarh of Assam. As per 2011 census their population was 6,80,424, male 3,45,786 and

female 3,34,638. The Misings officially recorded as 'Miri' in the list of the scheduled tribe of India under Constitution of India Order 1950, are originally a hill tribe of the Himalayan region of North-Eastern India (Pegu, 1998). Ethnically, the Musings hail from the same stock as the Adis, the Nishi's, the Apatanis, and the Hill Miris of Arunachal Pradesh and belong to the North-Assam branch of the Mongoloid races (Kuli, 1998). Nyori (1993) also mentioned that "the Adis and the Miris originally belonged to a single tribe; those who migrated earlier towards the plains were known as the Miris to the men of the plain". As the Misings are a riverine tribe, they generally construct their houses on the raised platform i.e. stilt house. Agriculture is the predominant occupation among the Misings. Besides agriculture, animal husbandry and fishing are their subsidiary occupation. As mentioned by Bhandari, (2008:50) that "the economy of the Misings is primarily household economy in which the household is the unit of production and consumption". The Misings are also experts in the manufacturing of bamboo and cane goods. But, these are rather produced to meet the domestic needs and the commercial aspect of this avenue is still to be exploited (Bordoloi, 1991: 53). Weaving is also a very popular activity among the Misings. The Misings women are experts in weaving. Cooperative outlook is the salient feature of the Misings. On the occasions like the building of a house, solemnizing a marriage ceremony, observing death rites or harvesting paddies, etc., the villagers co-operate wholeheartedly in such activities. The Misings have also some village organizations to maintain social order and unity among themselves. There was a village organisation called 'Kébang'. The head of the Kébang is called 'Gam'. The post is not hereditary. Generally, a 'Kébang' is held in connection with judicial matters to give judgment of different cases. There is an institution called 'Ya:me Mímbír' and the boys and girls of a village are the members of this institution (Bordoloi, Thakur, Saikia, 1987:120). But, these institutions are gradually disappearing among Misings. 'Murong' is another important socio-economic organisation among the Mising tribe, commonly called a bachelor's dormitory. The Misings prefer to live in a joint family. "The Miris (Misings) have the tradition of living joint family based on a patrilineal and patrilocal system. The eldest male member in the family becomes its head" (Doley, 1998: 91-104). After the death of a father the property is divided equally among the sons. Daughters are not entitled to share the father's property. But if a man has no son, his daughter may share the property. According to Sharma Thakur (1972) "Misings are broadly known by two sections namely- 'Barogam' and 'Dahgam'. Further, these two divisions are divided into several clans namely -amongst the Barogam Doley, Kutum, Kuli, Pait, Patir, Kardong, Misong, etc., and amongst the Dohgam-Moying, Chayang, Panging, Yein, Morang, Bori, Taye, Noroh, Koman etc". The major festival of the Mising tribe is known as Ali-Ayé-Lígang. It is a spring festival of socio-cultural significance (Sharma Thakur, 1976). The festival is observed to mark sowing seeds on the first Wednesday of Fagun (Assamese) Month of every year. 'Po:rag' is also another important festival of the Misings. They also observe three Assamese Bihu namely- Bohag Bihu, Magh Bihu and Kati Bihu. The religious belief of Misings is based on the belief in supernaturalism and animism. They are also a follower of Hinduism. While they are devout followers of 'Vaisnavism' preached by the great saint Sankardeva and his disciples, they at the same time worship spirits and different deities and sacrifice birds and animals for the appeasement of the spirits and the deities some of which are benevolent and some malevolent (Bordoloi, 1991).

The census 2011 figure reveals that the highest concentration of Mising population has been found in Dhemaji district (32.3 percent) of Assam and followed by Lakhimpur (29.1 percent), Jorhat (15 percent), Golaghat (7.8 percent), Sonitpur (7.2 percent), Sivasagar (4.1 percent), Tinsukia (2.7 percent) and Dibrugarh (1.2 per cent) districts. All these districts constitute about 99.6 per cent of the total Mising population in the state.

Increase in the workforce participation rate for the Mising population group along with males and females over the period 1991 to 2001. For males, the rate has increased from 44.9 per cent in 1991 to 54 per cent in 2001. For females, the rate has also increased from 41.1 per cent to 48.3 per cent in this period. But, there has been a marked declining trend in workforce participation rate observed during the period 2001-2011. In this period, the overall workforce participation rate among Misings (51.2 per cent) is significantly decreased (3.5 per cent points) to 47.7 per cent. For males, the declining rate was 1.2 per cent 69 points and for females, it was 5.5 per cent points from the previous year. But, the workforce participation rate among Misings is significantly decreased to 47.7 per cent in the year 2011, along with both males (52.5 per cent) and females (42.8 per cent) workforce participation rates. The declining trend in workforce participation rate among Misings is not necessarily a negative sign of moving downward. This may take place even as a consequence of socio-economic progress. There are studies (Vepa, 2012; Mehrotra, et al, 2013) to show that female workforce participation is sometimes given up by distress that means women a force to work because of the economic hardship of the family. So, with improvement in the economic condition, their compulsion to work may slowly be receding. Some women may stop working and concentrate on household and domestic responsibilities. Secondly, as both girls and boys as larger percentages go for higher education. Workforce participation rate may show a decline for sometimes

Methodology

Determinants in the levels of development of female labour force

In the light above review and discussion, it is to examine the relationship between the level of economic development or income (proxied with MPCE) and females' labour force participation rates (FLPR) in rural India across agro-climatic regions, based on the primary data.

Regions considered here are as classified and consists of one o districts based on their agro-climatic conditions (henceforth NSS-regions). In this exercise, the average MPCE represents its level of development of a region.

Present exercise extracted regional averages for the selected variables from like sample of the unit record data of 66th (2009-10) and 68th (2011-12) round NSSO Employment and Unemployment Survey (EUS) and Levels of Development and Female Labour Force Participation Rates 199 the Consumer Expenditure Survey (CES). The average monthly per capita consumer expenditure (MPCE), as a proxy for the level of income or development is extracted from CES data of NSSO.

Along with labour force and workforce participation rates (%), the average rural wage rate (casual/daily) for females and the other important control variables are drawn from the EUS data of NSSO. In addition to income and wage rates, we have taken into account the other factors which are significant in explaining the variation in FLPR or FWPR across agro-climatic regions. For the

labour force or workforce participation rates of women in rural India, the age-group we have considered is 15-59 years.

For the rural female wage rate, it is the average daily wage rate for casual labour. Analysis in the present exercise is based on data of two subsequent surveys of NSSO. On the one hand, it is to validate our results for the two survey periods. On the other, it is also to understand the impact of drought on the women's labour force and workforce participation rate pattern across regions distinguished by agro-climatic conditions. As it is known that the survey period (2009-10) was drought affected one. Many parts of rural India have witnessed drought condition during this period. Because of this, Planning Commission, Government of India directed NSSO to carry out another survey (i.e. in 2011-12) subsequently in the normal year.

Following the Mincer's (1964) : equation we have estimated the labour force participation rate of women in relation with family/household income (MPCE) and market wage rate for female labour. The Mincer's simplest specification of a labour market supply function of women can be written as:

m = a.y + b.w + u ……

where m is the quantity of labour supplied to the market, y is a "potential" of family income computed at a zero rate of leisure and of home production, w is the women's full-time market wage or market earning power, and u reflects other factors or "tastes." We can rewrite the Mincerian equation with our construction of factors/variables, the specification would be

FLPRi = a.AMPCEi + b. AMPCIFi + error term

AMPCE – Average Monthly Per Capita Consumption Expenditure of female.

AMPCI – Average Monthly per capita income Females (agriculture activities + non-agriculture activities)

X – other factors (set of controlled variables); U – Error/disturbance Term

The following are the other variables included in the regression:

X1 (Cult H%) percentage of cultivator's households to total rural households;

X2 (PERC%) percentage of rural females who had educational levels primary and above;

X3 (Ch14%) percentage of child population below 15 years of age to the total rural population;

X4 (Sex Ratio) Sex Ratio in general in rural areas

X5 (Contribution %) percentage of contribution to the household.

Objective:

To examine the levels of development of female labour force participation in Golaghat district

Hypothesis:

There is no significant of levels of development of women labour force participation in Golaghat district.

Review literature on development of female labour force:

The U-shaped hypothesis describes the correlation of the female labor force participation rate with economic development (structural shifts in economic activity and changes to household labor supply and attitudes about women working outside the home). In its basic form, the hypothesis

posits that female participation rates are **highest in poor countries**, where women are engaged in subsistence activities, and fall in middle-income countries because of the transition of (mainly) men to industrial jobs. As education levels improve and fertility rates fall, women are able to join the labor force in response to growing demand in the services sector.

When examined the relationship between the economic development/growth and the labour participation rate there emerge U-shape hypothesis of women participation rate based on developed countries experience (**Goldin, 1994; Mammen and Paxson, 2000**). Initially, due to necessity to make subsistence in the presence under developed economic conditions, family labour including women is necessary. As most of them work on family farms and enterprises, social stigma attached to women participation in labour market is not a matter. But for those who do not have productive resources other than labour, they have to. Therefore, at this stage, women participation is a distress-driven one. As the economy gradually shifts from agriculture to industry along with increasing wage rate and thereby increase in family incomes reduces the compulsive participation of women and gradually reaches their participation rate a plateau. Because the growth of industry especially manufacturing sector is rather discouraging for the women's labour force participation along with income effect and social stigma attached to adverse working conditions of women in the labour market. But the gradual shift of economy further to services sector is encouraging with better working conditions in this sector. Therefore, the U-shaped curvature of labour participation rate of women is due to structural shifts in economy, changing income and substitution effects, educational development among women and emerging demand for female labour along with technology that substitutes women's home work (**Goldin, 1994; 2006).**

There is another hypothesis of the Discouraged Worker Effect saying that when there is economic downturn situation high unemployment discourages them to be in labour force (**Dagsvik et al., 2010).** This hypothesis is an opposite one of Added Worker Effect that developed based on the labour market situation during the Great Economic Depression. According to the Added Worker Effect, when the main breadwinner is either unemployed or unable earn sufficient income, the otherwise non-workers enter into labour force to supplement the family income. In other words, it is a distress driven participation in the labour/work force. The Discouraged Worker Effect on the opposite indicates that in situation of high unemployment and under-employment, along with lack of confidence in getting employment and a high perceived cost of job search, it discourages the otherwise potential labouers to withdraw from labour force (**Dagsvik et al., 2010**). For all these theoretical conjectures and hypotheses, the underlying thread is an economic circumstance that is the income or development levels

Empirical verification of theoretical formulations or formulation of theory based on empirical evidence in respect of labour supply began in the first quarter of 20th Century. Douglas (1934) had observed the backward bending labour supply curve based on USA data related to labour supply. In the light of Gary Becker's theoretical formulation of Home Economics and Fertility, empirical studies on female labour supply have further advanced the analysis (Mincer, 1962; Goldin, 1994). There are a large number of empirical studies in this respect that have been conducted in the developed country context particularly in USA. Empirical evidence of many studies confirms the backward-bending labour supply curve but the debate is on size of the income and substitutions

effects and labour supply elasticity (See McClelland and Mok, 2012). The cross-country and time series analysis while relating the women's labour participation rate with economic development observed the U-shape labour participation rate (Goldin, 1994).

In the developing country context, empirical studies on the form of labour supply curve with respect wage rates or labour participation rates with respect to income in general and that of women in particular are very few. One study conducted in one of the developing countries observed the inverted-S shape of women's labour supply curve in respect of wage rate and income (see Sharif, 1991). Some studies have observed an inverse relationship between labour supply and wage rate at a low level of wage (Dessing, 2002; El-Hamidi, 2003). A study that investigates cyclicality in women's labour supply in response to smoothing household consumption in environments characterized by income volatility found that within-country relationship of women's employment and income is negative in Asia and Latin America but positive in Africa (Bhalotra and Umarita Aponte, 2010).

In India context there are a few systematic studies that relate the labour supply with wage rate (see Dasgupta and Goldar, 2005). But there were attempts since long back to estimate labour supply functions for poor agrarian households in India (Bardhan, 1979; 1984; Rosenzweig, 1980). Bardhan study in the Indian agrarian economy context observed that wage rate on market labour supply was not significant but asset effect is strongly negative (Bardhan, 1984). With respect to women it was observed that along with insignificant effect of wage rate, a strong negative effect of assets and status on female labour supply. The study states that "the dominant culture ascribes low status to women's …manual work and upwardly mobile social groups and households often withdraw their women from labour force" (Bardhan, 1984: p. 22). But among the dispossessed groups (SC/ST) at the bottom of the social hierarchy such a trend is not observed (ibid). Besides, it was also observed that demand conditions in the labour market strongly influences the labour supply behavior wherein the job search discouragement effect prevails and it can outweigh the income effect on labour supply.

A recent study observes that forced employment or need-based participation in workforce for females from BPL families in rural areas (Dasgupta and Goldar, 2005). It infers that if the female wage rate earned by BPL households in rural areas goes up substantially or if male members of such households get more employment opportunities, more and more women of BPL families may withdraw from the labour force. It argues that women withdraw from the labour force because they find the returns from home-based work higher. Another study, in the Indian context, using dynamic panel models, it did not find a significant relationship between level of economic development and women's participation rates in the labour force. It suggests that growth by itself is not sufficient to increase women's economic activity, but the dynamics of growth would matter (Lahoti and Swaminathan, 2013).

Another study (see Saha et al., 2013), based on filed survey1 observed that due to various socioeconomic and cultural factors along with security reasons females prefer to find employment opportunities in the vicinity. But the work opportunities for females were limited in rural areas with shrinking employment opportunities in agriculture and not enough employment opportunities in the non-farm sector. As, the study observed, their participation in the labour market is greatly

constrained by their responsibilities in households, it restricts them from looking for jobs in areas beyond their immediate neighbourhood. Besides, lack of conveyance facilities and adequate skills are restricting their mobility beyond their vicinity (ibid).

A study that examined the stagnation in women's labour participation rate in urban India, observed that the main supply side factors were rise in household incomes, husband's education, social stigmas against educated women engaging in menial work, and falling selectivity of highly educated women. On the demand side, employment in sectors appropriate for educated women grew less than the supply of educated workers, leading many women to withdraw from the labour force (Klasen and Pieters, 2013). Another study observes that work participation decision by women depends on personal attributes, household characteristics, local economic conditions and socio-religious traditions (Mazumdar, 2013). Besides, there exist an argument that social-cultural factors particularly in the Indian context that interact with these above factors and leading to the decline (Neff et al., 2013).

The above discussion indicates that there are multiple dimensions to the change (decline) in females' labour force participation rates. Along with the safety/security considerations and social prestige that is intrigued with the cultural factors, there is a crucial economic factor i.e. income/development levels that are associated with the variation and change in labour force participation of women.

Result and Discussion

In the light above review and discussion, we have examined the relationship between level of economic development or income (proxied with MPCE) and females' labour participation rates (FLFPR) in rural Assam. We consider in this exercise that MPCE represents the levels of development of the particular agro region in Assam. Here are two aspects in this relationship between labour force participation rates of rural females and the level of income or development especially in the context of rural Assam, Golaghat district. At a lower level of income, all the household members, as many as they are including women their participation is necessary in order to meet the household needs (distress driven conditions).

Although women's participation in a labour market is inevitable in this distress driven situation but all that depends on the availability of employment opportunities. Thus, the low participation rates at lower income / development levels could be due to lack employment opportunities which may discourage them to be in the labour force. Working men of households, as main breadwinners, occupy all the opportunities in the labour market. Women rather occupy in domestic duties and in activities that substitute goods and services that otherwise have to seek (buy / exchange) from the market (like fetching water, collecting firewood, gleaning on the fields), in the development / economic parlance they are non-SNA activities.

However, expanding labour market along with an expanding economy may facilitate women working in the labour market and that may raise the demand for their labour. It could be, on the one hand, that increasing opportunities for women along with the men. On the other, in an expanding economy, when men move away (prime movers in shifting / diversifying) from their traditional occupation, for instance, agriculture, the space left behind in this labour market is occupied by the women labour. Also, the increasing wage costs in the production may encourage

the producers to look for a cheaper labour and hence to restructure the labour market in a segmented manner (gendered) by engaging the female labour at cheaper wage rate. There may be difference in productivity of labour by gender. If at all, then, when the gains to employers through the difference in wage rates (between male and females) is much higher than loss accrued with the difference in labour productivity between them, it may augment the demand for cheaper female labourers. It is however, may be limited to specific operations where men and/or women can perform. But the declining participation rates at higher income levels must be due to either women relieving themselves from their participation under distress driven condition or growing aspirations and leaving the agriculture with an expectation of better opportunity in non-agricultural activities, but lack of opportunities in this sector may discourage them for being in the labour force. In a distress driven situation labour force participation of women is doubling burden on her shoulder as she has to carry out household / domestic duties along with labour market work. Once the household is comfortable with the men wage earnings or income, the women of the households may wish to relieve themselves from that burden of their working in the labour market desperately to meet the household's basic needs. They may restrict themselves in carrying out domestic duties. Also, there is a cultural factor that household that is not desperate in depending on the contribution of women's wage earning or market income particularly out of menial / manual work in agricultural or other activities, earns a social prestige particularly in a village society. The Sanskritization of this cultural norm with the increasing household's income and reproduction of such a culture among the households that are experiencing an upward economic mobility may reduce / restrict women's entry in or encourage withdrawal from the labour force / market.

Notwithstanding the line of argument elicited above, one should not ignore the displacement of labour in the advent of mechanization process leading to decline in participation rates at higher levels of development. As we know when the elasticity of substitution is higher in the production process, mechanization definitely affects the opportunities in the labour market; it substitutes and thereby dispenses the labour. It may affect especially the feminized rural labour market particularly that of agriculture; as we know most of the female workforce in rural areas is engaged in agriculture. As this mechanization process may go along with the level of development, one can find that regions at higher income levels may have higher levels of mechanization. Thus, the lower labour force participation rates of women may be a fall out of the above phenomenon. Hence, herein again, it is be due to lack of opportunities affected by mechanization that is taking away opportunities of women. Therefore, one has to find whether it is the income effect or the substitution (mechanization) effect due on declining or low female labour force participation at higher income levels.

The result is based on the estimated equation that included all the variables above mentioned, presented in above mention shows that all they are statistically significant, at one per cent level (**see Table ..)** Although the estimated equation still leaves unexplained a little more than two-fifths ($R2 = 0.101$) of the variation in it, the significance of these selected variables is explicitly exhibited and a considerable proportion of variation in FLFPR is explained through these variables.

The positive association of FLFPR with LH, INDEBTED, HOUSE SIZE, FEMALE MPCI, EDUCATION which is included in our analysis to reflect the cultural factors – low social and economic value for females – in predominantly patriarchal societies in some parts of the country particularly in northern regions. In south and tribal regions, the sex ratios are not so adversely against the females and the labour force participation rates are also fairly moderate. Most of these caste households especially those belonging to ST community own none of the productive assets like land, rather they have to depend on their labour power. In tribal and hill regions in general and tribal communities anywhere in particular, women participation in labour force is higher when compared to other regions and castes.

On the whole, what one can make out from above analysis and discussion is that the female labour participation rate varies along the level of income / development. Particularly in a rural and agrarian economy, lack of opportunities at lower levels of development may result in lower participation rates and it rises with the increasing opportunities in any expanding economy. If the women's participation in labour force is desperate in a distress-driven circumstance, at higher levels of development with the ease of distress conditions women withdrawal from the labour force is inevitable (income effect). The cultural factor may further augment the income effect. However, it may also be possible that if mechanization which dispenses the labour, is associated with the level of development, the declining or low female labour force participation rates at higher income levels could be partly associated with mechanization (substitution effect) that dispenses the labour. Herein one has to see whether the phenomenon of declining or the low participation rates at higher incomes/development levels are due to the income and substitution effect.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.318[a]	.101	.083	.474

Predictors: (Constant), female contribution to the household, FPA, Education, INDEBTED, MARITAL, LH, MPCE_grp, OHH, Sex Ratio, DR, Femal_MPCI_Grp, HOUS_size

The R-square value 0.101 signifies the strength of the regression analysis and the variance explained by the model. In this case it is 101 %.

ANOVA[b]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	15.658	12	1.305	5.803	.000[a]
	Residual	139.648	621	.225		
	Total	155.306	633			

Predictors: (Constant), female contribution to the household, FPA, Education, INDEBTED, MARITAL, LH, MPCE_grp, OHH, Sex Ratio, DR, Femal_MPCI_Grp, HOUS_size
Dependent Variable: FLP
In the ANOVA table, the p-value 0.000 (< 0.05) signifies that the data considered for regression analysis is appropriate and valid.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.409	.198		2.068	.039
	DR	.000	.001	-.033	-.676	.499
	FPA	-.093	.083	-.045	-1.121	.263
	OHH	-.080	.083	-.037	-.956	.339
	Sex Ratio	.000	.000	-.032	-.797	.426
	MARITAL	-.008	.038	-.008	-.211	.833
	Education	.044	.020	.086	2.212	.027
	LH	-.107	.032	-.136	-3.376	.001
	HOUS_size	.039	.016	.148	2.492	.013
	INDEBTED	-.104	.030	-.134	-3.418	.001
	MPCE_grp	.063	.056	.053	1.131	.259
	Femal_MPCI	.127	.033	.200	3.852	.000
	female contribution to the household	-.030	.023	-.053	-1.348	.178

a. Dependent Variable: FLP

From the above coefficient table of regression analysis, it has been observed that the LH, INDEBTED, HOUSE SIZE, FEMALE MPCI, EDUCATION are found to be significant towards labour force participation rate.

Conclusion

High growth of Indian economy combined with decelerating rate of growth in labour force resulting in jobless growth. The declining labour participation rate of women particularly in rural areas raises concerns as women' labour force participation has implications for the gender equality and women empowerment. In this backdrop, we have tried to examine factors associated with the variation in female labour force participation rates in rural Golaghat, Assam in India.

Our results based on quadratic form of equation for regression show that the relationship between income and females' labour force participation rate is significant and the fitted curvature is inverted U-shaped one. Also, LH, INDEBTED, HOUSE SIZE, FEMALE MPCI, EDUCATION is found to be significant towards labour force participation rate.

FLFPR is negatively associated with female DR, FPA, OHH, SEX RATIO Marital Status, MPCE group, female contribution to the household**.** Our results show the significance of the level of income / development in variation in females labour force participation rates of Golaghat district.

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Agrarian Crisis and Rural Distress in Flood Affected Areas: A case study on the River Island District of Assam, India

Miss Mondira Tamuli
PhD Research Scholar
Department of Social Sciences (Economics)[affiliated to Dibrugarh University]
OKD Institute of Social Change and Development, Guwahati, Assam
Email: mondira.t1993@gmail.com,Phone- +919365299901

Abstract:

Flood, river bank erosion and land degradation are apparent determining factors of agrarian crisis in the Brahmaputra valley region. People residing in flood affected areas are more prone to livelihood vulnerability, caused by recurrent flood every year. Majuli, is one of the largest inhabited river islands of the world situated in the Brahmaputra river of Assam, India that possesses unique socio-economic and geographic characteristics. Several research studies have stated that the island has been suffering from extensive erosion on its banks which is consistently threatening the existence of the lives and livelihood of its people. The situation is getting severe, because a large proportion of char dwellers are experiencing two or three rounds of frequent floods every year. Under such circumstances, practicing economic activities mostly agricultural and other off-farm activities can be observed as an obstacle to sustain their livelihood in a decent way, since post-flood situations such as soil erosion, sand deposition, sedimentation etc. can severely affect economic operations of household. Therefore, the agrarian crises faced by them are significantly different from other regions of the state. Hence, they require specific policy attention to understand the depth of such crises .

Given this context, this study aims to examine the issues and challenges of households in the river island district for carrying out economic activities and also to understand their livelihood vulnerabilities under flood-ridden crises.

Key-Words: Flood, Agriculture, Agrarian Crisis, , Majuli,

Introduction and Review of literature

Assam, situated in the north-eastern region of India is fundamentally an agrarian economy as more than 70 percent of the total work force depends on agriculture, providing more than 53 percent of its total employment.According to Assam State Development Report, 92.6 percent of the cultivated land in the state is flood prone. According to Gayari P. (2005), one of the major problems of agricultural development in particular and economic backwardness in general of Assam is occurrence of frequent floods every year. He also stated that floods in the Brahmaputra and Barak valleys of Assam cause "serious erosion, loss of life and livestock and heavy damage to infrastructure and property retarding agricultural productivity on account of risk avoidance and sand casting, disrupting communications and education and posing health hazards.Cultivation becomes subsidiary occupations in such situations which have led to further agrarian distress in the state. Not only the paddy cultivations, several others agrarian practices have been largely affected by different magnitude of flood causing vulnerable livelihood crises in such areas. According to Mandal(2014), the two main types of risk to which a farmer is usually exposed while carrying out

his agricultural operations are production risk and price risk. stated that the production risk arises due to supply shocks that originate from diseases of crops, pests, and weather-related conditions such as rainfall, flood and drought. Paddy cultivations, especially the summer paddy which is widely practiced by the farmer's community often faces the frequent, intense and unpredictable several rounds of flood every year. Das (2015), in his study mentioned that continuing to rely on the seasonal monsoon for the necessary water for cultivation is the characteristics of farming in Assam. As a result, potential exists for sever crop failure and consequent economic disaster. Parida() , in his study on '*Effect of Flood on Rural Agricultural Wages in Indian States: An Empirical Analysis' has mentioned that* any catastrophe situation like flood adversely affects welfare of rural households through damage of agricultural crops, damage of household assets and creating a direct impact on the agricultural labour market conditions.

Given this context, this study is an attempt to examine and understand the agrarian crisis and rural distress in flood affected areas putting emphasis on river island district Majuli[5] of Assam, India.

II. Objectives of the study

To understand the issues and challenges of economic activities in the flood affected areas.

To examine the livelihood crisis and vulnerability of farming households in such areas.

III. Data and methodology

The study has included both primary and secondary information to substantiate the analysis. Field investigation is the main tool for the collection of qualitative data and the collection of information on vulnerable farmers. To present the important attributes emerged from the primary data relevant descriptive tables to have been generated. The study also accesses secondary data from various Govt. and Non-Governmental database, administrative data from different departments. The study at the village level is done through a multi-stage approach. At the first stage complete enumeration of all the households of the selected villages is done through a short questionnaire involving enquiry on their socio-economic profile. The final sample however excludes the households with regular salaried formal jobs in the organized sectors- both public and private.

IV. An overview of the river island district and its Changing Scenario

Flood, erosion and land degradation can be considered as major contributing factors of agrarian crisis in the Brahmaputra valley region. Assam represents highly flood-prone region characterized by severe hazards of floods every year. Although occurrence of frequent flood has been an age old phenomenon in the riverine areas of this region, the extent of damage caused by the flood has increased significantly in recent years. With more than 40 percent of its land surface susceptible to flood damage, the total flood-prone area in the Brahmaputra valley is about 3.2 Mha. (Goswami,2001). The riverine areas (island) of the river Brahmaputra, locally known as "Char/ Chapori cover about 3.60 lakhs hectares of land and population of approx. 24.90 lakhs (as per Socio Economic Survey 2002-03).The physical, sociological and institutional constraints on development of Char Areas are many and complex. Naturally, people resides in flood affected areas of Assam are more prone to stress and vulnerability caused by flood. The problems in the

[5] Majuli, which was a part of Jorhat district earlier, formally declared as a separate district in 24th September, 2016. It is the first island district of India.

Char Areas are unique in nature, due to constant threat from flood and erosion especially during the rainy season. This kind of situation is much more prominent in river island district Majuli of Assam where a large proportion of char dwellers are experiencing two-three rounds of regular flood in every year. According to the Census of India 2011, Majuli has 243 villages (210 cadastral, 33 noncadastral) and zero urban settlements. This implies that the entire population of Majuli is rural, and totally dependent on agriculture and allied activities for their survival. Majuli has highest scheduled cast populations with no urban population. The district is experiencing increasing frequency of flash floods; dry spells during floods; flood timings (longer, delayed or early); increased duration and area of water-logging; and changes in time, volume, and pattern of rainfall over the years. Such uncertainty has created more vulnerable situation for those people who depends on agriculture as their prime source of income as land use pattern, land productivity, crop diversification etc. are hugely influenced by the occurrence of natural calamities especially by the occurrence of frequent floods every year .As stated earlier, between 1950 and 2016, the area of Majuli has been reduced by almost two-thirds, and 107 of the 210 Cadastral Villages have been totally or partially lost to the river. Such large-scale loss of land in an agricultural society has stressed the local economy, causing a large number of people to move off the island, and either settle as agriculturalists in nearby districts, seek work in the industrial centers across the country, or become refugees on their own land.

Under such situation, practicing farm activities can be seen as an obstacle to sustain their lives in a decent way. The conditions of work in such areas also show higher levels of unemployment, marginalization of work, and greater dependence on unpaid family labor. Thus, it will require an exploration on the use of available natural and human resources from broader regulatory framework and interventions of the state..

V.Socio-economic profile of the sample village

The Mera garh village in Majuli block of the district was chosen for a detailed survey. Mera Garh is a medium size village located in Majuli Circle, with total 84 households. Total geographical area of the village is 165.88 Hectares. The village has population of 405 of which 204 are males while 201 are females as per Population Census 2011. Total working population of Mera Garh is 221 which are either main or marginal workers out of which 123 are male and 98 are female. 49.77 percent of workers describe their work as main work (employment or earning more than 6 Months) while 50.23 percent were involved in marginal activity providing livelihood for less than 6 months. Complete enumeration of the village during the primary survey reveals presence of 84 households at Mera garh. Among 84 households, 16 households are having regular/ private jobs and according to the criterion of sample selection they are excluded from the targeted sample size. Out of 68 farm based households, half of their population i.e. 34 households have been selected for the final sample size.

Table 1 : Level of Educational Attainment of the heads in the surveyed households(in percentage)

Educational attainment level	Percentage Share
Illiterate	5.9
Literate	14.7
Primary	8.8
Middle school	26.5
High school	0.0
Secondary	23.5
others	20.6
Total	34

Source :Primary Survey

VI. Diversity of Economic Activities in the study village: Evidences from Primary Survey

During the primary survey, it has been found that the complete sample households(100.0 percent) are engaged themselves in cultivation activities in addition to the all other activities .Livestock rearing has been found as widely practiced and contributing significant share of income among households(Table 7). Cultivation is the most common form of economic activity, which is self-employed by nature, along with the agricultural labor in casual category. Self-employment in agriculture with a return to ensure self-sufficiency and decent living provides some kind of pride to a rural household. The cultivating households also thrive on support received from the casual agriculture labourers. Engagement in the occupation of agriculture labour is however not by choice, but out of certain compulsions; and there are several underlying factors.

Table 2 :Percentage distribution of sample household by Occupational Employment

Agricultural Occupations	No. of Households	Percentage Share
Cultivation	34	100.0
Agriculture Labour	5	14.7
Livestock Rearing	33	97.0
Poultry	5	14.7
Fishing	3	8.8
Forestry	0	0.0
Mining	0	0.0
Manufacturing-agriculture	0	0.0
Non-Agricultural Occupations	No.of Households	Percentage Share
Manufacturing- Non-Agriculture	1	2.9

Construction-road building Trade/shop	7	20.6
Transport, communication etc.	2	5.9
Finance ,insurance	0	0.0
Community and social service	2	5.9
Personal Services	1	2.9
Others	0.0	0.0

Source: Primary Survey

The seasonal nature of agriculture work makes the situation harder for the agriculture based households compelling them to look for option in non-agriculture sector. With little human and physical capital, they were left with no option but to take up low paid daily wage to sustain their lives. But, apart from the agriculture and allied activities, non-agricultural economic operations are also found among the households although the share of such activities are relatively low(38.2 percent) in comparison to the agricultural activities(Table 1). It can be assumed that there is lack of enough rural non-agriculture activities which further forces them to look for opportunities outside the village and in such cases out-migration from the state is quite obvious. But, it is noteworthy to mention that although household's members out-migrate to neighbour states Bangalore, Hyderabad, and Kerala etc.; they send only a few amount of cash to their home that too in an irregular manner only. Although, wage rates are relatively high in destination states; workers however revealed that the prime driver is not wage rather a regular job(Das,2020).Out-migration in such situation may imply lack of descent income earnings by them outside the state also.

Table: 3 Place of Work of the heads of the households

Place of work	Percentage Share
Within the village	47.1
Within the block	38.2
Within the district	8.8
Within the state	97.1
Outside the state	2.9

Source: Primary Survey

VII. Issues and Challenges of Agrarian Distress in the Study Area

Land is the prime factor towards assurance of livelihood in agricultural and farm sector activities. The standard of livelihood in rural areas has a direct relationship with the land size, land productivity and most importantly land use pattern. In rural Assam, proportion of rural households is small and marginal holders having on an average of 1.41 and 0.42 hectares of land (2015-16).With the growth of population, land fragmentation is a major concern in the study village. Per household availability of operational holding land in the village is estimated at an average of 3.75

bigha ranging a maximum of 13 bigha and 0.15 bigha minimum from the survey. Along with the low size class of uneconomic holding; significant shift from agriculture activities in the rural areas is due to its increase in expenditure of agriculture operation with no remunerative return.

Table: 4 Households by size class of land holding(in bigha)

Size class of possession in bigha	Percentage Share
No Land	0.0
Upto 1 bigha	23.5
1.01 to 2 bigha	14.7
2.01 to 4 bigha	17.6
4.01 to 8 bigha	38.2
8.01 to 12 bigha	2.9
More than 12 bigha	2.9
Maximum (bigha)	13.0
Minimum (bigha)	0.15

Source: Primary survey

Apart from the land constraints; regular flood, animal and pest attack have been hugely affecting the village.(Table 4).Moreover, continuing to rely on the seasonal monsoon for the necessary water for cultivation is another characteristic of farming in Assam. Rainfall variations and lack of irrigation facilities for summer paddy have become constrained for many households of the sample village. During the field survey, it has been found that only a very few households could manage irrigation facilities in their farm on their own costs. Multi-cropping pattern is not at all popular among them due to lack of irrigation facilities and water logging problems .Flood affected areas are facing severe problem in paddy cultivation.(Table 6).Farming households have been found mostly doing winter paddy only as summar and autumn paddy cultivation are severely get affected by fresh flood during May-October month of every year. Post-flood situation often get worsen due to heavy water-logged problem, sand deposition and sedimentation which further lead to numerous difficulties in agricultural operations. As the study village has considerable amount of *Chapori* area, households cultivate rabi crops such as Mustards, Potatoes, vegetables, etc. although the production of such crops reduced over time due to its low profit margin and proper market channelization. Transportation and communication is a serious problem for char people as they live far from mainland areas .Apart from the flood and other natural calamities ,animal attack; especially a heard of elephants regularly devastate paddy fields including such crops and due to which many households now cultivate paddy and other crops for self-consumption only rather than doing in commercial sphere. As a result, farming households are compelled to sell to the nearest dealer/buyers, mostly immediately after harvesting when the price is at the lowest, instead of trying to find the best market for their products. Thus, the overall harvest of the village has been severely affected as households are bound to reduce agricultural production as they are facing

losses. Thus non-remunerative agriculture sector compel them to move out from such activities but low absorption in non-agriculture sector further grim their livelihood vulnerabilities.

Table 5 : Average land affected by Flood, animal and Pest(in Bigha)

Flood	Animal atteck	Pest attack
3.75	3.50	3.39

Source: Primary survey

Table: 6 Yield of major crops per bigha/ha (in quintle)

Production of Major crops	Winter Paddy	Summar Paddy	Autumn paddy	Rabi Crops
Average	14.02	0.3	0.0	6.5
Maximum	50.0	0.6	0.2	18.0
Minimum	0.4	0.0	0	1.0

Source: Primary survey

Livestock rearing has also become a major source subsidiary income of many households. In spite of having huge potentials, due to lack of proper individual effort and govt. initiatives these activities have and not been flourished in commercial sphere and unable to provide a decent income. But, these activities has huge potential and may boost economic well-being of households by contributing a significant share of household income (Table 6)

Table:7 Annual Return from Major Allied activities(livestock rearing and Poultry Farming)

Annual Income(in Rs.)	Livestock rearing	Poultry Farming
Average	47500	4308.82
Maximum	19000	14000
Minimum	0	0

Source: Primary survey

It can be observed that although agriculture income has declined over period, income from non-agriculture sector are too not able to provide descent earnings to the households(Table 8) .This agriculture sector has just been marginalized, with a large section of people still are engaged having no opportunity or capability to shift to other activities. Under such circumstances, the distress in the agriculture sectors is very much evident .Thus, the importance of agricultural activities as a both primary source of income though has declined; employment in this sector,

whatever is the forms have however not declined proportionately Many villagers are now engaged in petty business, work as helper in construction work and vending of vegetables. These activities have become activities to survive in the constraint situation. Poor and irregular earning from both agriculture and non-agriculture activities now makes the life of the people harder. Many youths now commute and work outside their village as assistant (helper) in building construction and other construction activities to just supplement their family income. Many households to fulfill their daily needs and contingencies now take loan from individual and Self-Help Groups. Most of them however carry out agriculture in spite of low profit margin just to ensure household food security

Table: 8 Income from Agriculture and Non-agriculture (Primary Activity)

Monthly Income(in Rs.)	Income from Agriculture	Income from Non-agriculture
Average	4196.9	1820.58
Maximum	6000	5300
Minimum	1200	0

Source: Primary Survey

VIII. Conclusion

The development and adaptation of practices has not only helped reduce the impacts of floods, but also considerably helped secure people's livelihoods. It has been observed that people's livelihood resilience depends a lot on how well the person utilizes the available resources in its adaptive strategies.To cope with the flood, farmers can manage crop cycle so as to induce profit. They can practice pre-flood cultivation, cropping with floods (crops which grow well even in floods); and post-flood cultivation (planting late varieties or those which survive in water logging). It can be observed that households are facing difficulties in operating economic activities as the rural agriculture as well as non-agriculture sectors both are not remunerative enough to ensure descent earning of the people. Livelihood improvement and empowerment of rural poor through sustainable farming practices should be given more priority to uplift the standard of living of the flood-affected farming community.

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Current status and trend of Organic farming: Evidence from India

Jyotish Engti,
Assistant Professor, Panigaon OPD College, Lakhimpur (ASSAM)
E-mail: jyotishengti0@gmail.com

Abstract:
Organic farming is described as the process of production that does not use synthetic pesticides, growth hormones, antibiotics, or genetically modified organisms. It is an agricultural practice that makes use of biological pesticides and fertilizers made up of plant or animal waste. In terms of growing organic crops globally, India is practically at the top of the list. Madhya Pradesh has played a significant role in the introduction of organic crops, which is one of the reasons for India's prosperity. In addition to the organic sector, India's organic producers are also expanding day by day. It is also showing a upward trend of growth. This article makes an effort to look at the areas, trends, and output of organic farming in India.
Keywords: Agriculture, Organic area, Organic farming, Organic producer

Introduction

67% of the population and 55% of the labour force in India are employed in agriculture and associated fields, making it a heavily dependent nation on agriculture. For India's population, which is expanding at the highest rate, agriculture provides the standard needs and 30% of total income. In 2016 Sikkim become the first entirely organic state in the world. Since organic farming has long predominated in North East India, significantly fewer chemicals are consumed there than elsewhere in the nation. Similar to this, organic farming has long been practised in tribal and island areas. Flax seeds, sesame, soybeans, tea, medicinal plants, rice, and pulses have been India's top organic exports, followed by sesame, rice, and soybeans. The amount of organic exports in 2018–19, which totaled Rs. 5151 crore, increased by over 50%. Beginning exports from Assam, Mizoram, Manipur, and Nagaland to the United Kingdom, United States, Eswatini, and Italy have demonstrated the potential by growing in volume and reaching new markets as the demand for health foods rises.

Literature review

In their work, Nadia El-Hage Scialabba and Maria Muller-Lindenlauf analysed three key aspects of farming system design, cropland management, and grassland and animal management to examine the alleviation and alteration potential of organic agricultural systems. According to the authors, organic agricultural systems in developing nations produce yields that are comparable to or even higher than those produced by the country's current conventional farming methods. This suggests that in the face of climate change, these systems could be a significant option for rural poor people seeking to ensure their food security and maintain sustainable means of subsistence. It is possible to encourage climate-friendly farming methods all around the world by selling certified organic products, which provide farmers higher revenue options.

In an effort to evaluate organic farming as a promising substitute agricultural system in the nation, Smita Bhutani, Simrit Kahlon, and Monika conducted a study in 2008. Many NGOs around the country have embraced the cause of organic farming, and most state governments have developed promotional plans for it. Low productivity is the system's scourge since it cannot meet the population's growing needs. However in some regions of the nation have attained the position to produce at a high level.

The issues experienced by organic farming in Sikkim were examined by Jayasree Das and Deepro Bhattacharyya in their paper, along with their causes and solutions. The author comes to the conclusion that organic farming is the sole workable option that has emerged. As sikkim is the only state to grow of its crops organically, so it is highlighted in this context .

Antapu Siva Sankar and Kamatham Venkata Reddy pointed out that The market for organic food is currently expanding at the quickest rate in the entire world, including India. Consequently, action plans for promoting organic farming should be pertinent to social, economic, and cultural values and should be a part of a bigger plan for nature conservation, community health, and land health. India's organic food industry is booming, and it has to be acknowledged as a distinct sector of the economy. To the advantage of farmers, processors, and consumers all together, They suggested that the government and commercial parties must adopt a solid policy.

Objective

To find the trend of organic producer and area.
To analyses the current scenario of organic farming in India.

Methodology

The current paper is based on secondary data collected from different government and non-government sources i.e. available on internet. For explanation, the simple statistical tools like percentage, mean, etc are used. To examine the trend of organic area and organic producer two different polynomial function are used for higher goodness of fit. For organic area the polynomial equation is

$y = -6065.x^3 + 4E+07x^2 - 7E+10x + 5E+13$

$R^2 = 0.940$

For organic producer the used trend equation is

$y = 19064x^2 - 8E+07x + 8E+10$

$R^2 = 0.973$

The current status of organic farming in India

With 2.66 million hectares of organic agricultural land and 1.6 million producers, India currently h olds the top position in number of organic producer and achieved 4th rank in term of area of organi c agricultural land. (IFOAM, 2020). 47.1% of the 3.4 million producers worldwide are from India. And are uings 2.66 million hectares, or 3.55 percent, of the total (74.9 million hectares)

area of organic cultivation land (World of Organic Agriculture 2020 report). But, the majority of our organic farmers are also facing difficulties as a result of weak legislative measures, limited knowledge, rising input costs, and a lack of market awareness.

Organic Agriculture Statistics at a Glance in 2021-22

AREA

Cultivated Area (Organic+In conversion)	4726714.74 Ha.
Wild Harvest Collection Area	4393151.17 Ha.
Total Area (Cultivated + Wild Harvest)	9119865.91Ha

The total land area under organic agriculture is presented in Table-1. Out of total land area (9119865.91 hector) 51.81 percent of land is used in organic agriculture in conversion and another 48.19 percent is under wild harvest collection.

PRODUCTION

The total organic production of India is reflected through the table-2. The farm production contributes the majority portion of total production i.e. 99.40 percent of total. Remaining 0.60 percent of production comes from wild harvesting.

Farm Production	3410195.02 MT
Wild Harvest Production	20540.63 MT
Total Production	3430735.65 MT

ORGANIC EXPORTS

The total export value of organic production is summarized in table-3. Out of total production 13.42 percent is exported which is valued by 5249.32 Crore i.e. 771.96 Million in US$

Total exports quantity	460320.40 MT
Total Export Value (INR)	5249.32 Crore
Total Export Value (US$)	771.96 Million

Source: Agricultural and Processed Food Products Export Development Authority (APEDA), Ministry of Commerce and Industry, Government of India.

State wise Organic Farm Production for the year 2021-22

S. No.	Sate name	Organic production (in MT)	Conversion Production(In MT)	Total Production (In MT)
1	Madhya Pradesh	1,262,966.52	147,927.97	1,410,894.49
2	Maharashtra	581,164.05	110,255.67	691,419.72
3	Rajasthan	331,900.65	15,060.67	346,961.32
4	Karnataka	150,640.95	12.10	150,653.05
5	Odisha	135,999.21	47,604.82	183,604.02
6	Uttar Pradesh	131,812.92	0	131,812.92
7	Gujarat	122,155.19	136,518.84	258,674.03
8	Jammu & Kashmir	38,640.64	0	38,640.64
9	Kerala	31,965.48	0	31,965.48
10	Uttarakhand	31,719.74	0	31,719.74
11	Tamil Nadu	31,005.87	458.99	31,464.86
12	Chhattisgarh	21,841.22	518.10	22,359.32
13	Andhra Pradesh	18,751.55	907.71	19,659.26
14	West Bengal	17,497.89	0	17,497.89
15	Assam	15,897.00	0	15,897.00
16	Meghalaya	10,192.01	0	10,192.01
17	Haryana	4,547.48	0	4,547.48
18	Telangana	3,871.64	0	3,871.64
19	Himachal Pradesh	3,486.48	0	3,486.48
20	Goa	2,652.76	9.39	2,662.15
21	Nagaland	1,192.87	0	1,192.87
22	Punjab	443.35	0	443.35
23	Tripura	339.83	0	339.83
24	Manipur	121.67	0	121.67
25	Arunachal Pradesh	81.55	0	81.55
26	Sikkim	20.17	0	20.17
27	Bihar	12.11	0	12.11
Total:		**2950920.79**	**459274.24**	**3,410,195.02**

Source: Agricultural and Processed Food Products Export Development Authority (APEDA), Ministry of Commerce and Industry, Government of India.

According to Table 4, India produces organically to the tune of 86.53% of its overall output, with conversion production accounting for the remaining 13.77%. Twenty States have not registered the conversion production. Madhya Pradesh State produces a majority of the entire conversion production. Rajasthan (3.27%) and Maharashtra (24.01%) are the next two states in this regard,

respectively, after it. The state of Madhya Pradesh tops the list in terms of organic production, accounting for 42.80% of all national production. Maharashtra was in second place, holding 19.69% of the market.

Ten years data on organic area and producer in India

year	Organic area	Organic producer	Area - Producer Ratio
2011	1084266	547591	2
2012	500000	600000	0.8
2013	510000	650000	0.8
2014	1183000	600000	2
2015	1180000	585200	2
2016	1490000	835000	1.8
2017	1780000	835000	2.1
2018	1938221	1149371	1.7
2019	2299222	1366226	1.7
2020	2660000	1,600,000	1.7

Source: Different version of "The Wolrd of Organic Agriculture" published by Global organic farming statistics FiBL and IFOAM

With the aid of data from the previous 10 years, this article is attempting to determine the trend of organic producers and areas in India. Figure 1 illustrates the upward trend that both the organic producer and the organic area are exhibiting. With 0.94 coefficient of determination the organic area is increasing in polynomial order 3. Trend equation for organic area is

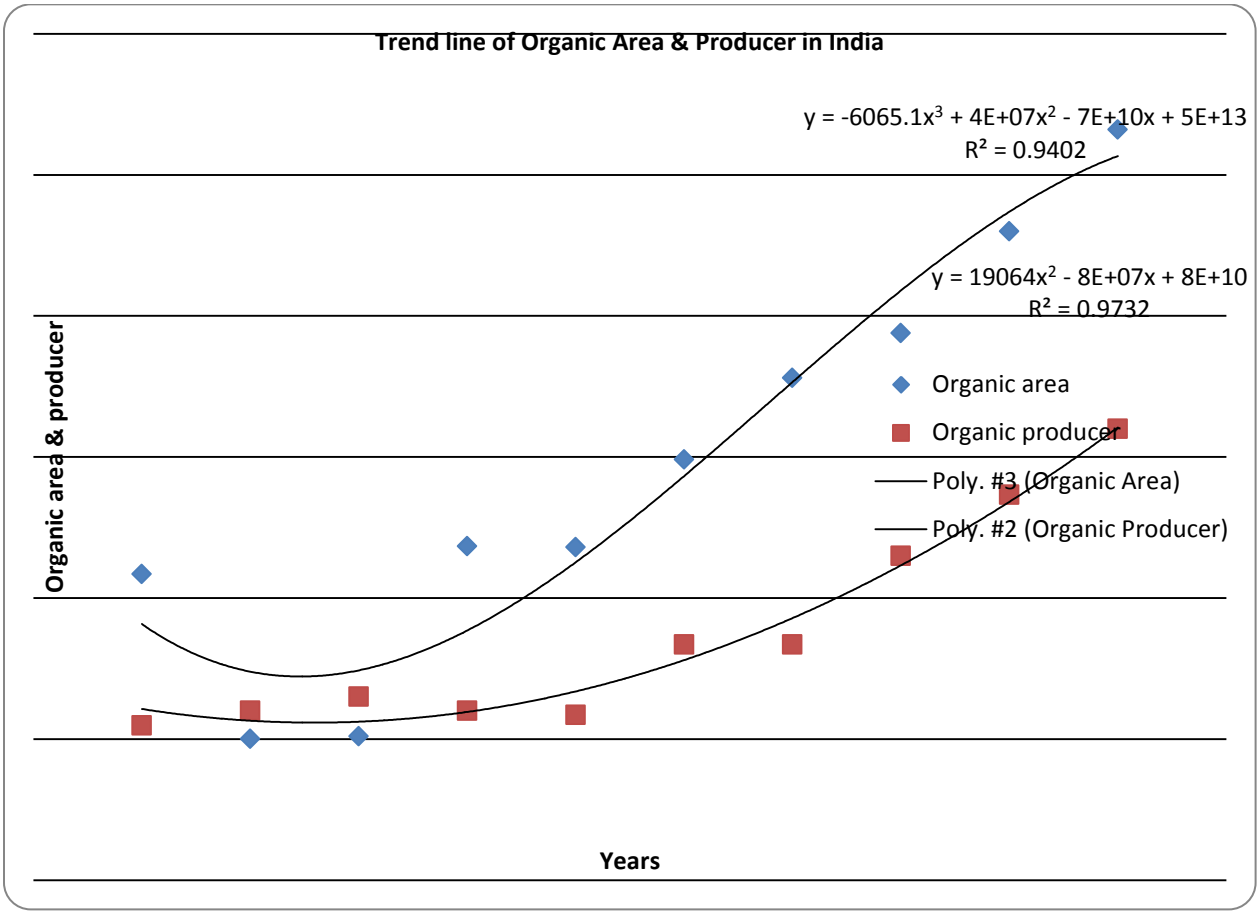
$y = -6065.x^3 + 4E+07x^2 - 7E+10x + 5E+13$

$R^2 = 0.940$

Again, with 0.973 coefficient of determination the organic producer is increasing in polynomial order 2. Trend equation for organic area is

$y = 19064x^2 - 8E+07x + 8E+10$

$R^2 = 0.973$



Conclusion:

It is unquestionably true that India's agricultural productivity increased significantly during the era of the green revolution. Also, the time series data have shown that it is succeeding in producing organic crops till now. The export of them presents the greatest opportunity. The government can reward the farmers with appropriate legislation and everything else by providing a vast open market.

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Food Processing and Organic farming: A Study of Policies and Challenges of MSME units of Sikkim

Dr. Tulika Devi
Research Associate, NEDFi

Abstract:
Sikkim is considered as one of the world's biodiversity hotspots. Sikkim became India's first and only state to proclaim itself organically in 2016. The organic policy has been welcomed by all the farmers as well and thus it has become accepted by communities. After the state has been declared organic, the state has attracted more number of tourists and the value of the produce of state has also increased. Sikkim produces variety of organic products ranging from fruits, vegetable & spices. The most important ones are Large Cardamom, Ginger, Dalle Chilly, Kiwi, Passion Fruit, Sea-buckthorn, Buckwheat, etc. The objective of the paper is to understand the major products and activities of this sector and also to understand the various policies implemented for this sector in the state of Sikkim with special reference to the MSME units. The challenges faced by this sector have also been tried to be identified along with the alignment strategies after interacting with various stakeholders like Government departments, MSME units and employees of MSME units.

Key Words: Food Processing, Organic farming, Sikkim, Challenges, Policies

1. Introduction:

Sikkim is a state in northeast India that has become a pioneer in organic farming. It is one of the few places in the world to have fully embraced organic farming on a large scale. The organic farming movement in Sikkim began in the late 1990s, when farmers and activists became concerned about the negative impacts of chemical farming on the environment and human health. They began experimenting with organic farming methods, such as composting, crop rotation, and intercropping, and found that these methods not only improved soil health but also increased yields and incomes. Sikkim became India's first and only state to proclaim itself organically in 2016.

The Sikkim government's organic farming policy provided a major boost to the movement by providing financial and technical assistance to farmers, promoting organic certification, and creating a market for organic products. The policy also banned the use of chemical fertilizers, pesticides, and genetically modified organisms (GMOs) in the state.

Today, organic farming has become a way of life in Sikkim, with thousands of farmers produces variety of organic products ranging from fruits, vegetable & spices. The most important ones are Large Cardamom, Ginger, Dalle Chilly, Kiwi, Passion Fruit, Sea-buckthorn, Buckwheat, etc. Sikkim is the only state in India to produce Dalle Chilly and has got GI (Geographical Indication) for the same and is known for its spiciness across the world. The state is the largest producer of Large Cardamom in the country and is also unique to the region as this cardamom in produced only in two other places in the country i.e. Darjeeling & Arunachal Pradesh apart from Sikkim. Ginger is produced in bulk and is sold as fresh & dry flakes.

2. Objectives:

The objective of the paper is to understand the major products of the state and also to understand the various policies implemented for this sector in the state of Sikkim. The challenges faced by this sector will also tried to be identified along with the alignment strategies.

3. Methodology:

This paper is descriptive in nature and based on the findings of primary data, secondary data analysis as well as in-depth consultation with stakeholders and policy analysis. Secondary research has been done by going through various reports and articles related to Organic farming and Status of organic farming in Sikkim published by agencies and the Reports published by different departments of Sikkim. The secondary study led to understand the overall scenario of organic farming and thereafter focus group discussion and interview were conducted among the stakeholders who has been associated in this sector like entrepreneurs, farmers, members of Farmers Producer Organisation (FPO), employees of Sikkim IFFCO Organics Limited, Govt. Fruit Preservation Factory (Sikkim Supreme), Nature's gift, entrepreneurs, government officials of various departments, training providing institution like Advanced Technical Training Centre(ATTC) etc. Therefore, the major part of the study is in-depth consultation with stakeholders. In this connection, primary survey was conducted among 50 stakeholders in the state to have better understanding and their point of view regarding the sector in Sikkim.

4. Discussion:

This part will be divided into four sections: Major products of the state; Policies implemented by the government; Sectorial Challenges and alignment plans for the sector's expansion. They are covered in the discussion that follows.

I. Major products of the state:

It is found that Ginger, Large Cardamom and Dalle Khursani/Sikkim Red cherry pepper chilli, Buckwheat, Turmeric are the main products.

Ginger

Because of its tremendous value, ginger is widely cultivated throughout India. It is used for a variety of things, including pickles, food additives, sweets, and traditional medicine for stomach aches. Ginger is a source of revenue for small and marginal farmers in Northeast India, particularly in the Sikkim region. In Sikkim, variety of ginger has been produced like Bhaise, Gorubathane, Jorethange, Nangrey and Majhauley. It is cultivated in a varying degree of altitude, but an elevation of 1500 above msl is found to be more suitable.

Ginger producing belt in Sikkim	
East district	Rakdong, Nabhe, NakchotaChharggu, Gangtok, Saramsa, Aho, Tumin, Kambul, Martam, Singtam, Sajong, Amba, Saramsa, Pachak
South district	Rhenok, Lingtam, KupupBrang ,Polot, Patam, Lingi, Lingmo, Mangjing, Rabang, Parbing, Sangmo, Ranguthang, Namchi, Parbing, Chidam, Malli
West district	Mangalbaria, Chakung, Chumbung, Zoom, Tharpu, Malbansey, Gyalsing
North district	Dzongu & Mangan
Source: Food Security and Agriculture Development Department, Sikkim	

In Sikkim conditions, ginger is marketed as fresh and used mostly in salad, tea blends, sauces and additives as well as a sole constituent of curry and pickles, confectionery, curry powder, ginger chocolates and candies and for beverage purposes like ginger cordial, ginger cocktail, ginger tonic, ginger brandy, ginger wine, ginger beer, etc. Ginger produced in Sikkim is completely organic in nature, so it is considered to be premium. Most of the ginger is consumed in fresh form, however, a large number of processed products are there in the market nowadays like Ginger Dry Slices, Ginger powder, Ginger oil etc.

Large Cardamom

Large cardamom is the main cash crop cultivated in the sub-Himalayan state of Sikkim and Darjeeling district of West Bengal. Large cardamom is known to be amongst the oldest spice used by the mankind. Sikkim's cardamom is particularly prized for its unique flavor and aroma, which is said to be due to the state's unique soil and climatic conditions. Sikkim is the largest producer of large cardamom and contributes lion's share to the Indian and world market as Sikkim cardamom is considered to be some of the best in the world. Large Cardamom is mainly sold as dried (Smoke dried & Vacuum dried).

Varieties of Large cardamom available in Sikkim

State	Varieties	District
Sikkim	Ramsey, Golsey, Seremna, Varlanegy, Sawney	Rongli, Rorathang, Takchang, Martam, in East Sikkim
		Pecherek, Lingchom and Geyzing in West Sikkim
		Namchi, Singtam, Jorethang in South Sikkim
		Phodong, Pensang, Meyong in North Sikkim

Source: ICRI, 2018

Large cardamom is sold in dried form and mainly used in various cuisines. It has also got its popularity for its health benefits. Majority of the large cardamom which are being sold in market as Indian origin and mainly from Sikkim & Darjeeling region. On interacting with farmers in Dentam area in West Sikkim, it is told that most of their produce is taken to Singtam area in East Sikkim from where these go to different markets. The farmers sell it at around Rs. 500/- to the traders. Prices of the large cardamom ranges around Rs.2,500/- in the retail market.

Dalle Khursani / Sikkim Red Cherry Pepper Chilli

The Red Cherry Pepper Chilli of Sikkim is locally known as '*Dalle Khursani'*. It is grown in the region of Sikkim and Darjeeling, however, Sikkim has got its GI (Geographical Indication) tag from the Union department of Industry Promotion and Internal Trade. Dalle Khursani belongs to the family of Solanaceae and Genus Capsicum that is noted for its unique and high pungency. According to the Scoville Heat Unit, Dalle Khursani has a range of 1,00,000 to 3,50,000 SHU

(Scoville Heat Units). SHU is a unit to measure the pungency of chilli and in case of Dalle its value is considered to be extremely high.

Government Fruit Preservation Factory (GFPF) is the only organised food processing industry in the state with "Sikkim Supreme" brand name. The pickle they are producing is very good in quality as the solid content in the pickle is much higher than its competitors. Moreover, this pickle is unique to the region as the cherry pepper is not produced elsewhere. However, Sikkim Supreme is not marketing it by themselves and have tied up with few other organizations like *neorigins, GISKAA* etc. for its marketing.

Dalle Khursani is unique to the region. This cherry pepper has also become popular among the tourist and due to its high pungency it has attracted a large number of people who like hot flavours. When interacted with the retailers and farmers, we came to know that many people are buying it fresh and take them to their places and try to grow them.

Buckwheat

Buckwheat is a highly nutritious whole grain and a good source of protein, fiber, and energy. Buckwheats health benefits include that it may improve heart health, promote weight loss, and help manage diabetes. It has also popularized because of its high mineral and antioxidant content. The organic Buckwheat enhances the benefits of regular turmeric with the chemical- free growth leading to no side effects.

Buckwheat is an ingredient in many everyday food products, such as breakfast foods, flour, and noodles. Farmers also use it for livestock feed. As of now, two products are derived out of the Organic Buckwheat being produced and supported by Sikkim IFFCO. These are Buckwheat flour and Buckwheat kernels. Buckwheat flour is a great dietary alternative because it doesn't contain gluten.

Turmeric:

One of the major produces from the state of Sikkim is turmeric. It is used in many forms in the daily routine. The organic turmeric enhances the benefits of regular turmeric with the chemical-free growth leading to no side effects. **S**ome of the products of Turmeric are Dried Turmeric, Powder, Curcumin, Oleoresins and Oil etc.

Product Types	Usage
Dried Turmeric	Ground, preserved and used for longer durations
Turmeric Powder	Popularly used in cooking
Turmeric Curcumin	Known for its anti-inflammatory properties and is a strong antioxidant
Turmeric Oleoresins	Used for flavouring and colouring
Turmeric Oil	Used as a face mask and helps avoid acne scarring

Source: Food Security and Agriculture Development Department, Sikkim

In addition to these products, Sikkim is also known for its organic fruits, such as apples, oranges, and peaches. These fruits are grown using sustainable and chemical-free farming practices, which makes them safe and healthy to consume. They are also known for their unique taste, texture, and color, which is a result of the state's unique soil and climatic conditions.

II. Policies implemented by the government:

Organic farming has been practiced in Sikkim since 2003, when the state government declared its intention to convert the entire state into an organic farming zone. Consequently, the government initiated the Sikkim Organic Mission in 2010, which aimed to make Sikkim a fully organic state by 2015. The mission was completed in 2016, and Sikkim became the first state in India to achieve this status. Prime Minister Narendra Modi on January 19, 2016 declared Sikkim as the first organic state in the country.

The success of organic farming in Sikkim has attracted attention from other states in India and other countries, and the state government has shared its experiences and best practices with others. The government's efforts in promoting organic farming have also won international recognition, including the Future Policy Gold Award from the United Nations in 2018. This certification has brought Sikkim to the premium organic map in the world. Any produce of the state now is automatically treated as organic, which is a great incentive to the farmer.

Organic farming has gained popularity in India due to its focus on sustainability, environmental protection, and health benefits. Here are some of the major schemes related to organic farming:

Mission Organic Value Chain Development for North Eastern Region (MOVCDNER):

A Central Sector Programme called "Mission Organic Value Chain Development for North Eastern Region (MOVCDNER)" has been created by the Ministry of Agriculture and Farmer Welfare in recognition of the potential of organic farming in the North Eastern Area of the country during the 12th plan period. The plan aims to develop certified organic production in a value chain mode to connect farmers with consumers and to support the development of the entire value chain beginning with inputs, seeds, certification, and the establishment of facilities for collection, aggregation, processing, marketing, and brand building initiatives. At state level the mission has been implemented by the State Level Executive Committee (SLEC) and executed through a designated state Lead Agency in the form of state “Organic Commodity Board” or “Organic Mission”. Subsidy under the scheme are being released through North Eastern Development Finance Corporation Ltd. (NEDFi). Under MOVCDNER scheme, Regional Centre of Indian Institute of Food Processing Technology (IIFPT-RC) has been providing technical guidance for all postharvest handling methods of the food commodities including primary processing, secondary processing, packaging, storing, handling and transportation. North Eastern Regional Agri-Marketing Corporation Limited (NERAMAC) has be providing marketing and logistic assistance in terms of aggregation and transportation of organic produce/ products.

Paramparagat Krishi Vikas Yojana (PKVY): This is a centrally sponsored scheme, launched in 2015, that aims to promote organic farming among farmers. Under this scheme, financial assistance is provided to farmers to cultivate crops without using chemical fertilizers and pesticides.

Rashtriya Krishi Vikas Yojana (RKVY): This is another centrally sponsored scheme, initiated in 2007, that provides financial assistance to farmers for various agriculture-related activities, including organic farming. The scheme also focuses on increasing the income of farmers through value addition and market linkage.

National Programme for Organic Production (NPOP): This is a certification program that provides a set of guidelines for organic production, accreditation of certification agencies, and certification of organic products. It is implemented by the Ministry of Agriculture and Farmers Welfare.

The standards and procedures have been formulated in harmony with other International Standards regulating import and export of organic products. The National Programme for Organic Production (NPOP) also provides an institutional mechanism for the implementation of National Standards for Organic Production (NSOP). The National Programme for Organic Production (NPOP) launched during 2001, was the first such quality assurance initiative by the Government of India under Ministry of Commerce and Industry.

Pradhan Mantri Krishi Sinchai Yojana (PMKSY): This scheme was launched in 2015 to improve the efficiency of water use in agriculture. The scheme promotes the use of organic farming practices and provides financial assistance for the same.

Pradhan Mantri Fasal Bima Yojana (PMFBY): This is an insurance scheme, launched in 2016 by Prime Minister Shri Narendra Modi for farmers that provides financial support in case of crop damage due to natural calamities, pest attacks, etc. The scheme also encourages farmers to adopt organic farming practices by providing a premium discount to those who do.

These programmes have significantly contributed to the promotion of organic farming and increasing awareness about its benefits among farmers in Sikkim as well as India.

Realizing the potential of organic products and its market, recently in October 2020, Indian Farmers Fertiliser Cooperative (IFFCO) has signed a joint venture with Government of Sikkim. Under this initiative two integrated processing units is being set up at Rangpo, East Sikkim with an investment of Rs. 50.00 crores. SIFFCO (Sikkim IFFCO) will produce 100% organic which is non-toxic in nature and has tremendous potential for export to US and European countries. The Joint Venture will be initially processing ginger, turmeric, large cardamom and buckwheat and gradually expand its product line. The government has also set up a food park in East Sikkim to promote food processing and agro-based industries. Overall, while food processing is still in its early stages in Sikkim, there are efforts being made to promote the sector and take advantage of the state's natural resources and organic produce.

III. Sectorial Challenges:

The interactions with the stakeholders show that Food Processing & Organic farming of Sikkim has some challenges. These are discussed below.

Lack of Modern Facility Centres

While interacting with the officials of Govt. Fruit Preservation Factory and few entrepreneurs, it has come to light that the former is the only one organized food processing unit in the state, however, some value addition like sorting, washing of ginger is done by many small entrepreneurs while production of flakes is also done by few enterprises like Nature’s Gift and now SIFFCO is

also being set up at Rangpo. Dalle pickle is manufactured by many of the small entrepreneurs but in very small scale and in cottage industry form. Large cardamom drying is mainly done by farmers in traditional bhattis. So, there is limited number of organised player in the food processing sector which can bring more revenues to the MSMEs and can also create more employment.

Lack of Testing lab

The field interaction highlighted the fact that to test the quality of any product i.e. to test the content of the active ingredient in the products there is no lab in the state. For example, if someone wants to test the curcumin percentage of turmeric or gingerol in ginger, one has to send the sample to Kolkata for testing, which delays the process of testing and also increases the cost.

Packaging Problem

While interacting with entrepreneurs, it was found that a major challenge exists in packaging of the products. Despite the fact that the product inside is of the highest quality and is 100% organic, the smaller MSMEs lack understanding about the packaging material and the contents to write on the packets. For example, one SHG called *'Kanchanjunga SHG'* in Chakung in West Sikkim was visited, it is found that this SHG had received grant from NERLP for investing in various machineries for turmeric processing and around 20 women took initiative and started the unit. They have been sustainable, but they need marketing and packaging assistance to grow their business even more. In this regard they are not getting the requisite support. This indicates that the brand which the Sikkim products were supposed to be created is not getting the desired mileage due to packaging.

Issue with Branding & Marketing

Sikkim being an organic state, its produce should be valued much higher in the market. However, due to inadequate branding and marketing strategy, the products of the region could not get the desired mileage and reach what it should have got. Even brands like Sikkim Supreme under Govt. Fruit Preservation Factory could not penetrate in other markets despite of its uniqueness and premium quality products. For example, Dalle Khursani pickle is unique to the region and it contains 79% solid whereas in general other brand pickles contains 60% solid in it. Despite of such features in its products, it is not able to penetrate in other markets due to inadequate branding and marketing strategies.

Skilled Manpower for Production & Marketing

Sikkim has potential of its unique products. Indian Farmers Fertilizer Cooperative Limited (IFFCO) has realized the potential and so it has done a JV with government of Sikkim and set up two units in Rangpo for processing to begin with ginger, turmeric, large cardamom & buckwheat. While interacting with stakeholders like Govt. Fruit Preservation Factory (Sikkim Supreme), SIFFCO, Nature's gift and few more entrepreneurs, it is found that there is a mismatch between the required skilled manpower and available manpower. The production units require skilled employed. But it is found that there is inadequate food technology/processing focused training institutes in Sikkim which can train the youths after the interaction with Advanced Technical Training Centre (ATTC), Singtam. The training has to be very practical and should be designed as per the requirement of the region and industry-oriented programs. So far, the trainings conducted

were more theoretical in nature so gradually the youth lost interest as there were limited opportunities after attending such training programs.

Production Volume is not very high

Since all the produce of the region is organic, the productivity is low. Moreover, because of the tough terrain, the farmland is also limited. So the production quantity is not very high and is consumed in local market itself except few of the products which are surplus in the state. Kiwi and Passion fruits are processed into squash and jelly, Sea-buckthorn is also processed into squash, which has got tremendous health benefits. Dalle Khursani (Cherry Pepper) is made into pickle in oil and in vinegar and also pickle with bamboo shoot. All this is done in Govt. Fruit Preservation Factory under the brand name Sikkim Supreme which is a Government of Sikkim initiative. Most of these products are in smaller quantity so the amount of processed products produced in the state is limited. The only commercially viable products which are in surplus and value addition can be done are Large Cardamom, Dalle Chilly & Ginger.

IV. Strategies for the growth of the Sector:

Setting up of Common Facility Centres (CFCs)

Common Facility Centres (CFCs) can be set up at strategic locations near the production belt where small farmers/entrepreneurs can utilise the common facility and produce semi-processed material which can be bought by B2B buyers. These CFCs can be linked with a mobile application to get the real time data of products available and quality of the products. This will help to manage the inventory properly and also help to optimise the logistics and spaces of warehouses/cold storages within the facility.

Setting up of Design & Packaging bank

Majority of the entrepreneurs including the MSMEs like Govt. Fruit Preservation Factory (Sikkim Supreme) suffers from good/attractive packaging solutions. A design bank from where a MSME/startup can procure the design solutions, packaging materials and packaging technology at minimal cost can be set up. This will help the entrepreneurs/MSME to understand the various packaging need of domestic and international customers. This bank can be linked with a packaging unit which will be focused only for packaging. This kind of unit can be set up near the CFCs so that farmers/entrepreneurs/MSMEs can take advantage of such facilities.

Marketing platform & digital marketing

The world is going towards ecommerce and digital platforms. But when we look at the industries in the sector in Sikkim, we see a lot of gap in this field. The products of Sikkim are of very good quality and considered organic as well. But few has been found in digital platform like www.amazon.in or www.flipkart.in. A digital platform can be created.

Dedicated Food processing training institute

A dedicated training institute which is to be focused on food processing can be established. This training institute need to be linked with various MSMEs, start-up and entrepreneurs, so that the learning would be practical. The course curriculum has to be based on the geography of Sikkim and suitable for the youth of Sikkim. This institute has to be linked with Food Processing

Incubation Cell. It is preferable to have an incubation cell within the training institute. This incubation cell will promote entrepreneurship as well.

Seed Bank suitable for local environment

Seeds normally comes from outside and then distributed to the farmers/FPOs. Seeds are distributed as per norms of mainland India and as a result seeds are not distributed timely and sometime seeds even get expired by the time it is distributed among the farmers. Seed bank can be established from where farmers can source seed as and when required. This seed bank should have seeds which are suitable for local environment and seeds which are developed in various vegetable clusters in the state. The seeds in the seed bank need to be a certified one. The bank should also support in various other inputs like organic pesticides, guidance on good farming practices and requisite training.

5. Conclusion:

Sikkim is rich in biodiversity with abundant plant species because of which the soil is rich in organic matter content and makes the conversion easier. The fragile ecosystem in Sikkim hills demand sustainable farming practices without depletion of natural resources. It is therefore advantageous for Sikkim to go into organic system of farming keeping in view of protection of the soil from degradation, protection of environment & ecology and healthy living of the people for generations.

Sikkim has adopted a holistic approach to organic farming that includes practices such as crop rotation, use of natural pesticides and fertilizers, and promotion of traditional farming techniques. The state also emphasizes the use of local and traditional seeds, rather than genetically modified seeds. To support organic farming, the Sikkim government has established organic markets, provided training and financial assistance to farmers, and created a certification system for organic products. In addition, the state has banned the use of chemical fertilizers and pesticides, and has established a program to encourage the cultivation of medicinal plants. Overall, Sikkim's commitment to organic farming has been a successful model for sustainable agriculture that other regions could learn from.

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What an untapped opportunity! Pisciculture in Assam: a study of South Kamrup and Gohpur.

Ashok Pradhan
Student M.A. 4th Semester, Pragjyotish College, Guwahati.
Email:ashokpradhan21880@gmail.com
Palashjyoti Das
Student MA 4th Semester, Pandu College, Guwahati,
Email: daspalashjyoti21@gmail.com
Masum Ahmed
Assistant Professor, Department of Economics, Pragjyotish College, Guwahati.
Email: masumahmed@pragjyotishcollege.ac.in

Abstract:
Pisciculture is one of the most underexplored sectors of Assam's rural economy, despite Assam's abundance of fresh water bodies. People use fish as a source of protein as well as a source of livelihood. During the rainy season, Assam experiences more than 2077 mm of rainfall each year, and the state hosts more than 216 ichthyofauna species due to the mighty Brahmaptura and Barak rivers, ponds and lakes. In spite of this, the state's domestic consumption cannot be met by domestic production, and therefore the state is dependent on imports of fish from Andhra Pradesh. In this context, using primary data, this paper explores the problems and prospects of fishing industry in South Kamrup and Gohpur Assam, India. Data were analysed using descriptive statistics, and t tests. Our data indicate that the average monthly income of the fish farmers is Rs. 45,063 (SD=109669.64). Only 3.22 percent of respondents have benefited from government policies relating to pisciculture. This demonstrates the relevance of the present paper.

Key words: Pisciculture Fish, Assam, Problems of Fish industry.

Introduction:

The term "pisciculture" refers to the practice of growing and selling fish. It's derived from the Latin word 'piscics' which means "fish'. Today, pisciculture is carried out in freshwater ponds, paddy fields, lakes, and even artificial tanks and reservoirs. The number of fish species that can be successfully kept in captivity from egg to adult is extremely limited. Pisciculture is providing large scale employment opportunities, improving rural economy and protein rich food across the globe.

The demand for fish products around the world is steadily increasing. In order to increase food production, pisciculture plays a very important role. It facilitates the utilization of vast areas such as unused fields that are capable of being used for the cultivation of fish. Culture of selected varieties of fish will help in a good yield of commercial forms.

After China, India is the world's third largest fish producer and the world's second largest aquaculture nation (Fisheries Animal Husbandry and Dairying, 2022). Fishing and aquaculture are important sectors in India as evidenced by the Blue Revolution. There is no doubt that the sector is a sunrise sector, and it will play an important role in the Indian economy in the near future. Recent years have seen a paradigm shift in Indian fisheries, with inland fisheries contributing 70% of fish production, up from 36% in the mid-1980s. The transition from capturing fisheries to culture-based fisheries has paved the way for sustained blue economies in inland fisheries. Approximately 2.36 million hectares of tank and pond areas are present in India, where culture-based fisheries contribute the majority of the country's total fish production. According to the Department of Fisheries, the current production from tanks and ponds is 8.5 million MT (Department of Fisheries, Government of India, 2022).

The volume of global fish production reached 184.6 million metric tons in 2022, an increase from 178.1 million metric tons in 2021. In the world, fish is one of the most widely consumed foods (Statista, 2022).

Assam's fisheries can be broadly divided into two categories, namely, capture fisheries and culture fisheries. Generally, it is observed that fish was initially produced through capture fisheries, which were wholly dependent on natural production. However, due to the increasing demand for fish, people gradually began to turn to pisciculture and it became competitive. In India, the fishery sector provides a livelihood opportunity to approximately 10 million rural agricultural workers (Ayyapan, 2004). Indian fisheries and aquaculture is a important sector of food production with annual production levels of six million tonnes of fish & shellfish providing nutritional security (Ayyapan2004). The state of Assam is also suitable for both captured fisheries and culture fisheries.

The volume of global fish production amounted to **184.6 million metric tons** in 2022, up from 178.1 million metric tons in 2021. Fish is one of the most widely consumed foods in the world, and it is only becoming more popular over time (Statista, 2022)..

Background Literature:

According to Munro and Scott (1985), fishery resources are difficult to manage properly as they are, with a few exceptions, common property. Das (2006) mention in his study- *Small scale rural aquaculture in Assam , India-a case study* ; 'despite the vast aquatic resource Assam has not able to produce ample fish to cater to the needs of its ever increasing population. Assam's share of

the total inland fish production india is reported to below 6.55% . A study by Haque, Borah and Borah (2021) revealed that capture fisheries contribute 36% of the state's total fish production and play a significant role in its socio-economic development. Nevertheless, the productivity of the capture fishery has declined in recent years. According to Debnath, et al. (2020), beels are Assam's most significant fisheries resource, supporting the highest numbers of indigenous fish fauna. Assam has 263 registered raw fish markets, and two dry fish markets which supply fishes to the entire state. Overfishing, pollution, poor management, and other factors are contributing to the decline of marine resources, according to the Food and Agriculture Organization of the United Nations, The State of World Fisheries and Aquaculture (2022). The fraction of fishery stocks within biologically sustainable level decreased to 64.6 % in 2019,1.2% lower than in 2017. Despite the fact that aquatic food systems support millions of lives and livelihoods, many small-scale producers, especially women, face precarious working conditions. The key to sustainable development and equitable development is to build their resilience.

Assam has abundant water bodies that are ideal for fish production, yet the state still imports 78 metric tonnes of fish daily from other states to meet its needs. Government initiatives have resulted in an increase in local production, but the state has the potential to become not only self-sufficient in fish production but also a major supplier. In addition to the Brahmaputra and Barak river systems with their tributaries and distributaries, the state has approximately 5,47 lakh ponds and 1625 unregistered beels as well as 4,47 lakh tributaries and distributaries (Sentinel, 2022). It has been noted that the state produced 4.17 lakh tonnes of fish in 2021-22, an increase from 3.93 lakh tonnes in 2020-21 and 3.07 lakh tonnes in 2016-17, which has helped bridge the wide gap between demand and supply (Sentinel 2022). In order to achieve an exportable surplus, a quantum leap in production is necessary. Moreover, the local demand for goods and services is also increasing, as household income increases and per capita consumption increases. In Assam, the per capita consumption of fish has increased to 11.72 kg/per year but it is way below Tripura, with the highest per capita consumption of 29.29 kg/per year followed by Kerala with 19.41 kg, Manipur with 14.1 kg and Odisha at 13.79 kg (Sentinel, 2022).If the consumption in the state touches that of Tripura, the spike in demand and the local production is not increased proportionately, the success story of increasing local production and reducing procurement from outside will soon be forgotten. The southern state is a classic example of how the potential of fisheries can be harnessed to script a marketing success story and generate huge livelihood opportunities and revenue for the state. The Food and Agriculture Organization of the United Nation, in its 'The State of World Fisheries and Aquaculture 2022 Towards Blue Transformation' report highlights that with 1.80 million tonnes India accounts for the largest share of 16% of total inland water capture fisheries production followed by China (13%) and Bangladesh (11%). It attributes China falling behind India and not being the top producer in inland water catches first time since 1980 to a 10-year fishing ban in the waters of Yangtze River for conservation of living aquatic resources. In Assam, the scheme 'Breeding Unit for Locally Important Fishes' funded by the National Fisheries Development Board (NFDB) is a key initiative to propagate and culture the local fish species which are in high demand within the state. According to NFDB, of the 838 freshwater fish species in India, 450 are categorized under small indigenous species. Under the scheme, six breeding units of locally

important fishes were set up in Nagaon, Dibrugarh, Kamrup, Sonitpur and Udalguri for an expenditure of Rs 32 lakh in 2020-21 and five more units in Udalguri, Nalbari, Kamrup and Dhemaji with a total expenditure of Rs 35 lakh (exact source of NFDB). Considering the spread and number of the beels and water bodies sustaining indigenous fish species and also the extinction threats to these wetlands and the fish species, there is scope and need for scaling up the intervention to cover more districts. The State Government can explore providing funds from its sources if the NDFB fund support is not adequate to increase.

Fishery sector could play a pivotal role in the socio-economic development and employment generation in the State. Department of Fishery has been implementing a number of schemes in the State with a view to achieve self-sufficiency in fish production and socio-economic development of poor section of the society. Pisciulture is gradually gaining popularity in the state, as farmers have taken up fish seed farming and Pisciulture on commercial scales as a result of extensive awareness campaign by the Department. To study the development process of pisciculture today, we took two areas: South Kamrup and Gohpur, Assam.

Objective:

Exploring the problems of pisciculture in south Kamrup and Gohpur area of Assam.

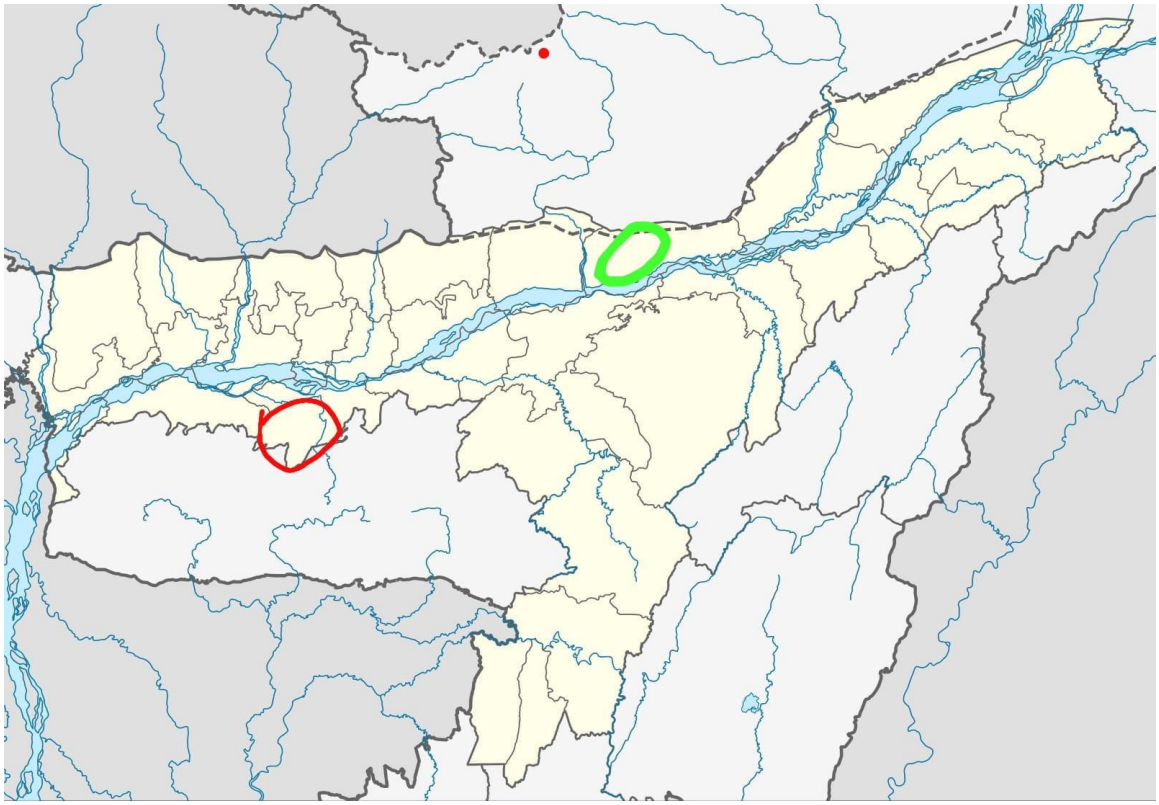
Methods and Tools of Data Collection:

The present study is based on the primary data collected from the fishing community (pond owners, fisherman and fish seller) of South Kamrup area and Gohpur, Assam with 30 participants from each of the area. These two areas were selected for the sake of ease and speed of data collection by the authors. Snow ball sampling was used to identify the respondents since there is hardly any database of the stakeholders of pisciculture in the public domain.

Description of the study Area:

The South Kamrup area located in Kamrup district ,Assam. Latitude of the place is 26.1847^0 N, and longitude of the place is 91.6672^0 E . In this area, we have taken some villages for collection of data that includes Amtala, Gonokpara, Kukurmara, Palashbari, Nahira , Satpakhali, Rampur ,etc. There are many rivers ,bills, khals, etc. in this area. These are Khulsiriver, Bathariver, Singrariver, etc. Therefore the area is rich in water resources from ancient time. But due to various reason like industrialization, decrease of rains, the condition of rivers and bills degrading.

Gohpur is sub district of Sonitpur district ,Assam state of India. The longitude is 26.8790^0 N and 93.6058^0 E of the place. The name of villages taken in this area for collection of data are BalijanBanua, Jalukbari, Balijan no.4, Simoluguri, Santipur , khomabari ,etc.There are many rivers , bills where different types of fish are got naturally. These rivers are balijanbanua river , Chatrang river , and Brahmaputra river, etc. There are some problems like flood where more water comes from Arunacha Pradesh in monsoon and autumn seasons.Basically , chatrang river brings flood problems. More ponds are filled by water and fish go out from the ponds and fisherman happens more losses.



In the above map the red circled area is the South Kamrup area and Green circled area is the Gohpur area respectively.

Results and discussion:

Variables	South Kamrup	Gohpur
Age	48.9 (SD=9.56)	43.97 (SD=9.82)
Gender	Male =93.5% Female=6.5%	Male=90.0% Female=10%
Religion	Hindu=96.8% Islam=3.2%	Hindu=76.7% Christianity=23.3%
Education (in years)	7.65 (SD=5.04)	8.93 (SD=3.91)
Family size	Less than four =51.6% More than four = 48.4%	Less than four= 36.7% More than four= 63.3%
Children engaged in work	Yes= 25.8% No= 74.2%	Yes=16.7% No=83.3%

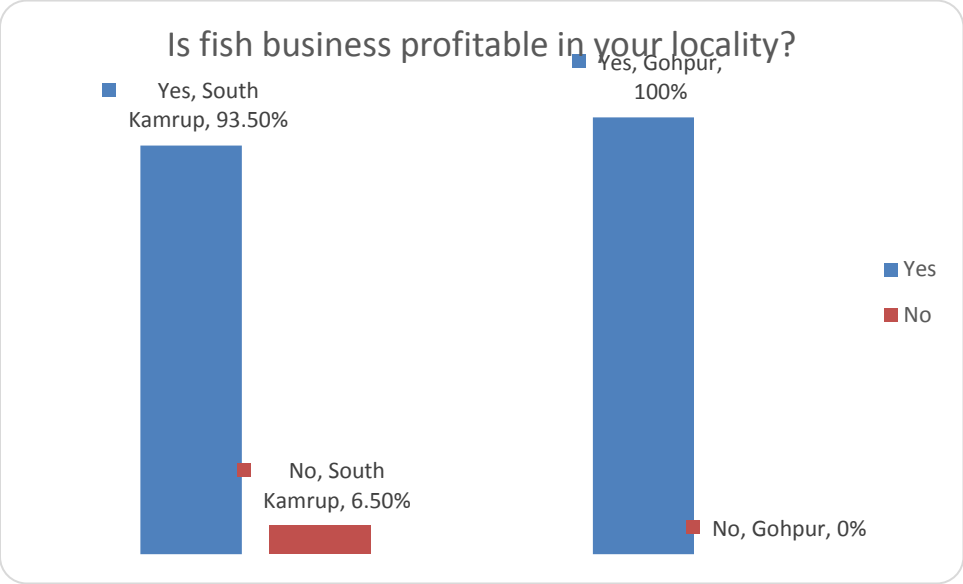
Source: Authors' calculation from field data.

Table 1 depicts the mean age of the fish farmers in South Kamrup stands at 48.9 years (SD=9.56) while that of Gohpur stands at 43.97 years (SD=9.82). Our data suggests that males are numerically superior in both the areas. The fishing community is generally poor with formal educational achievement. The mean year of schooling in South Kamrup stands at 7.65 years (SD=5.04) in South Kamrup whereas the same stands at slightly higher for the Gohpur area at 8.93 years (SD=3.91). As far as religion is concerned the Hinduism is the dominant religion in both the study areas. The average household size in rural India stands at 4.44 (NSSO) We enquired into the family size of the people engaged in fishing industry for both the areas and found that while in South Kamrup area the majority of the people (51.6%) have a family size of less than four while in Gohpur the most of the families (63.3%) have a family size of more than four.

The minimum legal age to work in India stands at 14 years (Ministry of Labour, Govt. of India, 2017). Despite that it is often seen that poorest section of the society engage their children who are yet to attain 14 years of age. Nearly 1/4th of the children and 16.7 percent of the children are engaged in work to help earn livelihood to their families in South Kamrup and Gohpur areas respectively. An independent t test revealed that there is a significant difference in the mean income of the households in the aforementioned areas.The fish farmers of south Kamrup area (M=70,690.3, SD= 12,4251.3) has more income than their counterparts in the Gohpur region (M=17,440, SD=25234.4) at t(32.5)=2.3, p=.026. One potential caused is the distance to the nearest market and the self consumption of fish, rather than selling the same at the market. In this regard we asked the respondents whether they get atleast 50 percent of the market price of the fish. Nearly, 93.1 and 86.7 percent of the fish farmers of the South Kamrup region and Gohpur respectively replied affirmative.

We then enquired about the profitably of the fishing business. None of the respondents from either areas maintained a proper books of account but a rough calculation in their mind. The results are presented in the figure 1.

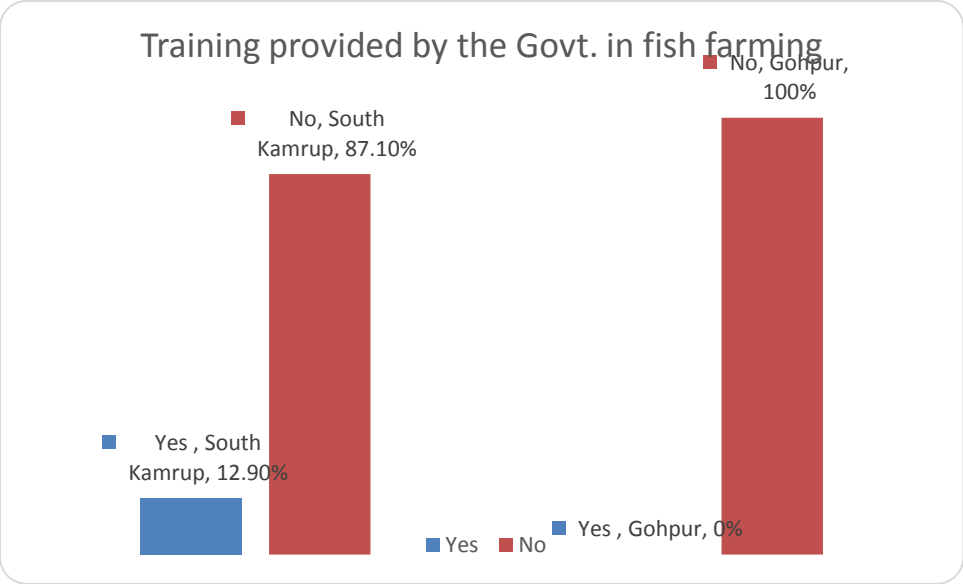
Figure 1: Perception of the fishing community on the profitability of the business



Source: Authors' calculation from field survey.

Now that profitability is not an issue for the farmers' in Assam what prevents Assam to be at least self-reliant in fish production? To enquire this we asked the respondents if they had got some support from the government or not. The support can be in the form of training (figure 2) and subsidies (figure 3).

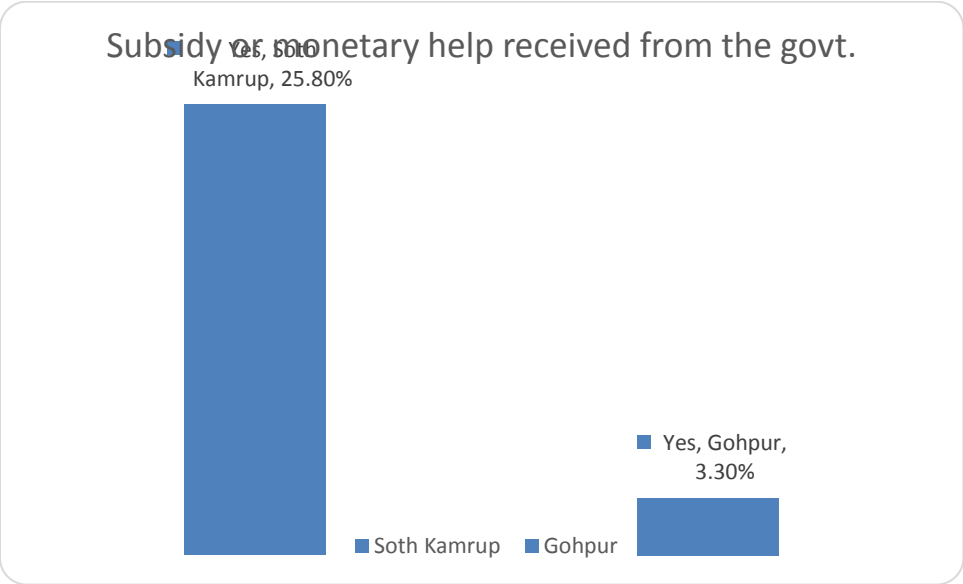
Figure 2: Training provided by the government in fish farming.



Source: Authors' calculation from field data.

The training on fish farming are hardly reached to majority of the respondents in both the study areas. Our data shows that only 12.90 percent of the South Kamrup region got the same while no one from the Gohpur area received any formal training on this aspect. We then enquired about the subsidy or monetary benefit schemes penetration.

Figure 3: Access to subsidy or monetary help form the government.



Source: Authors' calculation from field data.

74.20 percent of the respondents in South Kamrup and 96.70 percent fish farmers in Gohpur have not received the any financial benefit and are not aware of the Assam Matsya Samridhi Scheme, Matsya jagaran- ghare ghare pukhuri ghare ghare mach etc..

Our data revealed that Assamese fish farmers farm in South Kamrup and Gohpur areas farm around 10 different types of fish.

Table 2: Fish variety cultivated by the farmers in the study area.

Local Name of the Fish	Scientific name	Percentage of farmers producing the same
Rou	Labeo Rohita	44.26%
Bahu	Labio catla	36.06%
Miriga	Cirrhinus cirrhosus	31.14%
Grasscarp	Ctenopharyngodon idella	24.59%
Silvercarp	Cirrhinus	16.39%
Golden carp	Probarbus Jullieni	13.11%
Chanda	Elongate glassy perchlet	11.47%
China puthi	Puntius punjabensis	11.47%
Borali	Wallago Attu	8.19%
Magur	Clarias batra chus	3.27%

Source: Authors' calculation from field data.

Rou and Bahu are the most widely cultivated fish amongst the farmers, followed by Miriga and Grasscarp.

From the above study it is clear that people are not much aware about the govt. schemes which has taken for helping the fishery sector for increasing the productivity. People do not think about the business but they farm fish for their own consumption only. Therefore the mind set have to be changed. From ancient time the business of fish has done by some particular community only , though now a days it is changing but it is also a reason for low productivity of fish. Therefore it is also important to encourage people of all community to get involved in this sector. Now a days the condition of small fisherman also pathetic. Because now a days they get very low quantity of fish from the natural sources. Due to establishment of industries in various place of south kamrup area the rivers , beels etc are dying. The water resources are also adversely affected . Therefore it is urgent need to save the rivers and water bodies for save the environment. Government should educate the people about the fishery management. It is needed to control flood to save the pond owner from incurring loss during flood. In Gohpur area ,more people face problems like flood.In this case ,government should provide facilities to over come from this problems .

Conclusion:

With the passing of time, fish farming has gained momentum and gained a distinctive place in society. If done properly, fish farming can be a profitable occupation. While Assam has abundant

fish production areas, we haven't been able to meet our production capacity. Our country can solve its unemployment problem by concentrating on fish production. The government of Assam must therefore take steps to develop the fishery industry by utilizing the waters properly and protecting rivers, bells, etc. from pollution. Providing proper fishery management education and giving subsidy to the pond owner, fish seller government can encourage them and that will ultimately lead to high productivity of this sector.

Limitation of the study:

The present study is a preliminary investigation of the status of the fish farmers with minimalistic use of descriptive statistics and the percentage analysis. Future research should be more rigorous to find various latent dimensions of this segment of the agro-economy.

Acknowledgements

We are thankful to the Department of Economics, Pragjyotish College, for supporting us with the required infrastructure for the current study.

Declaration of conflicting interests

The authors declared no potential conflict of interest with respect to the research, authorship, and or publication of this article.

Ethical approval

All procedure performed in the study involving human participants were in accordance with the ethical standard of the 1964 Helsinki Declaration and its later amendments or comparable ethical standard.

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Dairy Farming and Rural Livelihood: A case study in Amlighat, Morigaon, Assam

Ratumoni Das
Assistant Professor, Dept. of Geography, Jagiroad College
Suravi Kaushik
Student, 6th Semester, Dept. of Geography, Jagiroad College

Abstract:
Dairy farming is an important source of subsidiary income for small/marginal farmers and agricultural labourers. Assam, being a predominantly agrarian economy, has about 70 per cent of its population living in villages, where livestock plays a crucial role in socio-economic life. The dairy sector today provides thousands of farm households with the triple benefits of nutritive food, supplementary income and productive employment for family labour, mainly for women. For the last few decades, Amlighat, a revenue village in Morigaon district, Assam where dairy farming plays a very important role in sustaining the livelihoods of the study area. This study is an attempt to analyze the changing livelihood pattern of the Amlighat area through dairy farming.

Keywords*: Dairy Farming, Amlighat, Livelihood Pattern*

Introduction:

Dairy farming is an important source of subsidiary income for small/marginal farmers and agricultural labourers. Assam, being a predominantly agrarian economy, has about 70 per cent of its population living in villages, where livestock plays a crucial role in socio-economic life. Dairy farming is the primary source of income where the study is conducted. Dairy farming changes the livelihood pattern among the people of the study area i.e. reduces the poverty level for individual, families and communities by making necessities of life, food water, shelter and clothing – accessible and affordable. Simultaneously, the farmers also face some challenges to run the farm smoothly.

Based on the above understanding, the research topic was undertaken to analyse the changing livelihood pattern of the people of Amlighat Revenue village and the challenges face by the farmers.

1.1 Objective of the study:

Based on above conception, the main objectives for the study are-

- To analyse the changing livelihood pattern of the study area.
- To find out the issues and constraints of dairy farming in the study area.

1.2 Database and Methodology:

The study of followed an empirical and exploratory approach. The study is based on primary and secondary sources of information collected from the field and relevant sources like department of Health & Family welfare, Government of Assam, Gova Panchayat of The village etc. Secondary information has been consulted from relevant sources like books, published reports, papers from

research journals and magazine along with materials available in web based platform relevant to the study

Primary data has been generated by targeting villagers of the village. Altogether 10%. of the total population were surveyed in the process. Houses were selected randomly.

1.3 About the Study area:

The present study was conducted in Amlighat area and located **South West corner of Morigaon District and extent between 26.13'00"N to 26.13'22"N and 92.27'11" to 92.27'37" E.** The data were collected from the dairy farmers during 18th Feb – 21 Feb, 2023. The Amlighat area comprises few small villages i.e. Roumari, Sitajakhala, Bamungaon and Sindhiswar from where data were collected because most of the people are dependent on dairy farming as a primary source of livelihood.

Analyses and Discussion:

According to the census 2011 there are about 326 houses in Amlighat village .In the survey we found out that around 275 houses hold dairy farming unit also here is a large farm in the village itself. The average life of a cow is estimated 10- 12 years and each cow produce 6 to 12 liters of milk every day. The cow is not milked year round instead it is milk 8 to 9 months. A small dairy unit earns a total of twelve thousand rupee per month but is much more in case of a large unit. With 3 milk collection booths the village produces around 12000 liters of milk per day. Cattles are milked in traditional way in small unit and using machines in large farms. It is found in the survey that 6000 cattles are present in the village (HF cross, Jersey cross and Sahiwal).the total expenditure on each cow is 200 per day.

Sl. No.	Category	Variables	Numbers (in%)
1	Farm Structure	Kutcha	2
		Semi-Pucca	15
		Pucca	83
2	Type of Milking Cows	Jersey/ Holstein friesan(HF)/Sahiwal	100
3	Milking type	Manual	96.6
		Machine	3.4
4	Average annual production	5000-10000	16
		10000-20000	57
		Above 20000	27
5	Sale of Milk	Direct Selling	5
		Sell to middleman	13
		Cooperative	82
6	Availability of Govt. Veterinary Services	Not-available	3
		Available but not enough	86
		Fully available	11

7	Annual maintenance cost of Dairy farms	Less than 10000	18
		10000 - 50000	71
		Above 50000	11
8	Annual Profit	Less than 200000	23
		200000 – 500000	62
		Above 500000	15
9	Children sent to School	Yes	100
		No	0
10	Nature of School	Private	62.7
		Government	37.3
11	Any Vehicle	Two Wheeler	66
		Four Wheeler	34

Source: Collected from the field by researcher

2.1 Findings:

Dairy farming has been important part of the every household for few decades in Amlighat area. The demand of milk is rapidly increasing in nearby city Guwahati and towns like Jagiraod, Raha, Nagaon etc and also in nearby rural areas. The important factors influencing this demand are rapid increase of population, growing nutritional awareness spread of education etc. That's why dairy farming becomes primary source of most of the poor farmers and reduces the poverty level in the study area. As a result, the farmers produce more milk through buying high breed cow and they become economically benefitted. More than 80 % farmers are part of cooperative society i.e Sitajakhala Dugdha Utpadak Samabai Samiti LTD. This society creates job opportunities because it has two BMC (Bulk Milk Cooling) Centre where pasteurized milk, different sweets are produced every day where more than 100 workers are involved with BMC. The Society had started a high school in Amlighat area through their surplus income and also had huge contribution to the upliftment Jagiroad College. The Society provides free ambulance service to the farmers and provides financial assistance to the poor students of the study area.

Most of the household has Gobar gas facility which generate from cow dung and use as a fuel for domestic purpose and also for running motors for drawing water from well. The manure from cows provides a good source of organic matter for improving soil quality and crop yield. That's why the farmers are interested in horticulture farming during free times.

Dairy farming faces some challenges from time to time. Entire Amlighat area is located nearby Killing River and Kapili River which causes flood every year during monsoon season and affect the farm houses and the farmers lost their valuable properties along with the animals. On the other hand, during Covid pandemic, most of the consumers not bought milk from the farmers as well as from the cooperative society. So the farmers threw the milk in to the Killing River and became big breaking news in media during Covid period.

Conclusion:

Dairy farming becomes dependable source of livelihood for the rural poor of the Amlighat area. Now a day banking sectors disburse loans to the farmers for basic infrastructure and to buy high breed cows. Bank also provides cattle insurance facility to the farmers that they never face any lost during upcoming critical situations. High cost of feed and shortage of veterinary services are major disadvantage for the farmers in the study area.

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Organic Farming: A Sustainable Approach to Agriculture in North Eastern India

Swagatam Das
Department of Agricultural Engineering, Assam Agricultural University, Jorhat, Assam, India
Parimita Talukdar
Assistant Teacher, Vivekananda Kendra Vidyalaya, Nalbari, Assam, India

Abstract:
With the current global population reaching around 8 billion people, the demand for food production has reached new heights. Increasing food production contributes to a surge in use of chemicals, fertilizers and pesticides, which in turn contributes to various negative impacts on the environment and depletion of natural resources. Intensive agriculture results in increased water use, depletion of soil nutrients and decline in soil fertility. This raises concern over sustainability of agricultural production and need of conservation practices to regulate the soil quality. The North Eastern region of India has a geographical area of 262179 km^2 and around 53000 km^2 of total cultivable area, majority of which relies on rain fed irrigation. More than 50% of the population depends upon agriculture as their livelihood. The North Eastern region is bestowed with abundant rainfall, favorable climatic conditions, agro and forest biodiversity for growing wide range of crops. Most of the farming practices in this region already follow organic farming practices, while Sikkim being 100% organic state. Organic farming is an agricultural practice that utilizes on farm natural resources viz. animal manures, vermicompost, plant residues and emphasizes on crop diversification techniques such as crop rotation, inter-cropping, etc. Organic farming relies on maintaining as well as improving the soil health by increasing the soil organic matter, thereby increasing the soil water holding capacity and soil fertility. Organic produce are known to be healthier and richer in micronutrients, vitamins and other quality parameters. Organic farming is environmentally friendly, productive and tends toward long-term sustainability.

Keywords: Organic Farming, Sustainable Agriculture, North Eastern India.

Introduction

With the dawn of Green Revolution in India, we saw a steep rise in the utilization of chemical fertilizers in the agricultural lands to increase food production. This goes hand in hand with the steady growth in population globally. This increased uncontrolled and unscientific use of fertilizers has led to an adverse effect on the soil properties. Although intensive agriculture results in a boost in food production, it also has detrimental effect on the soil in the long term, thereby causing problems in respect of nutrient imbalance. Indian soils not only show deficiency of NPK (Nitrogen, Phosphorus and Potassium) but also of secondary nutrients (Sulphur, Calcium and Magnesium) and micro nutrients (Boron, Zinc, Copper and Iron etc.) in most parts of the country. Nevertheless, in our attempt to increase food production, we have ignored the health of soil to a

great extent, that it is indirectly affecting people's health and consequently threatening the sustainability of agriculture for future generation. Prior to the Green Revolution, Indian farmers were not familiar with the use of chemical fertilizers and followed organic/natural agricultural practices.

Adopting organic farming practices is a good way to maintain the soil health, as it avoids over exploitation of soil nutrients and also contribute to build up of soil organic matter and thus facilitate sustainability of agriculture. FAO defines organic farming as "Organic agriculture is a holistic production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles, and soil biological activity. It emphasises the use of management practices in preference to the use of off-farm inputs, taking into account that regional conditions require locally adapted systems. This is accomplished by using, where possible, agronomic, biological, and mechanical methods, as opposed to using synthetic materials, to fulfil any specific function within the system." Organic farming promotes soil building practices such as crop rotations, inter-cropping, symbiotic associations, cover crops, organic fertilizers and minimum tillage, which contribute in maintaining and improving the soil productivity.

The main principles of organic agriculture are the followings:

- Principle of Health: Healthy soil, plants, animals, humans; a healthy planet.
- Principle of Ecology: Emulating and sustaining natural systems.
- Principle of Fairness: Equity, respect and justice for all living things.
- Principle of Care: For the generations to come.

The North Eastern Region of India, comprising of the following states viz. Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura, lies between $22^{o}05'$ N and $29^{o}30'$ N latitudes and $87^{o}55'$ E and $97^{o}24'$ E longitudes. The region is characterized by diverse agro-climatic and geographical conditions. The region is a hot spot of biodiversity having many endemic species which accounts more than 50 bamboo species, 6000 rice lines, 14 species of banana, 17 species of citrus, 600 orchids out of which 175 are rare and many medicinal and aromatic plants. The North Eastern region of India has a geographical area of 262179 km^2 and around 53000 km^2 of total cultivable area, majority of which relies on rain fed irrigation. More than 50% of the population depends upon agriculture as their livelihood.

Status of Organic Farming

Almost 187 countries practice organic farming, with around 3.1 million farmers associated with this and 72.3 million hectares of agricultural land being utilized for the same. With the most organic agricultural land in Australia (35.69 m hectares) followed by Argentina (3.63 m hectares) and the Spain (2.35 m hectares) as shown in **Figure 1**.

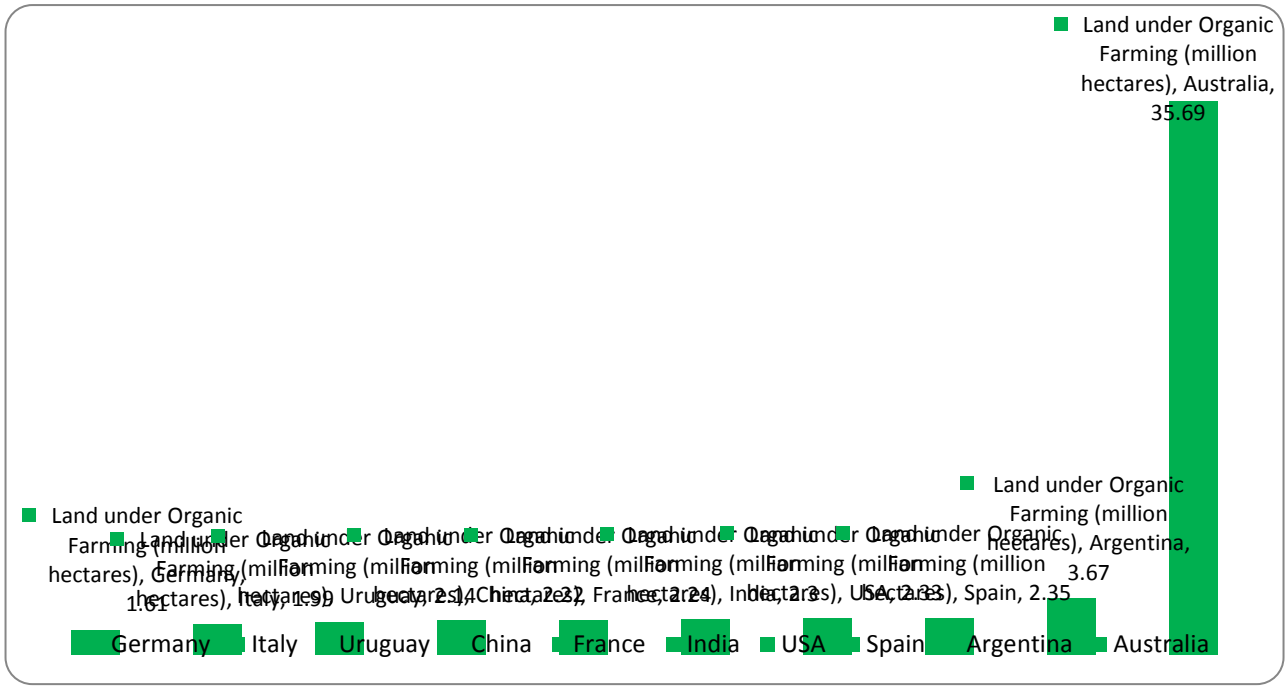

Fig. 1: Status of Organic Farming worldwide. (Source: FiBL Survey 2021)

Organic farming is in a budding stage in India. About 2.30 million hectares of farmland was under organic cultivation as of March 2019. This is two per cent of the 140.1 million ha net sown area in the country. A few states have taken the lead in improving organic farming coverage, as a major part of this area is concentrated only in a handful of states. Madhya Pradesh tops the list with 0.76 million ha of area under organic cultivation that is over 27 per cent of India's total organic cultivation area. The top three states namely, Madhya Pradesh, Rajasthan and Maharashtra account for about half the area under organic cultivation. The status of organic farming in the North East Region of India has been listed in **Table-1**.

Table-1: State-wise area covered under organic farming in North East Region during 2020-21.

Sl. No.	State	Under NPOP Certification Area (Hectares)	Under PGS Certification Area (Hectares)
1	Arunachal Pradesh	13114.12	380
2	Assam	18470.84	4400
3	Manipur	12724.92	600
4	Meghalaya	38376.39	900
5	Mizoram	13038.89	680
6	Nagaland	14790.38	480
7	Sikkim	75729.66	3000
8	Tripura	6521.31	1000

Source: Data provided by the APEDA from accredited Certification Bodies under NPOP on Tracenet and NCOF as per the details available on PGS portal for PGS certification.

Organic farming initiated several thousand years ago. During that period farmers practiced farming near the water sources and utilized the naturally available resources. Indian scriptures Ramayana, Rig-Veda, Mahabharata briefly narrate the organic agricultural inputs by the farmers at that time.

In the Ramayana the cycle of dead things is mentioned that the foul waste stuff that returns to earth in the form of nutrients. The word 'Aryans' comes from the root word 'Arya' which means to cultivate. The word 'Veda' means knowledge and Agriculture inspired by Vedic knowledge called Vedic Agriculture. Vedic texts describe the principles of organic farming like Krishi Parashar, Brihatsamhita, and Manusmriti etc. The technology of agriculture mentioned in those texts is completely organic. In this technology cow dung, urine, plant extracts, and natural products are used.

Need for Organic Farming

There is lot of scope for organic agriculture in the hills especially in the North Eastern Region (NER) of India. Firstly, the use of inorganic fertilizers and chemicals is limited in the region. The farmers of the region, in general and hill farmers in particular are having apathy towards use of agro-chemicals. Secondly, the fruits of green revolution could not benefit the farmers of the NER as the system of production in the region remained low input-low risk-low yield technology and the average yield of most of the crop remained far behind the average productivity of the country. It is assumed that the difference in production gap due to adoption of organic agriculture is expected to be negligible; rather there is scope for enhancing productivity with good organic management, the organic premiums would boost earning of the farmers of the region. Thirdly, it is an added advantage that all the households are maintaining livestocks (pig, poultry, cattle, goats, etc.) producing sufficient quantity of on-farm manures, which could be efficiently used for organic agriculture. Moreover, the north eastern states being bestowed with abundant rainfall, favorable climatic conditions, agro and forest biodiversity for growing wide range of crops, leads to abundant production of biomass including weeds, shrubs and herbs. Some of these species could be efficiently used in organic production.

Conclusion

Agriculture often places significant pressure on natural resources and the environment. With the growing population, the demand for agricultural produce is also increasing rapidly. While usage of chemical fertilizer results in increase in food production, but in the long run it is detrimental to the environment. So as to safeguard agricultural production for future generations, we need to adopt sustainable agricultural practices. Organic farming is one way to achieve this, as it maintains and improves the soil health, as well as providing us healthier crop and not causing degradation to the environment. In the organic farming system, food is produced in an environmentally, economically, and socially sustainable manner. The NER of India has huge potential in organic farming since already they use comparatively less chemical fertilizers and most of them being small and marginal farmers depend on natural resources for farming. Also the diverse agro-climatic zones and abundance of rainfall are other favourable criteria. There is still need for further improvement, especially in the areas of research, extension and awareness among personnel directly or indirectly involved in the organic farming. The GOI also provides assistance for promoting organic farming through various schemes, which can be beneficial to the economically weaker farmers.

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A Journey by NEDFi towards Sustainability on Water Hycanith

Daisy Das
Assistant Professor
Department of Business Management
Gauhati Commerce College

Abstract:

Water Hyacinth is a weed found in lakes, and some other water bodies across the globe. Unique nature of water hyacinth has increased potentiality to use as sustainable product. consumption pattern of human beings has a influence on the society. NEDFi took the initiative to popularize the use of water hyacinth for making eco- friendly handicraft products. The main objective of the study is to examine the role of NEDFi in promoting eco- friendly product from water hyacinth and to study some success stories in Assam. NEDFi has been an integral part of north east India's eco system, playing the role of facilitating, nurturing, financing and promoting the development of entrepreneurship in this part of India. The water hyacinth project is a unique in its success in motivating the craftsperson of rural areas.

Keyword - Water Hyacinth, eco- friendly, handicraft products.

Introduction:

Water Hyacinth is a weed found in lakes, and some other water bodies across the globe. Unique nature of water hyacinth has increased potentiality to use as sustainable product. consumption pattern of human beings has a influence on the society. Ajzen seen environmental concern as,''an individuals' assessment or attitude towards the facts, their own behavior or the behavior of other people , that have an impact on environment.'' Water hyacinth products are considered as eco friendly products that is contributing towards sustainable consumption as well as reforming livelihood of many people in north eastern region. NEDFi is acting as a lead agent in this regard. NEDFi took the initiative to popularize the use of water hyacinth for making eco friendly handicraft products. A weed that was considered to be a nuisance in plains of north eastern region is now utilized to make eco friendly products which in turn earns livelihood to the rural women promoting inclusive growth.

Review of literature-

Nandini Borah (2014), in the study 'Water Hyacinth Craft: A Livelihood Initiative by NEDFi' examined role of NEDFi in building community and marketing initiative for promoting products. The study also analysed impact of joint initiative by NEDFI and NEC.

Bijoylaxmi Sarmah and Zillur Rahman(2016) in the study' NEDFI: Transforming Lives Through Shared Value Creation' studied the initiative take by NEDFi in transforming lives of poor village artisans living in the remotes part of north east India. The study found that the project of water hyacinth is uplifting the rural poor through economic empowerment and women artisans are enabled to live a dignified life through sustainable livelihood creation.

Objective- The main objective of the study is to examine the role of NEDFi in promoting eco friendly product from water hyacinth and to study some success stories in Assam.

Research Methodology- The study is descriptive in nature . The study is based on primary and secondary data . Primary data has been collected through interview and questionnaire and secondary data has been collected from article, newspaper, book, websites etc.

The new journey-

NEDFi has been an integral part of north east India's eco system , playing the role of facilitating ,nurturing, financing and promoting the development of entrepreneurship in this part of India. The NEDFI's journey in water hyacinth began 12 years ago and played a role in changing livelihood of many people in north eastern region. Ashim Kumar attended North East Trade and Investment Opportunity Week from October 1-4,2007 with 16 entrepreneur held in Bangkok. There he was amazed to see the product from water hyacinth. For more information the NEDFI DGM visited Bangsai Arts and Crafts Centre located in the outskirts of Bangkok .There was difficulty in getting trainers from Thailand, so Industries Crafts, Banglore was contacted and they organized two separate programmes for comparative study in water hyacinth and banana fibre crafts, as for both raw materials were free. As a CSR policy,25 artisans were provided training in the first phase, but there found lack of right technique ,so provisions were taken to contacted NID Ahmedabad, and artisans were sent for another training programme. The first programme wit NID was conducted in December 2010 on improvement in productivity and design. Training was conducted next year in November on weaving technique and surface development. In March 2012, trainers from Thailand came to India for training the local artisans. They taught the artisans their technology on the treatment of the raw material and use of mould and design. The number of artisans now has increased to 3500, including around 100 master craftsmen. The craftsmen have taken the activity as venture as well as creating employment opportunity for artisans. Water hyacinth craft CFC has been set up by Government of Assam in Morigaon district for preparing more skilled artisans .NEDFI also help in marketing the product through different sales outlets and provided orders from shops and online store.

To achieve the objective of social change through awareness and knowledge disseminating NEDFI has used network of NGO and SHGs. The NGO and SHGs helped by informing and educating artisans about the water hyacinth product 's potentiality and training programme being conducted by NEDFI. Water hyacinth craft became popular in 2012, the government of Assam in its budget allocated rs 5 cr to set up a common facility centre. NEDFI won NABARD Rural Innovation Award in the category of the public/cooperative sector. water hyacinth craft were among the artworks that helped Assam win gold in IITF 2017.

Table 1: Beneficiaries covered under the Basic Programme On Capacity Development

Type of Programme	No. of beneficiaries covered in FY 2011-12	Total no. of beneficiaries covered in FY 2010-2011 and FY 2011-2012
Basic programme on Capacity Development	1007	1294

Source- NEDFI Annual Report 2011-2012

Table 2: state wise break up of the beneficiary under the Basic Capacity Development Programme-

Sl no.	State	No. of artisans
1	Arunachal Pradesh	57
2	Assam	1065
3	Manipur	82
4	Meghalaya	49
5	Tripura	41
Total Male Female		1294 120(9.27%) 1174(90.73%)

Source- NEDFi Annual Report,2011-12

Present scenario-

NEDFI is initiating transforming livelihood of people in north eastern area. The number of artisans has been increasing. Among 3500 artisans at least 10per cent, earn around rs 10,000 a month and rest in the range of rs 3,000 to rs 5,000 per month. According to NEDFI, unskilled artisans, those who dry stems, get 15 paisa per 26 inch stem. Semi skilled laborers get rs 2-4 per meter of braided stems. Skilled artisans sell products in the range of rs 40 for a showpiece to rs 1500 for a lampshade and for furniture upto rs 25000. Besides of ONGC project, NEDFI has also assigned with training 600 women, 100 beneficiaries in six districts, under Assam government State Rural Livelihood Mission by 2018-19. The craft is spread in its wings to other parts of India as well as worldwide. Different states like Punjab, Uttar Pradesh, Telangana and Tamil Nadu and enthusiasts from other countries like Nigeria and Sudan have come to NEDFIs Craft Incubation Centre at Khetri for learning the art.

Production process-

Water hyacinth grows during July –November. The raw material is prepared by sun drying its stems; stems of 24-30 inches are preferably picked. They are sun dried for seven to eight days .Then stems flattened to prepare for weaving. For non framed products like bags, the stems braided and stitched to give desired shapes .For framed products like furniture, bamboo and cane frames are used. These are even weaved in looms to make products like yoga mate. For colouring, natural dies are referred. Colours mostly brought from Bangkok, are mixed I hot water and salt. Prepared stems are then boiled in colour and dried for permanent colouing. For a glossy look, products are burnished with melamine. Finally, they are smoked to protect them from insects and fungus . The products range from purses and jewellery boxes that cost from rs 120, lampshades and baskets starting at rs 400 to yoga mats, dining mats and caps.

Introduction of standard moulds, flattering machines, stitching machine are facilitating consistency in quality and productivity improvement. Under capacity development programme artisans are given flattening machine which helps in reducing drudgery of manual flattening of dry stems. Best

performing artisans are provided with special stitching machine for bags and mats perfection. Low cost technology introduction has enhanced artisan's capacity to produce in volumes.

Training of Artisans-

NEDFi follows criteria for selecting NGOs/units. The criteria includes goods reputations of the artisans, minimum 2-3 years of work experience, expertise in a specific field, recommendation from branch office and verification of registration certificate. Once NEDFi is satisfied with the procedure NGOs are selected and are asked to select member artisans for training under the basic skill development training programme.

Training Programme Phase1: Basic Skill Development Training Programme

The duration of the training was 10-12 days. In this phase, the artisans were informed about the possibilities of preparing handicrafts items out of the water hyacinth which is available in the village area. Along with the business value the training programme is started with awareness generation session. Each artisans are provided with identity card and progress report bearing unique name and code. The trainees are given information on business opportunities and micro credit facilities.

Training Programme Phase ii:

During this phase specialized training provided on water hyacinth based handicraft making items.

Training Programme Phase iii:

The artisans are selected for advance training programme at the NID, Ahmedabad. The completing the training programme craftsman are recognized as mater artisan trainers. Then they start provide training to new /fresh artisans in own village. Thus, continuity of the training programme is ensured with earning extra income from training programme.

Overview of Training Process of the Craftsmen:

NEDFi

↓

NGOs/Microfinance units

↓

Artisans

↓

Basic Skill Development Training Programme

↓

Advance Skill Development Training Programme

↓

Specialized Training Programme

(training Programme at NID, Ahmedabad)

Marketing Strategy – in the path towards success market linkage is crucial. Exclusive exhibition on water hyacinth held at NEDFi haat to promote the craft. Showrooms are being opened in small towns of northeastern region to market the product locally by the artisans. The joint initiative of NEDFi and NEC has developed a new breed of confident artisans. More than artisans they are brand ambassadors as a part of category promotion , NEDFi has coined the products under the brand name ''Aqua Weaves''. The tags are distributed free of cost to the artisans. Projecting the

artisans as Brand Ambassador is an effort from NEDFi to recognize and motivate the artisans for their effort to prepare items. NEDFi promoted artisans at various local, regional, national events such as 'Indian International Trade Fair', 'Indian Handicraft and Gift Fair' etc. pricing of the items follows fair trade practices.

Success stories-

Barnali Gogoi from Sivsagar district is engaged in making water hyacinth product from bags to yoga mats, that is appreciated across the world. She is training 10 artisans at a NEDFi Common Facility Centre in Nimaijan. She has become confident and independent and being able to see the outside world by engaging in making water hyacinth items. She got the opportunity to exhibit products at India Handicraft and Gift Fair in Exposition Mart, Greater Noida.

Rita Das, Dhuburi resident in Assam is another master artisan. She is a proud owner of a water hyacinth craft showroom and a training centre in Dhuburi. She is helping her family financially and employs 20 artisans. She got the opportunity for free training on water hyacinth craft for the pilot batch of 25 at Khetri in Assam in 2008, training from NID, Ahmedabad in 2010, from Thailand in 2012. She marketed her product with the help of NEDFi through sales outlets, fairs and exhibition and provided orders from shops and online stores. She started her own showroom in 2012 and opened a training centre in 2014.

Maya Gohain another artisan from Sivsagar showroom is earning around rs 15000 a month. They are having higher demand and received many orders , including online, from domestic and from foreign buyers.

The water hyacinth project is a unique in its success in motivating the craftsperson of rural areas. There are village elderly people who voluntarily got associated. Shri Hareswar Deka a retired head master of a village school in Darang District. He prepared hand written posters and pasted all across the village urging people to join the craft. He also wrote poems describing how the craft can change the lives of people in their villages.

Nilim Bhuyan, a mentor from Darang district of Assam is another unemployed youth in 2008,own satra, a NEDFI assisted Micro Finance NGO nominated him for the programme his life changed. ''I have recently purchased a motor cycle also from the income I made from the craft and I market products worth mre than Rs 40,000 per month''says Nilim,who is now a very busy man moving around the villages to guide more than 300 artisans

Findings –

NEDFi apart from creating awareness and training the artisans, has taken efforts to successfully market the products. in this context ,NEDFi has coined the brand name of the water hyacinth handicraft products as '' Aqua Weaves''. This has generated awareness among the customers along with confidence in the mind of customers.

NEDFi has also created an exclusive gallery cum demonstration centre for display and sale of water hyacinth craft at NEDFi haat which is located at the heart of the Guwahati City of Assam. The gallery displays the products made by the artisans and the demonstration centre facilities traning programmes with the assistance of a master craftsman for anyone who is interested in learning the crafts.

NEDFi has been organizing exhibitions exclusively for water hyacinth product in small towns as well as in big cities. It is constantly encouraging the artisans to make an effort to exhibit their items in these exhibitions.

Suggestion:

Establishment of common facility centre in all the targeted district and make is sustainable in long run

Artisans' card should be issued to the project beneficiary.

Preparation of catalogue, website and documentation for marketing the product.

Government should take steps for organizing more exhibitions in the local, national and regional level to promote water hyacinth product in Assam.

Policy should be framed for more linkage with marketing organizations like ARTFED, NEHHDC(North East Handicraft & Handlooms Corporation Ltd) as well as NEDFI showroom and online marketing agencies.

Conclusion- The water hyacinth project has been successful in developing sustainable livelihood. NEDFI is playing important role in women empowerment by making water hyacinth products. The demands for items are being increasing. Government should take more initiative for creating awareness regarding using of eco friendly products from water hyacinth.

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Determinants of Informal Dairy Value Chain: A case study in Kamrup district of Assam

Deepshikha Dutta
Research Scholar, Department of Economics, Dibrugarh University
Reshmin ara Begum
Research Scholar, Department of Economics, Dibrugarh University

Abstract:
Global markets for livestock products are expanding quickly, and a sizeable percentage of this demand may originate in developing nations due to rising human incomes, expanding urbanisation, and population increase. The dairy value chain strategy similarly pulls together many stakeholders to acquire control over production, marketing, processing, and distribution in order to obtain scale economies, lower transaction costs, and minimise supply-side uncertainties and the quantity of inputs and outputs. In this study, the informal dairy value chain in Kamrup district was analysed at the cluster level regarding the status of the bovine population, the average milk production, and the identification of different marketing participants that influence the price variance of milk and milk products. The locational aspects of milk production and its problems, on the other hand, claim that the supply of milk from producers is taken to consumers directly in traditional ways and results in a decreased marketable surplus of dispersed and small milk production units due to difficult marketing channels and high marketing costs. While keeping milch animals in cities and towns to supply daily milk supplies has led to a wide range of sanitary, health, and congestion issues. With this geographic perspective in mind, the Kamrup district has been selected to study these concerns regarding the spatial organisation of dairy activities in urban settings.

Keywords*:* *Bovine population, Average milk production, Informal Dairy Value Chain, Milk Marketing, Milk price*

Introduction:

The informal dairy sector is a critical source of livelihood for millions of households in India, particularly in rural and peri-urban areas. Nonetheless, despite its significance, the industry is still generally unstructured, has low levels of production, and is characterised by value chain inefficiencies. Small-scale farming methods in developing nations generate 80 to 90 percent of the milk, according to the Food and Agriculture Organization (FAO, 2009). It is crucial to note that the world's total milk production is anticipated to reach 850 million tonnes in 2021, with India followed by the United States and China accounting for around one-third of the entire production. The National Dairy Development Board (NDDB) estimates that India's total milk production in 2020–21 was close to 208 million tonnes, up from 198 million tonnes the year before. One of

India's North Eastern states that is beginning to produce a lot of milk is Assam. According to the 20th Livestock census in 2019, the total milk production in Assam was around 4.29 million tonnes. This study investigates the factors that affect the informal dairy value chain in the Assam, India, Kamrup area with an emphasis on market structure, size, production, and livestock management practices, as well as price volatility in relation to market access and distribution. The dynamics of the dairy value chain in Kamrup districts are significantly influenced by market structure and size. While market size refers to the overall amount of milk produced and the number of families, dairy cooperative societies (DCS), processors, and retailers involved in the value chain, market structure refers to how the actors within the dairy value chain are organised and distributed. Small and marginal farmers, home-based dairy processors, dairy cooperatives, and private dairy corporations are just a few of the different groups of actors that make up the dairy industry in Kamrup area. With 64% of households in the district engaged in dairy farming and an estimated 870,000 metric tonnes of milk produced annually, the market is sizable. A variety of factors can have an impact on milk price volatility, which is a significant problem for the dairy industry. Milk and milk products are so heavily weighted in the Consumer Price Index (CPI) and Wholesale Price Index (WPI), which can therefore significantly affect changes in milk prices. Food inflation, which is primarily influenced by shifts in the cost of staple foods, can account for about 3.6 percent of the CPI and 4.7 percent of the WPI. When food costs are rising, customers may consume less milk and milk-related items, which can lower demand and lower prices, and vice versa. As a result, the study looks at price variations in the dairy market in the study area, as well as the variables that affect price dynamics and how far price signals are spread across the value chain. The overall goal of the study is to understand the factors that influence the informal dairy value chain in the Kamrup district and to pinpoint ways to make the industry more competitive and sustainable.

Review of literature:

The economics of milk production and marketing is a dualistic process; on the one hand, agriculture is the major sector for production and on the other, the industrial sector includes a sophisticated processing and packaging component. India views the production of milk as a subsidiary business. Yet, India has developed the largest dairy cooperative network in the world with more than 14 lakh village level dairy cooperative societies, making this the industry. Despite India's expanding dairy industry, access to organised markets and institutional loans for farmers continues to be a major barrier to increasing the scope and productivity of dairying (Birthal, Chand, & Joshi, 2016) . According to a study on the growth of dairy cooperatives in India, dairy cooperatives stand out from other milk marketing channels due to their involvement in the purchase of milk and the provision of essential services to dairy farmers. Government and cooperative organisations are involved in milk marketing through the organised sector, whilst private organisations are also involved in the unorganised sector (Kumar, Rathana, & Thamila, 2015). A study was conducted to examine the price spread, marketing expenses, marketing effectiveness, and profitability among market intermediaries such as cooperative and non-cooperative (private) channels in the domestic market of liquid milk (Sarker & Ghosh, 2010). The cooperative marketing agency's intramarket price variation for liquid milk is not far from

uniformity, but that the cooperatives fail because their profit per unit of milk is lower than the non-cooperative channels. According to the dairy policy (Assam, 2008), developing the livestock market as well as the market for vermicompost made from cow manure and other materials is necessary for dairy farms to be profitable. Increased farm level milk production is a key factor in determining dairy farmers' wellbeing, and rising dairy productivity can help to guarantee higher dairy productivity. Using cross-breeding technologies is one approach to ensure it (Bayan & Dutta, 2017). The productivity and quality of milk production are significantly influenced by livestock management methods, such as feeding and breeding, thus they are a crucial variable to take into account in the study. According to a study conducted in Gujarat, crossbred households have estimates of the value added by cattle that are 64% more than those with local cattle. In light of this, the National Livestock Policy of India (2013) has also supported the current low input production systems for increasing productivity and income in order to improve the socioeconomic position of a significant portion of our livestock producers (GOI, 2013). Adopting crossbred cattle can therefore be a good choice for enhancing farmer wellbeing through increased farm income and increased farm milk consumption as a result of increased production leading to improved nutrition for households (Udo & Steenestra, 2010). The Key Village Scheme (KVS) was initially implemented in Assam during the first five-year plan (1951–1956) in order to increase the local cattle stock for milk production. According to the Government of India's 20th Livestock Census, which includes both domestic and exotic breeds of cattle, Assam's cow population has grown by almost 8% since the last livestock census, which was done in 2012.

Methodology:

The data for the study is obtained from both primary and secondary sources. Secondary data was collected from various government websites like NDDB, Dairy Development Board of Assam etc. Secondary data was required for identification of potential dairy clusters which are needed for carrying out the study. The study also depends on primary data that was gathered through interviews conducted with important stakeholders of mentioned clusters, which may be skewed by responses and summarised in next section in tabular format and graphical presentation.

Summary of Findings:

Rangia, Rampur, Chayagaon, Bihdia Jajikona, and Guwahati are the clusters that have been chosen to encompass the possible villages for the informal dairy value chain intervention. The table displays the average breakdown of participants by gender for each dairy cluster. When compared to the other clusters, the Guwahati cluster has the highest percentage of male participants, while the Bihdiya Jajikona cluster has the highest percentage of female participants.

Table 1: Gender-wise distribution of sample population

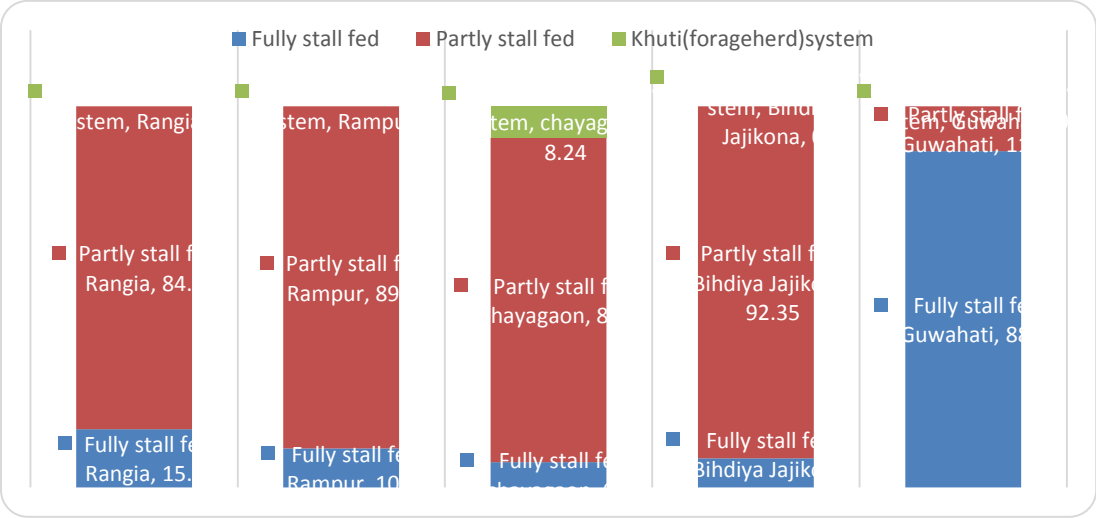
Dairy clusters	**Average no. of participants**	
	Male	Female
Rangia	5.26	2.85
Rampur	6.21	1.75
Chaygaon	5.40	3.60
Bihdiya Jajikona	4.38	3.77

Guwahati	8.25	0.39

Source: Primary data

About 72.25% of farm households in dairy clusters rear cattle in fully stallfed conditions, 72.25 percent of farmers rear cattle in partially stallfed conditions. Figure 1 shows that there is no khuti way of rearing other than in the Chayagaon cluster, where 8.24% of all agricultural households retain native cattle or buffalo. The type of cattle stock shown in has a direct relationship with the farming system based on raising techniques. Given that grade cattle and crossbred animals are typically raised in fully stallfed conditions, the fully stallfed rearing condition rises as the number of upgraded cattle stock increases.

Figure 1: Distribution of farm households by rearing practices



Source: primary data

Most of the milk in Guwahati, as shown in Table 2, comes from improved cattle. Due to the relatively higher productivity of improved cattle stock in the study area, the proportion of farming households raising improved cattle stock, contributes to almost 88% of the total milk production, compared to up to 66% of the total farming households rearing indigenous breeds, which contributes only 11.44% of the district's total milk production for all bovines.

Table 2: Cluster wise estimated total milk production based on total improved cattle stock

	Rangia	Rampur	Chayagaon	Bihdiya Jajikona	Guwahati
Estimated no. of hhs with improved cattle	416.75	8.40	115.56	30.51	827.05
Average herd size	1.50	1.45	1.10	1.55	4.36
Average milk production per improved cow	5.17	5.61	6.25	5.00	8.43

Source: Primary data

Table 3: Cluster wise estimated total milk production based on total local cattle stock

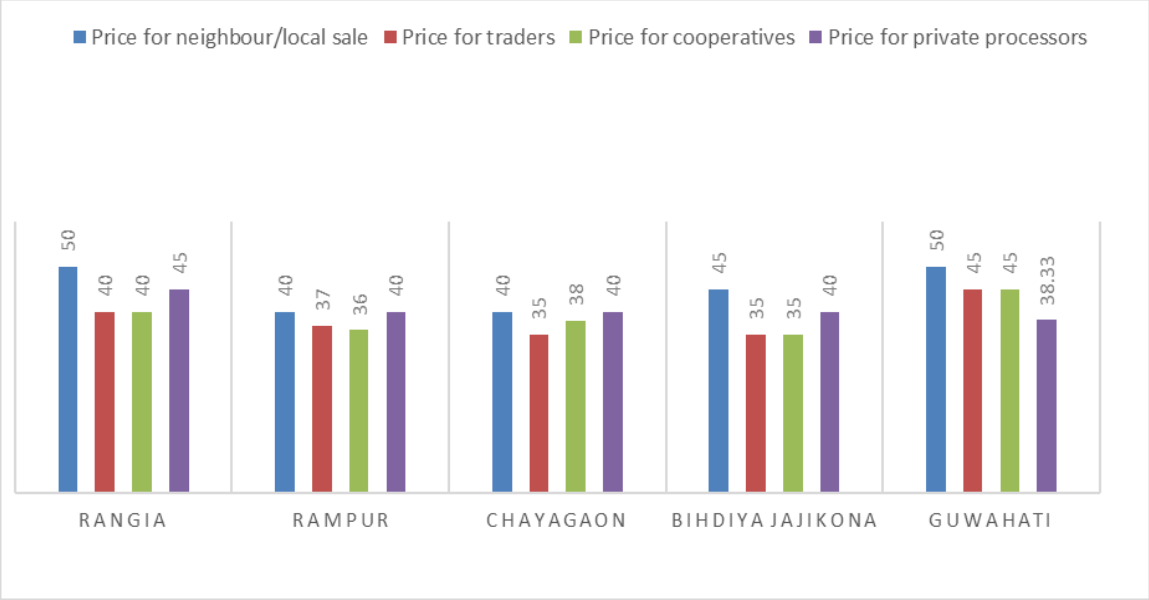
	Rangia	Rampur	Chayagaon	Bihdiya Jajikona	Guwahati
Estimated no. of hhs with local cattle	1854.00	114.02	1327.82	319.06	34.74
Average herd size	1.13	0.94	1.00	0.99	1.00
Average milk production per improved cow	1.19	1.16	1.11	1.23	1.44

Source: Primary data

The clusters need to focus on cattle crossbreeding to convert a significant portion of the farms from subsistence to commercial due to the low milk yield of the indigenous cattle and the bovine stock being mostly focused on indigenous cattle.

When farmers sell milk locally, they can expect to receive the highest prices from different marketing channels (Rs. 45/litre), followed by Rs. 40/litres from private processors. At the research sites of Kamrup, the price obtained for the selling of milk to DCS is Rs 38.80/litres throughout clusters, which is a relatively better price gained by farmers sourcing milk to DCS compared to certain other districts.

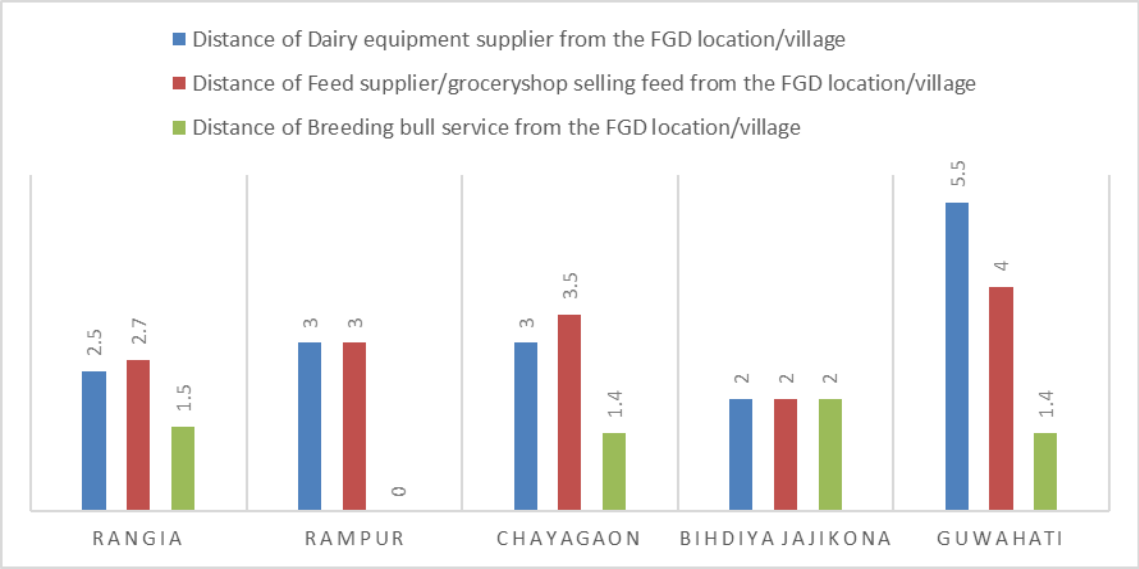
Figure 2: Price variation for different sources



Source: Primary data

Enhancing the availability and accessibility of veterinary services is crucial for increasing the productivity and milk production of cows. The average distance from the agricultural villages is 4.33 kilometres, and there are on average 1.4 local veterinarians per cluster.

Figure 3: Distance of input and breeding services at cluster level



Source: primary data

When we examine the availability of input and breeding (natural)services at the cluster level, we can conclude that Guwahati has the greatest concentration of dairy equipment, feed, and breeding bull service providers. The Guwahati cluster is located 5 km, 4 km, and 1.4 km away from the three suppliers, respectively.

Conclusion:

For the purpose of identifying potential interventions that can boost the effectiveness and sustainability of the industry as well as for ensuring the welfare of the small-scale dairy farmers who make up the majority of the value chain's stakeholders, it is imperative to understand the various determinants of the informal dairy value chain. The primary variables of the informal dairy value chain in Kamrup district, according to the study, are market structure and size, production and procurement, pricing trends, animal management methods, market access and distribution. The study also emphasises the significance of solving the difficulties smallholder dairy farmers in the study area experience, including restricted access to inputs and markets, poor productivity, and price swings. The results of the study can be used to help create policies and initiatives that will increase the effectiveness and sustainability of the unorganised dairy industry in the study area. Notwithstanding the study's drawbacks, such as its district-specific focus and dependence on secondary and primary data sources, its conclusions offer important new information about the factors that influence the informal dairy value chain in the study area. The report emphasises the

significance of adopting a comprehensive and integrated strategy to address the difficulties the informal dairy sector in Assam and elsewhere is now experiencing.

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A Study on Inventory Management Practices at Purabi Dairy

Dr. Priyanka Borah
Assistant Professor
Gauhati Commerce College
Contact No: 8638951964
&
Areefa Ahmed
M.Com 4th Semester
Gauhati Commerce College
Contact No: 8133969029

Abstrat:
The term "inventory" refers to a collection of tangible assets -- finished goods (saleable), work-in-progress (convertible), and materials and supplies (consumables). Therefore, inventory refers to goods or materials a business plan to sell for a profit to customers. A key element of the supply chain is inventory management, which involves tracking inventory from manufacturers to warehouses and to marketing points. Inventory management consists of having the right products at the right time, and in the right place. To accomplish this, inventory visibility is necessary, so that one know when to order, how much to order, and where to store stocks. A firm must maintain an efficient inventory management system since inventories reflect its investment in funds. Inventory shortages cause interruptions in production and sales, while excessive inventories increase carrying costs and accumulate idle funds. Profit-making institutions are not the only ones with inventory problems. Institutions in the social and non-profit sectors encounter the same type of problems. This paper focuses on the consumption inventory management practices at Purabi Diary, in particular the factors, and the methods for stocking consumable items.
Key Words: Inventory, Purabi Diary, Management, Stock

INTRODUCTION:

Inventory is the goods or materials a business intends to sell to customers for profit. Inventory management consists of having the right products at the right time, and in the right place. To accomplish this, inventory visibility is necessary, so that one knows when to order, how much to order, and where to store stocks. Inventory management can be summarized in the following steps:

- **Purchasing Inventory:** Goods ready for sale are purchased and delivered to the warehouse or directly to the customer.
- **Storing Inventory:** In inventory storage, items are stored until they are needed. Shipment of goods or materials is handled across your fulfilment network.
- **Profiting From Inventory:** Controlling the amount of product available for sale. The finished goods are pulled to fulfil orders. Upon delivery, the products are received by the customers.

A firm must maintain an efficient inventory management system since inventories reflect its investment in funds. Inventory shortages cause interruptions in production and sales, while

excessive inventories increase carrying costs and accumulate idle funds. Profit-making institutions are not the only ones with inventory problems. Institutions in the social and non-profit sectors encounter the same type of problems. Consequently, efficient inventory management helps businesses maintain an appropriate balance between these two extreme conditions for smooth operations.

Management of Inventories allows a firm to determine where supplies are stored. The storage of small items may not be an issue for a firm, but when it comes to large goods, warehousing space must be utilized effectively. This project period focuses on the consumption inventory management practices at Purabi in particular the factors, and the methods for stocking consumable items.

BACKGROUND OF THE STUDY:

PURABI is the brand name for milk and dairy products manufactured by West Assam Milk Producers' Co-operative Union Ltd. (WAMUL). Approved by FSSAI, it is one of the largest and most active dairy units in entire North East India. WAMUL came into existence in 1976 as a milk union of Milk Producers' Co-operative of Nagaon, Morigaon, Goalpara, Nalbari and Kamrup districts of Assam. The Union was set up under the Operation Flood Programme of the National Dairy Development Board (NDDB) for dairy development in Assam. Over time, it has created a symbiotic relationship between milk producers, techno professionals, the market and the consumers. Today, WAMUL is managed by the National Dairy Development Board (NDDB) and markets an average daily quantity of over 50,000 litres of liquid milk and 7000 litres of milk products in Guwahati and the towns of Upper and Lower Assam.

PURABI PLANT SITES:

PURABI CATTLE FEED PLANT AT CHANGSARI:

The cattle feed processing plant is located 40 kilometres from Guwahati and can produce 100metric tons per day. In the year 1986, Purabi Cattle Feed Plant came into existence with the intention of providing cows and buffaloes with a healthy diet in exchange for quality fat & protein-containing milk. During 2010, the plant was in a decline state, but it was able to resume operation in 2022. The plant produces three products named as Compounded Cattle Feed Product, Mineral Mixture Product and By-Pass Protein Product.

Since proper diet plays an important role in the well-being of cattle, Compounded Cattle Feed Product is the main product of Purabi Cattle Feed Plant, which contains 11 main ingredients and few other mineral ingredients. A Compounded Cattle Feed Product contains sources of protein, energy, and fat. The other two products are supplement products called Mineral Mixture Product and By-pass Protein Product. Thus, the CFP is for Cattle Consumption.

PURABI LIQUID MILK PRODUCTION PLANT AT PANJABARI, GUWAHATI:

A fully automated milk processing unit, which can process 60,000 litres of milk each day. Furthermore, it produces paneer, cream, ghee, curd, lassi, and flavoured milk using a computerized manufacturing system. Thus, the LMP is for Human Consumption.

WAREHOUSE STRUCTURE:

The Purchase & Store Department also provides the framework for three prominent warehouse structures.

RAW MATERIALS & PACKAGING MATERIALS WAREHOUSE:

Raw material & packaging materials warehouses handle inventory purchases, storage of raw materials & packaging materials. An indent is made towards the suppliers. In general, there are three kinds of suppliers: L1, L2 & L3. In the event that L1 is unable to supply stockpiles due to uncertainty, L2 is contacted and a negotiation is conducted. For inventory purchased from outside party, the plant estimates a minimum lead period of 50 days. Whereas, for inventory purchased from a local party, the plant estimates a minimum lead period of 20 days considering the factors like transportation, unwanted incidents like vehicle accident, vehicle breakdown, production delay etc.

PRODUCTION WAREHOUSE:

Following the purchase of raw materials and packaging materials, the production warehouse begins manufacturing the final product. . The goods produced by Liquid Milk Production Plant are Milk & Milk Products such as Purabi Milk, Purabi Lassi, Purabi Ghee, Purabi Paneer, Purabi Dahi etc. and Cattle Feed Plant produces Cattle feed products such as Compounded Cattle Feed Product, Mineral Mixture Product and By-Pass Protein Product. To meet the market demand and supply, the production house produces a 10% variance from its market estimation.

FINISHED GOODS WAREHOUSE:

Finished goods warehouses oversee the final product management by both plants. Following the production process, the finished goods are supplied to the market, and the warehouse manager keeps track of the stock condition.

INVENTORY PROCESS:

The supply chain begins from the farmers from whom the milk is collected and the rate of the milk is paid based on the containment of fat, protein in the milk supplied. The milk supplied is then measured by the representatives of Dairy Cooperative Society (DCS).

Once the DCS collects the milk, it is stored in a Bulk Milk Cooling Centre (BMC) and then transported to a plant for processing into liquid milk products. As with the cattle feed product, the supply chain management is reversed. After the product is manufactured in the plant, it is transported by BMCs and stored by DCSs. The DCSs supply the product to the farmers for the good growth of their cattle by providing the nutrients to produce proper protein, and fat in a cattle's milk.

The plant forwards an invoice to its raw material suppliers based on:

- Minimum Order Quantity
- Safety Stock

- Reorder Point, which is reviewed after every 6 months of production.
- Reorder Quantity

TYPES OF INVENTORY MANAGEMENT PRACTICES AT PURABI

Inventory Management Practices adopted at both CFP & LMP are:
- Bin Cards
- Ledgers
- Physical Verification
- Stock Reconciliation

Additional Practices at LMP Are:
- House Keeping Practices
- House Keeping Practices
- Good Warehouse Practices
- Monthly Stock Assessment

Note: In the practice of inventory management, the Purchase & Store Department follows First in First out (FIFO) & First Expiry First out (FEFO) Methods.

FACTORS AFFECTING THE INVENTORY AND MEASURES TAKEN TO PREVENT THE PROBLEMS ASSOCIATED

Factors affecting the inventory are the following:
- Damages by pest
- Theft
- Manual Error
- Storage Losses
- Processing Losses

Measures taken to prevent inventory from problems associated are as follows:
- In order to control pests, pest control mechanisms have been implemented
- CCTV surveillance has been installed at both plants to prevent theft.
- A computerized data storage system has been implemented to prevent large manual errors.
- In the case of storage issues, measures such as infrastructure development and expansion of plant sites are taken

A BRIEF REVIEW OF THE LITERATURE

Gite, S. P. (2003); stated in the study that it may become much more expensive to manage the huge stock of the perishable commodity, as more units are likely to perish before the stock is fully

exhausted. Management for small amounts of stock may result in an inadequate inventory level due to the perishable nature of the commodity and hence, in turn, it increases the setup as well as the shortage cost. Thus, care should be taken to determine the procurement quantity, which minimizes the cost associated with the system.

Manohar, V. (2009); in his study stated that "All inventory Management is exactly wrong." Though this statement may be an exaggerated one yet the underlying truth in the statement is that with all methods and techniques of inventory management and control being practiced by various concerns, the sad fact is that inventory is still a poorly managed component of working capital. Inventory management is a vital facet of the finance of an undertaking in factit plays a pivotal role in keeping the wheels of the concern running. Management of inventory and its control is not a one-time job of the manager of a concern. It needs continuous offers, revisions and reviews, very much care and prudence.

Shah, T. R. (2011); has reviewed that to fulfil local demand for various milk and milk products, they have to rely on other cooperatives to distribute various milk and dairy 3 products in the local market, which again increases the logistics cost. Investment in advanced information technology is key to enhancing logistics flexibility. The coordination of different types of information flow such as demand, capacity, inventory and scheduling along a supply chain is a key to faster response to customer demands, lower inventories and lower costs associated with operations.

Pradhan, L. M. (2013); stated in the study that when the demand for an item fluctuates or is seasonal, Inventory helps in maintaining the economy by absorbing those fluctuations. An Inventory problem is nothing but to formulate or establish a relationship between the Controlled variable (quantity acquired by purchasing, production and by other means, the frequency or timing of acquisition etc) and uncontrolled variable (holding cost, shortage cost, setup cost, demand, lead time, the amount delivered etc). Completely deteriorated items are discarded and partially deteriorated items are offered for sale with a discount meeting the demand.

Barik, S. (2016); emphasized in the study that Inventory management is one of the important aspects of the production system as well as in business affairs. The early period of the inventory management system was mainly focused towards the study of simple inventory models. But with the progress of time, the model becomes more and more complicated due to various factors.

Karthik, M. (2018); in his study stated that it is found that better training design is provided by the Private dairy plants compared with Co-operative dairy plants. But better overall training and development are provided by Cooperative dairy plants compared with Private dairy plants. The Cooperative dairy units are under government undertaking units. Co-operative and Private dairy plants should provide external training to their employees. Both internal and external training and development programs have advantages not only for employees‟ development but also for the organization (Dairy plants) itself. If the performance of the employees is not good, it will affect the whole business organization.

Rajeswari, B. (n.d.) reviewed in her study that under a dynamic business environment handloom cooperative societies thrive on feeble or very low margins as they are labour intensive. Any faulting the raw material purchasing and inventory practices will have a strong impact on profitability and lead to other consequences. In the Fourth Plan, measures were taken 4 to activate

the Handloom Reservation Act and to strengthen the cooperativisation of handlooms. Handloom exports increased considerably.

OBJECTIVES OF THE STUDY:

Inventory management aims to match inventories' supply with expected demand, and maintain inventories' investment within prescribed limits set by top management. The inventory management process helps achieve a balance between these two conflicting goals. Thus, the objectives of this study are:

1. To examine the various practices adopted by the organisation for its management of inventory.
2. To analyze the effectiveness of the management practices through employee review.

RESEARCH METHODOLOGY :

Performing research operations requires a researcher to use methods or techniques. The purpose of research methodology is to solve a research problem systematically. It can be viewed as the study of how research is conducted. Research is often considered to be centred on it. As part of stating a research problem, a researcher follows typically several steps. Researchers must design their research methodology for their research topic since the same may differ from problem to problem.

(A)SOURCES OF DATA: For the purpose of carrying out the research, the data has been collected from primary data & secondary data.

• **Collection of Primary Data:** This study has been conducted with the help of primary data. Primary data has been collected by using questionnaires and observation method relevant to the study which was presented to the respondents to get the review.

• **Collection of Secondary Data:** The secondary data used in this study has been collected through various articles, books, reports, and websites.

(B) RESEARCH DESIGN: This study is descriptive in nature. It focuses on answering the how, what, when and where questions. It describes the inventory management practices done in the dairy industry and specifically in Purabi.

(C)SAMPLE SIZE AND SAMPLE UNIT: The study covers the two plant sites of Purabi located in Kamrup District of Assam. In this research study the total sample size is 9. As the inventory is looked by the Purchase & Store Department of the industry, the work here is mostly capital intensive than labour intensive. For the employees review is limited to 9 respondents.

(D) SAMPLING TECHNIQUES: The sampling technique adopted in this study is convenience sampling as the researcher has selected the sampling units as per convenience. The researcher has selected those samples that would have an idea 6 regarding the research topic or who would at least be able to understand the questions asked by the researcher and provide reliable answers. The sample selected was from a particular industry, the sample comprises of various employees of the Purchase & Store Department of Purabi.

(E) DATA ANALYSIS TECHNIQUE: The data is collected by questionnaire and observation, and they are analyzed using the percentage analysis method, tabular figures, pie diagrams, and columnar diagrams to visualize the data.

DATA ANALYSIS AND INTERPRETATION:

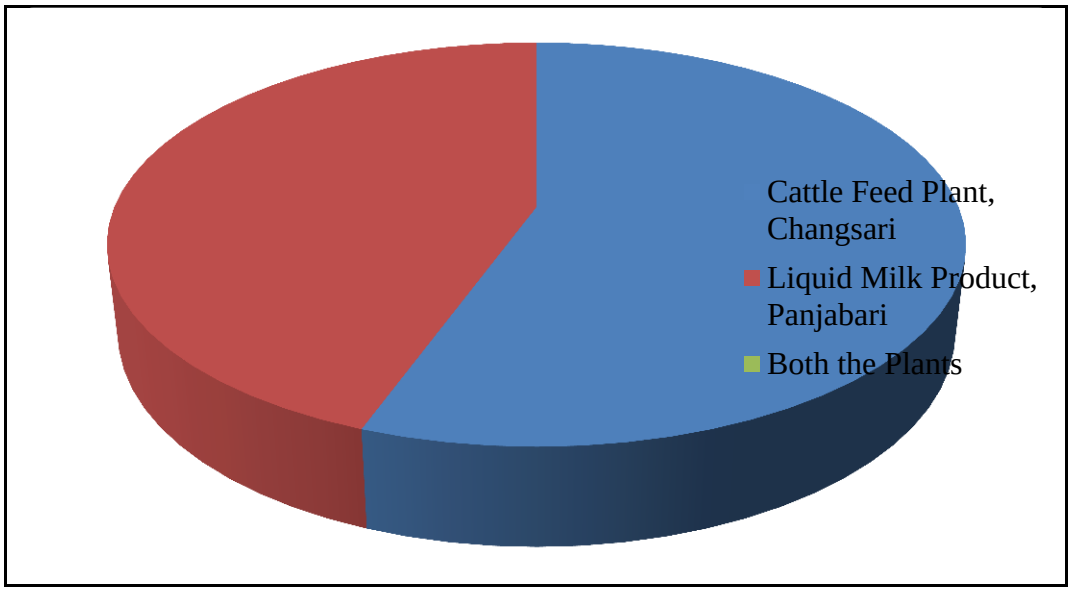
TABLE 1: DISTRIBUTION OF RESPONDENTS BASED ON WHICH PLANT SITE THEY WORK

SL. NO.	RESPONSES	NO. OF RESPONDENTS	PERCENTAGE OF RESPONDENTS
1	Cattle Feed Plant, Changsari	5	55.6
2	Liquid Milk Product, Panjabari	4	44.4
3	Both the Plants	0	0
TOTAL		**9**	**100**

Source: Field Survey, February 2023

CHART 1: DISTRIBUTION OF RESPONDENTS BASED ON WHICH PLANT SITE THEY WORK

Pie diagram showing the distribution of respondents based on which plant site they work



Source: Table 1

INTERPRETATION:

It is observed from the Chart 1 that out of 9 respondents,
55.6% of the respondents work in the Purabi Cattle Feed Plant, Changsari.
44.4% of the respondents work in the Purabi Liquid Milk Plant, Panjabari.

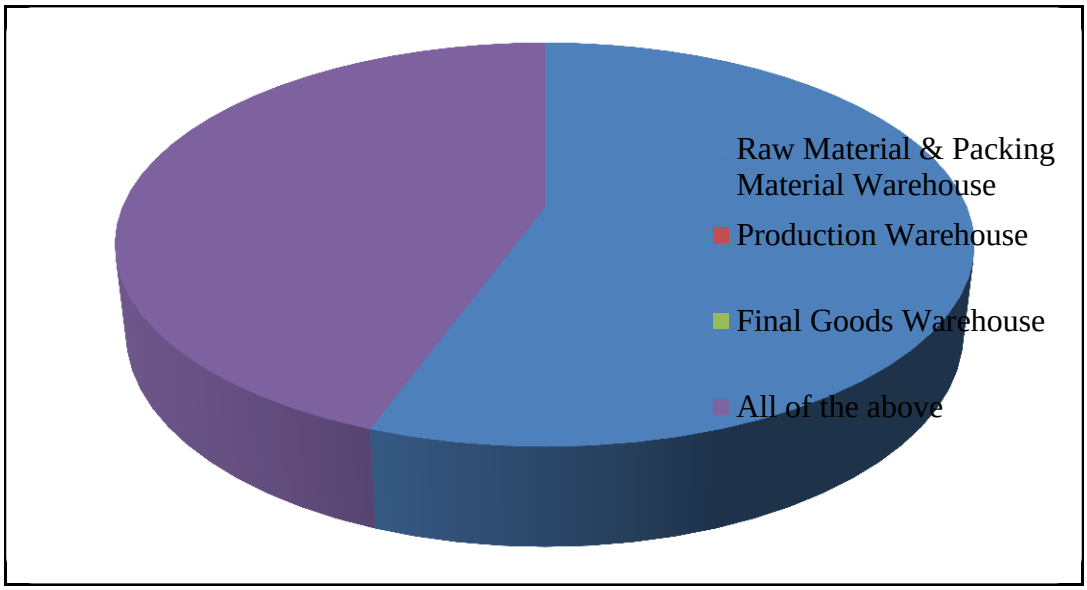
TABLE 2: DISTRIBUTION OF RESPONDENTS WORKING IN THE VARIOUS STORE & PURCHASE WAREHOUSES

SL. NO.	RESPONSES	NO. OF RESPONDENTS	PERCENTAGE OF RESPONDENTS
1	Raw Material & Packing Material Warehouse	5	55.6
2	Production Warehouse	0	0
3	Final Goods Warehouse	0	0
4	All of the above	4	44.4
TOTAL		**9**	**100**

Source: Field Survey, February 2023

CHART 2: DISTRIBUTION OF RESPONDENTS WORKING IN THE VARIOUS STORE & PURCHASE WAREHOUSES

Pie diagram showing the distribution of respondents working in the various store & purchase warehouses.



Source: Table 2

INTERPRETATION:

It is observed from the Chart 2 that out of 9 respondents,

5.6% of the respondents work in the Raw Material & Packaging Material Warehouse.

4.4% of the respondents work in the all the three warehouses i.e. Raw Material & Packaging Material Warehouse, Production Warehouse and Finished Goods Warehouse.

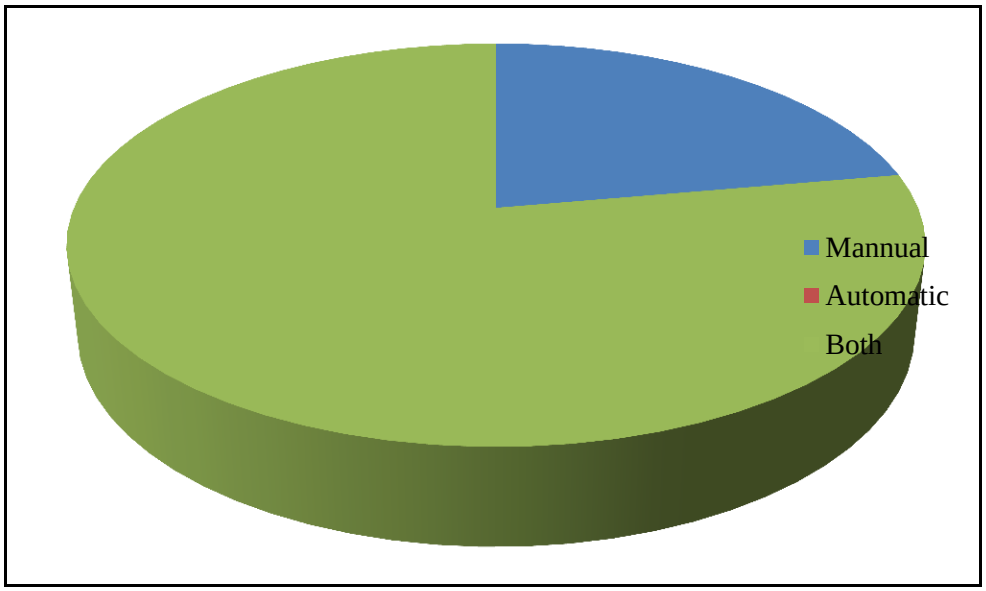
TABLE 3: DISTRIBUTION OF RESPONDENTS BASED ON THE USE OF METHODS TO TAKE INVENTORY AND VERIFY IT

SL. NO.	RESPONSES	NO. OF RESPONDENTS	PERCENTAGE OF RESPONDENTS
1	Manual	2	22.2
2	Automatic	0	0
3	Both	7	77.8
TOTAL		**9**	**100**

Source: Field Survey, February 2023

CHART 3: DISTRIBUTION OF RESPONDENTS BASED ON THE USE OF METHODS TO TAKE INVENTORY AND VERIFY IT

Pie diagram showing the use of methods to take inventory and verify it



Source: Table 3

INTERPRETATION:

It is observed from the Chart 3 that out of 9 respondents,

22.2% of the respondents practice manual methods to take inventory and verify it.

7.8% of the respondents practice both manual and automatic methods to take inventory and verify it.

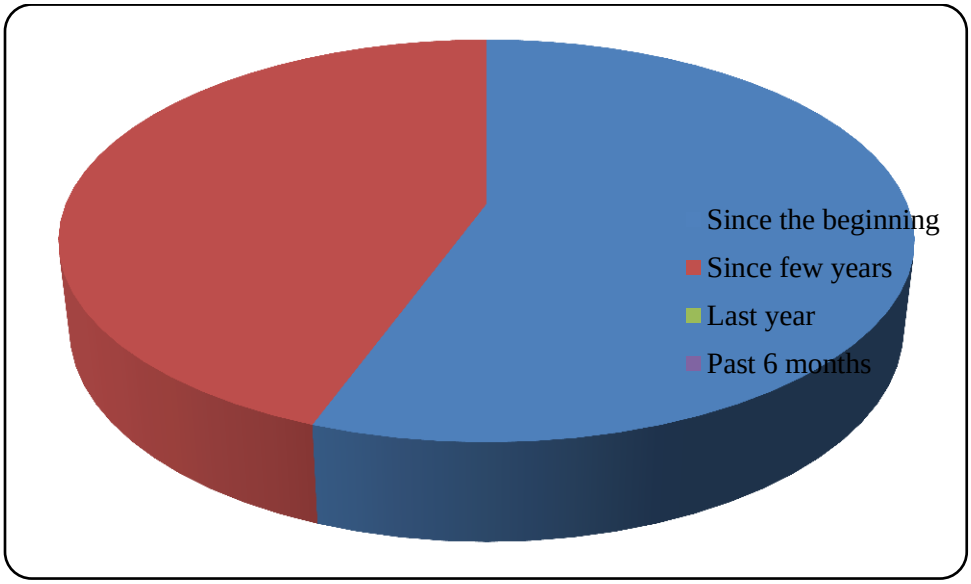
TABLE 4: DISTRIBUTION OF RESPONDENT'S REVIEW ON THE IMPLEMENTATION OF THE INVENTORY MANAGEMENT METHODS

SL. NO.	RESPONSES	NO. OF RESPONDENTS	PERCENTAGE OF RESPONDENTS
1	Since the beginning	5	55.6
2	Since few years	4	44.4
3	Last year	0	0
4	Past 6 months	0	0
TOTAL		**9**	**100**

Source: Field Survey, February 2023

CHART 4: DISTRIBUTION OF RESPONDENT'S REVIEW ON THE IMPLEMENTATION OF THE INVENTORY MANAGEMENT METHODS

Pie diagram showing the distribution of respondent's review on the implementation of the inventory management methods



Source: Table 4

INTERPRETATION:

It is observed from the Chart 4 that out of 9 respondents,

5.6% of the respondents reviewed that the inventory management methods were implemented since the beginning.

4.4% of the respondents reviewed that the inventory management methods were implemented since few years.

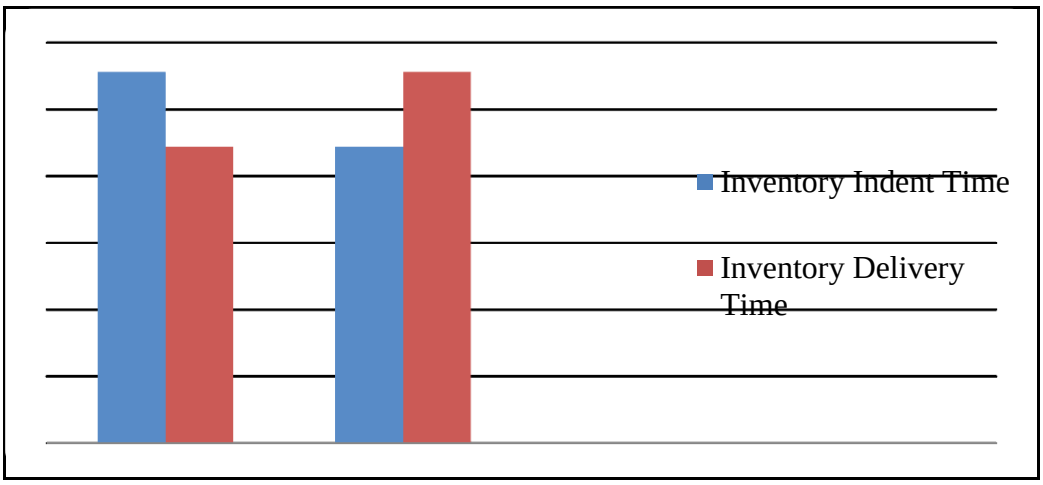
TABLE 5: DISTRIBUTION OF RESPONDENTS BASED ON THE EFFECTIVENESS OF INVENTORY INDENT TIME AND INVENTORY DELIVERY TIME

SL. NO.	RESPONSES	NO. OF RESPONDENTS		PERCENTAGE OF RESPONDENTS	
		Inventory Indent Time	Inventory Delivery Time	Inventory Indent Time	Inventory Delivery Time
1	Highly Effective	5	4	55.6	44.4
2	Effective	4	5	44.4	55.6
3	Less Effective	0	0	0	0
4	Not Effective	0	0	0	0
TOTAL		9	9	100	100

Source: Field Survey, February 2023

CHART 5: DISTRIBUTION OF RESPONDENTS BASED ON THE EFFECTIVENESS OF INVENTORY INDENT TIME AND INVENTORY DELIVERY TIME

Column Chart showing the effectiveness of inventory indent time and inventory delivery time



Source: Table 5

INTERPRETATION:

It is observed from the Chart 5 that out of 9 respondents,

55.6% of the respondents reviewed the inventory indent time as highly effective, whereas 44.4% of the respondents reviewed the inventory indent time as effective.

Similarly, 44.4% of the respondents reviewed the inventory delivery time as highly effective, whereas 55.6% of the respondents reviewed the inventory delivery time as effective.

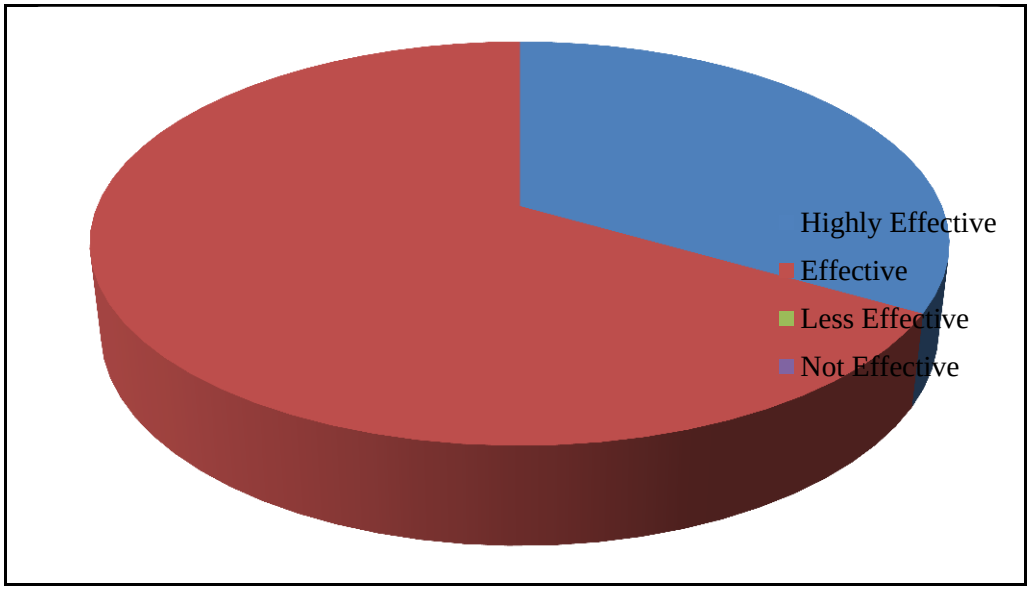
TABLE 6: DISTRIBUTION OF RESPONDENTS BASED ON THE EFFECTIVENESS OF THE INVENTORY TURNOVER IN THE PAST YEARS

SL. NO.	RESPONSES	NO. OF RESPONDENTS	PERCENTAGE OF RESPONDENTS
1	Highly Effective	3	33.3
2	Effective	6	66.7
3	Less Effective	0	0
4	Not Effective	0	0
TOTAL		**9**	**100**

Source: Field Survey, February 2023

CHART 6: DISTRIBUTION OF RESPONDENTS BASED ON THE EFFECTIVENESS OF THE INVENTORY TURNOVER IN THE PAST YEARS

Pie diagram showing the distribution of respondents based on the effectiveness of the inventory turnover in the past years



Source: Table 6

INTERPRETATION:

It is observed from the Chart 6 that out of 9 respondents,

33.3% of the respondents reviewed the inventory turnover in the past years as highly effective.

66.7% of the respondents reviewed the inventory turnover in the past years as effective.

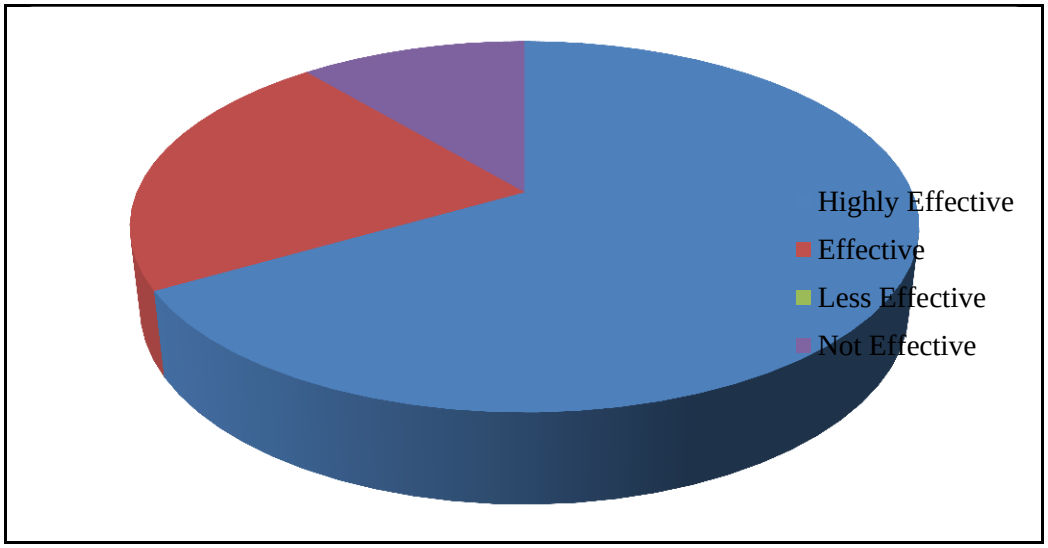
TABLE 7: DISTRIBUTION OF RESPONDENTS BASED ON THE EFFECTIVENESS WHILE USING BIN CARDS

SL. NO.	RESPONSES	NO. OF RESPONDENTS	PERCENTAGE OF RESPONDENTS
1	Highly Effective	6	66.7
2	Effective	2	22.2
3	Less Effective	0	0
4	Not Effective	1	11.1
TOTAL		**9**	**100**

Source: Field Survey, February 2023

CHART 7: DISTRIBUTION OF RESPONDENTS BASED ON THE EFFECTIVENESS WHILE USING BIN CARDS

Pie diagram showing the distribution of respondents based on the effectiveness while using bin cards



Source: Table 7

INTERPRETATION:

It is observed from the Chart 7 that out of 9 respondents,

66.7% of the respondents reviewed the effectiveness of using bin cards as highly effective.

22.2% of the respondents reviewed the effectiveness of using bin cards as effective.

11.1% of the respondents reviewed the effectiveness of using bin cards as not effective.

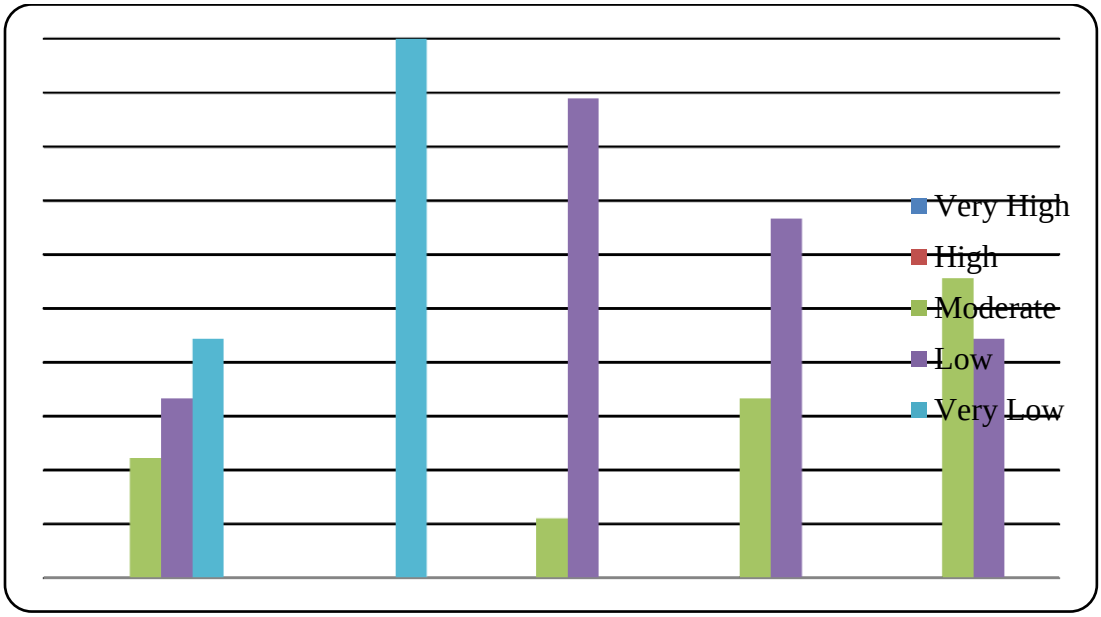
TABLE 8: DISTRIBUTION OF RESPONDENT'S REVIEW ON PROBLEMS ASSOCIATED WITH STORING INVENTORIES

Sl. No.	RESPONSES	NO. OF RESPONDENTS					PERCENTAGE OF RESPONDENTS				
		Damages by Pest	Theft	Manual Error	Storage losses	Processing losses	Damages by Pest	Theft	Manual Error	Storage losses	Processing losses
1	Very High	0	0	0	0	0	0	0	0	0	0
2	High	0	0	0	0	0	0	0	0	0	0
3	Moderate	2	0	1	3	5	22.3	0	11.1	33.3	55.6
4	Low	3	0	8	6	4	33.3	0	88.9	66.7	44.4
5	Very Low	4	9	0	0	0	44.4	100	0	0	0
TOTAL		9	9	9	9	9	100	100	100	100	100

Source: Field Survey, February 2023

CHART 8: DISTRIBUTION OF RESPONDENT'S REVIEW ON PROBLEMS ASSOCIATED WITH STORING INVENTORIES

Column Chart showing the distribution of respondent's review on problems associated with storing inventories



Source: Table 8

INTERPRETATION:

It is observed from the Chart 8 that out of 9 respondents,

22.3% of the respondents reviewed there are moderate damages by pest, 33.3% of the respondents reviewed there are low damages by pest and 44.4% of the respondents reviewed there are very low damages by pest.

100% of the respondents reviewed there are very low theft.

11.1% of the respondents reviewed there are moderate manual error and 88.9% of the respondents reviewed there are manual error.

33.3% of the respondents reviewed there are moderate storage losses and 66.7% of the respondents reviewed there are low storage losses.

55.6% of the respondents reviewed there are moderate processing losses and 44.4% of the respondents reviewed there are moderate storage losses.

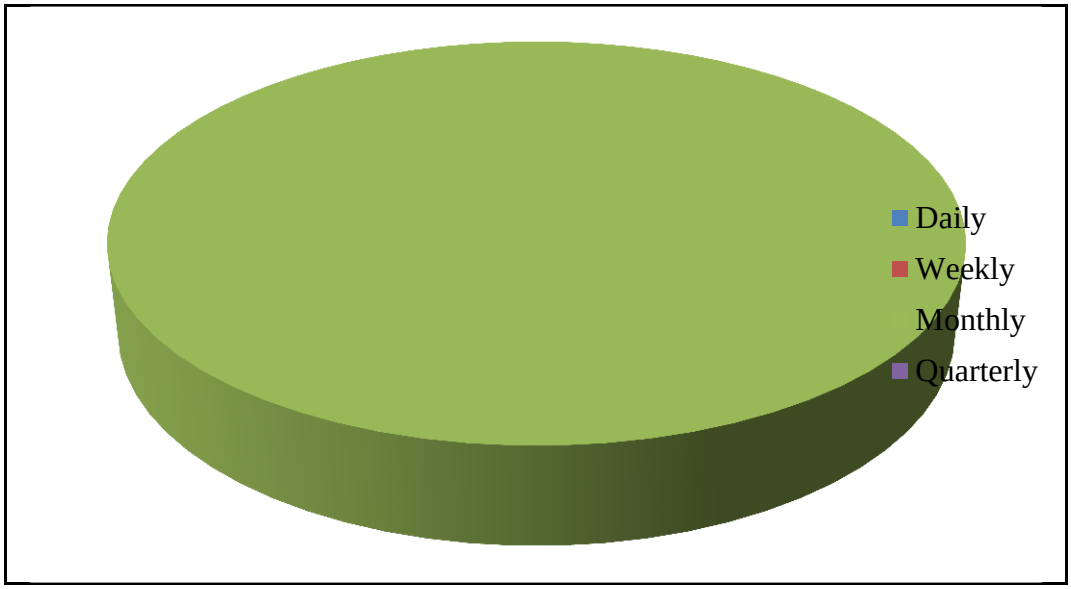
TABLE 9: DISTRIBUTION OF RESPONDENTS BASED ON THE FREQUENCY OF INVENTORY ASSESSMENTS

SL. NO.	RESPONSES	NO. OF RESPONDENTS	PERCENTAGE OF RESPONDENTS
1	Daily	0	0
2	Weekly	0	0
3	Monthly	9	100
4	Quarterly	0	0
TOTAL		**9**	**100**

Source: Field Survey, February 2023

CHART 9: DISTRIBUTION OF RESPONDENTS BASED ON THE FREQUENCY OF INVENTORY ASSESSMENTS

Pie Chart showing the distribution of respondents based on the frequency of inventory assessments



Source: Table 9

INTERPRETATION:

It is observed from the Chart 9 that out of 9 respondents, 100% of the respondents mentioned that inventory assessments are done monthly basis.

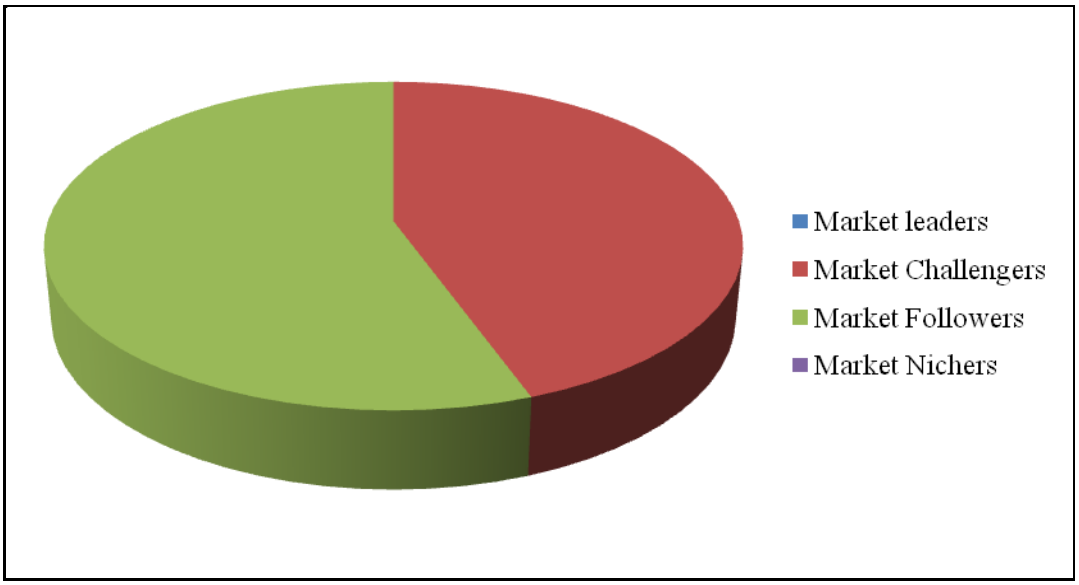
TABLE 10: DISTRIBUTION OF RESPONDENT'S REVIEW BASED ON THE FIRM'S MARKET STAND THROUGH THE INVENTORY PRACTICES

SL. NO.	RESPONSES	NO. OF RESPONDENTS	PERCENTAGE OF RESPONDENTS
1	Market leaders	0	0
2	Market Challengers	4	44.4
3	Market Followers	5	55.6
4	Market Nichers	0	0
TOTAL		**9**	**100**

Source: Field Survey, February 2023

CHART 10: DISTRIBUTION OF RESPONDENT'S REVIEW BASED ON THE FIRM'S MARKET STAND THROUGH THE INVENTORY PRACTICES

Pie Chart showing the distribution of respondent's review based on the firm's market stand through the inventory practices



Source: Table 10

INTERPRETATION:

It is observed from the Chart 10 that out of 9 respondents,

44.4% of the respondents reviewed the firm's market stand through the inventory practices as Market Challengers.

55.6% of the respondents reviewed the firm's market stand through the inventory practices as Market Followers.

FINDINGS OF THE STUDY

From the study, it is found that the plant sites are more of capital intensive than of labour intensive. Moreover, the firm uses both manual and automatic practices to take inventory and verify it. The implementations of such methods are from the beginning and the inventory management practices are conducted at three warehouse i.e. Raw Materials & Packaging Materials Warehouse, Production Warehouse and Finished goods warehouse.

It is found that, the store manager uses BIN CARDS and ERP system for taking inventory and verifies it. The use of BIN CARDS have been highly effective which has resulted in effective inventory turnover in the past years. The problems associated with the inventory management are less as proper measures are taken timely.

Inventory assessments are done monthly at both the Plant sites due to which the problems associated with inventory are less as proper measures are taken timely.

CONCLUSION

India's dairy industry traces its roots to the white revolution, and it has played a significant role in the nation's economy. The study is conducted on the inventory management practices of West Assam Milk Producers Cooperation ltd., which is not a cooperative industry but a cooperative society. The focus of the study is also on the effectiveness of the inventory management practices implemented in the Purchase & Store Department, as a result of employee review. Through the effectiveness of inventory management practices, one can find the inventory process, hygiene factor, cost factor, demand analysis, supply chain, diversion of suppliers, market position, and so forth. For these reasons, this study helps the users to gain a better understanding of the dairy production house in Assam. As a result of the study, it has also been learned that another form of ODS, namely the One Day Stock, is used by a few industries to meet consumer demand and improve working capital. In today's businesses, the Inventory Management Department is more capital-intensive, which contributes to the rapid growth of FMCG (Fast Moving Consumer Goods). As a final note; inventory management contributes greatly to the production system as well as business operations

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A study on Pradhan Mantri Fasal Bima Yojana (PMFBY) in Kamrup District of Assam

Ms. Kritika Das
PhD Research Scholar, KKHSOU, daskritikam4@gmail.com
Subham Thakur
M.A. Economics, Pandu College (Gauhati University) subhamthakur0137@gmail.com
Jahanara Khatun
M.A. Economics, Pandu College (Gauhati University) kjahanara80@gmail.com

ABSTRACT
Since independence India has witnessed various peaks and troughs in the agricultural sector. Though the first five-year plan emphasized thoroughly on the growth of agriculture, the second plan totally neglected it. The experience of the last plan compelled the Government to prioritize the agricultural sector as it is the backbone of the Indian Economy. However, in recent years, indebtedness, crop failures, non-remunerative prices and poor returns have led to agrarian grief in many parts of the country. To tackle these problems, the government has come up with various mechanisms viz. insurance, direct transfers and loan waivers. In February 2016, the government launched the crop insurance scheme, Pradhan Mantri Fasal Bima Yojana (PMFBY) to safeguard the interest of the farmers.
This study is conducted to study the performance of Pradhan Mantri Fasal Bima Yojana (PMFBY) in Assam over the years. It also analyses the socio-economic profile of the farmers and their perception towards the scheme in Kamrup district of Assam. The study is based on both primary and secondary data and appropriate statistical tools have been used to analyse the data. Initially it was observed that there was a decline in the percentage of farmers but after 2019 there was a sharp increase in the percentage of farmers taking up the scheme.
Keywords: PMFBY, economy, agriculture, farmers, crop insurance

INTRODUCTION

Agriculture has been the backbone of the Indian economy despite coordinated industrialization in the last few decades. The agricultural sector, which is the largest contributor of work force, accounted for sizeable 19.9% (2021-22) in Gross Value Added (GVA) of the nation registering a real GDP growth of 8.7% in 2021-22. It also plays an important role in the field of international trade and economic planning. But due to natural disasters like droughts, floods, cyclones, storms, landslides and earthquakes, Indian agricultural production and farm incomes are frequently affected. Apart from these disasters it has also experienced the outbreak of COVID-19 epidemic and man-made disasters such as fire, sale of spurious seeds, fertilizers and pesticides, price fluctuations etc. which has also affected the agriculture. The North Eastern part of India namely Assam, Arunachal Pradesh and Sikkim have diverse agricultural production owing to its varied climatic conditions. These regions suffer losses due to the natural calamities and therefore, crop insurance is considered to be an effective solution. It helps to safeguard the farmers from unforeseen contingencies and ensure their income by promoting and encouraging technology,

investment and credit flow. Sighting that the Government of India launched the Pradhan Mantri Fasal Bima Yojana (PMFBY) on February 18, 2016 by replacing National Agriculture Insurance Scheme (NAIS) and Modified National Agriculture Insurance Scheme (MNAIS). PMFBY is currently the largest crop insurance scheme in the world in terms of farmer enrolments, averaging 5.5 crore applications every year and the third largest in terms of premiums received. The main objective of the scheme is to provide financial support to farmers suffering crop damage arising out of unforeseen events and stabilize their income. The scheme also encourages the farmers to adopt innovative and modern agricultural practices to ensure flow of credit to the agricultural sector. It in turn contributes to food security, crop diversification and enhance growth and competitiveness of agriculture sector besides protecting farmers from production risks.

REVIEW OF LITERATURE

Rahul Mothukuri and Dr. Jahanara (2022) in their research article entitled "Assessment of Pradhan Mantri Fasal Bima Yojna on Farmers in Prakasam district of Andhra Pradesh" found that most of the respondent had opined that PMFBY gave better indemnity to the insured farmers than the earlier schemes like National Agricultural Insurance Scheme (NAIS). The premium rate for PMFBY was lower compared to the earlier insurance schemes. The researcher highlighted that to improve the socio-economic conditions of the farmers PMFBY was a necessity.

Meenu Punia, Parveen Kumar Nimbrayan and K.K.Yadav (2021) in their research article entitled "Problems, Prospects and Policy Recommendations of Crop Insurance Schemes" found that the farmers faced various problems like delay in claim settlement, inadequate implementation, and inaccurate yield of estimation and lack of awareness. The study suggested that assessment of losses should be done as soon as possible without much delay. It was also assessed that implementation procedure should be easy and quick because without proper implementation and modern infrastructure a crop insurance scheme was lucrative for the farmers as well as insurance companies.

Nishi Jain, K.N Pathak, Abhilasha Sharma, R.S. Gurjar, Sharukh Khan and Reena Bhawel (2020) in their research article "Perception of Farmers towards Pradhan Mantri Fasal Bima Yojana (PMFBY) in Sehore Block of Sehore District Madhya Pradesh" found that the profile characteristics of the farmers and their perception towards Pradhan Mantri Fasal Bima Yojana (PMFBY) the relationship between eleven attributes i.e., education, size of land holding, annual income, farming experience, source of information, extension contact, extent of awareness towards crop insurance, risk orientation, economic motivation, mass media exposure and achievement motivation were found to be significantly related with the perception towards Pradhan Mantri Fasal Bima Yojana (PMFBY).

P.Santhi and S.Sangeetha (2020) in their research article "Prediction of Farmers Access to Pradhan Mantri Fasal Bima Yojna (PMFBY) using Discriminant Analysis" revealed that there was lack of awareness among farmers. It was found that the farmers had insured small portion of cropped area in order to enjoy the benefits of full insurance. The researcher also highlighted that the speedy disbursal of compensation after one season would financially support the farmers to avail the crop insurance for the following season.

RESEARCH GAP

The review of literature exhibits that the farmers of different states of India has presented a mixed response towards PMFBY. No extensive study regarding this scheme has been carried out in Kamrup district of Assam. Therefore, this research paper tries to analyze the performance of this scheme in Assam. Also, it further studies the socio-economic status and perception of the farmers availing PMFBY in Kamrup district of Assam.

OBJECTIVES OF THE STUDY

- To study the performance of PMFBY across Assam.
- To study the socio-economic profile of the farmers in Kamrup district of Assam.
- To study the perception of the farmers regarding PMFBY in Kamrup district of Assam.

RESEARCH METHODOLOGY

Descriptive research design was followed in the present study. Descriptive research studies are those studies which are concerned with describing the characteristics of a particular individual, or of a group. The study was conducted in Kamrup district of Assam from the time period of 2016-17 to 2022-23. Kamrup being a large area, only two sub districts (Tehsil) i.e., Hajo and Chaygaon were taken for the study. The total number of farmers availing the scheme in the two sub-districts were 1667. A sample size of 217 from 10 villages of the two sub-districts were taken on the basis of intensity of agricultural activities, wherein farmers who have insured crops under the PMFBY Scheme were identified purposively, as the sample respondents. Accordingly, 217 farmers were identified from Ukhura (8), Sarabari (42), No. 1 Saradampura (13), Dihina (43), Milaghat (19), Manah Kuchi (20), Kamarpur (22), Japia (15), Janburi 1 & 2 (27) and Hirajani (8).

The study was based on both primary and secondary data. Secondary data were collected from published and unpublished sources which included:

- Directorate of Agriculture, Guwahati, Assam
- PMFBY Website
- Economic survey of India

Primary data were collected from farmers of Kamrup district of Assam. Simple Random Sampling method was used to select the farmers under PMFBY from the study area i.e., Kamrup district of Assam. Data were collected with the help of schedule, questionnaires and interview method. Collected data were analyzed with the help of statistical tools by using MS Excel which are as follows:

- Percentage analysis
- Diagrammatic representation of the data
- Correlation analysis

RESULTS AND DISCUSSIONS

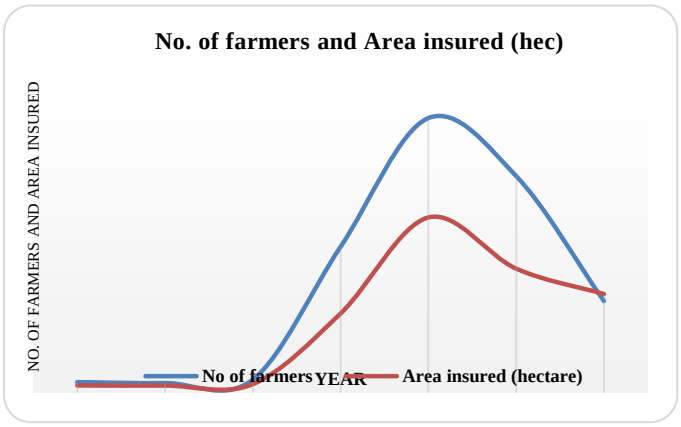
The results of data analysis are presented below:

Objective 1: To study the performance of PMFBY across Assam: This objective seeks to analyze the performance of PMFBY across Assam in terms of number of farmers who enrolled, amount of area insured (hectares) and sum insured (crores) over the years from 2016-17 to 2022-23.

Table 1: Performance of PMFBY across Assam from 2016-17 to 2022-23

Year	No of farmers	Area insured (hectares)	Sum insured (crores)
2016-17	60265 (Nil)	41785.19 (Nil)	244.79 (Nil)
2017-18	55260 (-4.03)	41230.41 (-1.33)	252.79 (3.26)
2018-19	73981 (33.88)	49055.48 (18.98)	316.44 (25.17)
2019-20	816389 (1003.51)	443869.6 (804.83)	2900.04 (816.45)
2020-21	1535681 (88.11)	980382.86 (120.87)	6940.36 (139.31)
2021-22	1211301 (-21.12)	694275 (-29.18)	4545.45 (-34.50)
2022-23	513118 (-57.64)	552240 (-20.46)	2485.84 (-45.31)

(Source: Directorate of Agriculture, Guwahati Assam)



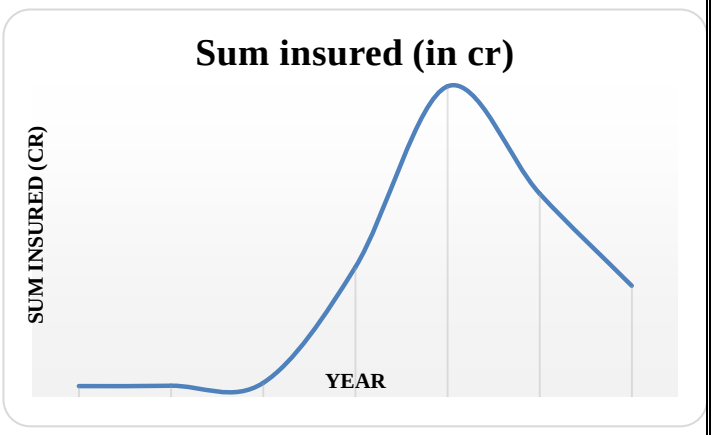


Figure 1.1 **Figure 1.2**

Table 1 depicts that after the implementation of PMFBY in Assam the number of farmers availing crop insurance have initially declined due to the lack of knowledge about the scheme and Aadhar compulsion. However, in 2019-20 there was a steep increase in the numbers due to spread of awareness regarding the benefits of the scheme. Before 2022, the premium rate was only □1 which later increased to □ 100 thereby resulting in the decrease of insurers.

The correlation coefficient (0.96) shows high degree positive correlation between number of farmers and area insured.

Objective 2: To study the socio-economic profile of the farmers in Kamrup district of Assam: This objective seeks to find out the socio-economic profile of the farmers in terms of their age, gender, religion, education, marital status, family size, no. of family members engaged in farming, yearly farm income, classification of farmers and area insured.

Table 2: Socio Economic profile of the sample farmers under PMFBY n=217

Variables ⬇ No. of respondents ➡		No. of respondents	Percentage (%)
Age (in years)	Up to 40	85	39.17
	40 to 60	110	50.70
	60 &above	22	10.13
Gender	Male	198	91.24
	Female	19	8.76
Religion	Hindu	97	44.71
	Muslim	120	55.29
Education	Illiterate	32	14.76
	Schooling	156	71.88
	Graduate	29	13.36
Marital status	Unmarried	56	25.81
	Married	161	74.19
Family size	Up to 4	60	27.65
	4 &above	157	72.35
No of family members in the farming	Up to 2	68	31.34
	2 to 4	100	46.08
	4 &above	49	22.58
Farming is primary occupation	Yes	158	72.81
	No	59	27.19
Yearly farm income	Below 1 L	23	10.59
	1 L to 1.5 L	76	35.04
	1.5 to 2 L	107	49.31
	2 L & above	11	5.06
Classification of farmers	Small	142	65.43
	Marginal	72	33.18
	Large	3	1.39
Area insured (in hectares)	0.01 to 0.1	17	7.83
	to 1	150	69.13
	1 & above	50	23.04

(Source: Primary data)

On analysis the socio-economic profile of the farmers showed that majority (50.70%) were of age group 40 to 60. Male farmers constituted 91.24% and female farmers 8.76%. Majority of the sample farmers followed Muslim religion 55.29% whereas of Hindu were 44.71%. The farmers were mainly educated up to schooling (71.88%) and graduation (13.36%). Approximately 14.76 % of the sample farmers were illiterate. The respondents were predominantly married (74.19%). The family size showed 72.35% of the total sample farmers had more than 4 members in their families whereas 27.65% had up to 4 members. The number of family members participating in the farming were 46.08% have 2 to 4 members, 31.34% were of up to 2 members and 22.58 had 4 & above. Agriculture was the primary occupation for 72.81% of the farmers and 27.19% were engaged in different activities like private jobs, banking, press etc. Majority (49.31%) of the farmers belonged to the yearly income group 1.5 lakhs to 2 lakhs. The sample farmers were classified into small (65.43%), marginal (33.18%) and large (1.39%) and majority (69.13%) of farmers insured 0.1 to 1 hectare of land.

Objective 3: To study the perception of the farmers regarding PMFBY in Kamrup district of Assam: This objective seeks to find out the perception of the farmers in terms of whether the farmers are fully satisfied with the scheme in Kamrup district of Assam.

Table 3: Perception of the sample farmers regarding PMFBY

n=217

Sl No.	STATEMENTS	Perception		
		Agree %	Neutral %	Disagree %
1	It is mandatory for all the farmers to get crop insurance	94.0	4.6	1.4
2	All crops must be notified under crop insurance	100.0	0.0	0.0
3	The premium rate for Pradhan Mantri Fasal Bima Yojana (PMFBY) is lower compared to earlier insurance schemes.	92.2	4.6	3.2
4	The premium which is to be paid by the farmers for Pradhan Mantri Fasal Bima Yojana (PMFBY) should be paid by the government.	73.7	5.5	20.7
5	The Pradhan Mantri Fasal Bima Yojana (PMFBY) helps in attracting and retaining youth in agriculture.	2.3	46.1	51.6
6	The Pradhan Mantri Fasal Bima Yojana (PMFBY) is necessary for improvement of socio-economic conditions of the farmers.	13.4	26.3	60.4
7	Use of smart phones/drones are ideal measure for assessment of crop damage	9.7	87.6	2.8
8	I'm satisfied with Pradhan Mantri Fasal Bima Yojana (PMFBY).	24.4	57.1	18.4

(Source: Primary data)

The results furnished in table 3 revealed the opinions of the respondents about PMFBY. 94% respondents are of the view that it is very helpful for the farmers to take crop insurance. 100% respondents agreed that all the crops should be notified under crop insurance. 92.2% respondents agreed that the premium rate of PMFBY is lower as compared to other insurance schemes. They pay an approximate amount of □100-200 per month as premium. 73.7% respondents agreed that it would be better if the premium is paid by the government rather than the farmers themselves. Only 2.3% respondents agreed that PMFBY helps in attracting and retaining youth in agriculture. 13.4% respondents agreed that PMFBY is necessary for improvement of socio-economic condition of the farmers. 9.7% respondents agreed that use of smart phones/ drones is ideal measure for assessment of crop damage. 24.4% respondents opined that they are satisfied with the scheme.

SUGGESTIONS

The respondents were of the view that there was delay in transmitting information regarding insurance.

The respondents suggested that the procedure of PMFBY is difficult to understand. The paper work and official procedure should be reduced and simplified for successful implementation of crop insurance.

A few respondents suggested that the perennial horticultural crops and pisciculture should also be included under the scheme.

The respondents suggested that the insurance should include the localized risks like crop losses through pests and disease, attacks of wild animals etc. Moreover, the unseasonal rain should also be defined clearly in operational guidelines of PMFBY.

The respondent's suggested that loss estimation process should be defined. For the purpose of settlement of claims feasibility of technology should be assessed using of satellite imagery. For identification of cultivators, who have really lost their crops as well as in defining the claim amount, the village Panchayat should actively participate.

A few respondents were of the view that since the upcoming generation is losing their interest towards agriculture, there's a need to bring about amendment in the schemes. According to them, the returns from agriculture is low and therefore they chose other profession over agriculture.

Awareness programmes, workshops, vocalized trainings must be conducted for the farmers so that they can avail the scheme without any hurdle.

Better use of remote sensing technology, smartphones and drones for quick estimation of crop losses will ensure early settlement of claims.

CONCLUSION

Crop insurance is one of the ways to safeguard the interests of the farmers from unexpected consequences. PMFBY has helped to enhance the growth of agricultural sector in the country. The study presented a mixed response from the farmers. It has been found that almost 24% of the farmers think that PMFBY has made the farmers self-sufficient. PMFBY has been found beneficial by a few farmers since government has been providing solar powered irrigation system for water pumping and also a premium of □100 is considered to be very minimal to afford. Many farmers opined that scheme like PMFBY helps in retaining farmers in the field as it helps improving their

health. However, there are various drawbacks such as lengthy formalities, delay of claims, online registration which make the farmers deviate from the scheme.

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Study on socio economic status of dairy farmers and its impact on environment at Topatoli village of Kamrup Metropolitan district of Assam, India

Raghu Tamang
PhD research scholar at Council of Scientific & Industrial Research- North East Institute of Science & Technology (CSIR-NEIST), Jorhat.
Former student of Dimoria College, Khetri

Dr. Pratap Chutia, PhD, PDF, NET
Head of the Department of Environmental Management, Dimoria College, Khetri

Dulumoni Talukdar
Assistant Professor
Department of Environmental Management, Dimoria College, Khetri

Bhaskar Dev Swargeary
Assistant Professor
Department of Environmental Management, Dimoria College, Khetri

Durlov Jyoti Kalita, Ex Assistant Professor
Department of Environmental Management, Dimoria College, Khetri
Current Designation: Assistant Professor at Daffodil College of Horticulture, Khetri.

Abstract

This study was conducted to analyze the socio economic status of dairy farmers and impact of dairying practice on the environment at Topatoli village of Kamrup (M) district of Assam, India. The research employed both quantitative and qualitative methods using the questionnaire method to answer the research questions and structured face to face in-depth interviews to complement the quantitative findings.

In the study area out of 21 respondents, 90.48% dairy farmers were primarily involved in dairying practice and the only source of their livelihood. The respondents with income >50000 thousand per month constitute 14.28%. Income between 21000-30000 and 31000-40000 constitute the same percentage that is 9.52%.The highest percentage of respondents with 52.38% with range between 11000-20000 per month.

In this study it was found that dairy farming in the study area is affected by geographical factors such as land availability, climate, vegetation cover, transportation and communication, irrigation, dairy cooperative and population. Dairy farming requires a good amount of money for purchasing dairy animal, construction of herd, feed, maintenance and management of dairy farming activities.

Due to lack of money, proper maintenance and management of dairying at the study area was not seen during survey period. The entire respondents were not able to generate biogas from the available cow dung due to financial problem. 42. 86% of the respondents were inherited dairy farming and practicing it from generation to generation. Other 42.86% farmer respondents started dairy farming from bank loan. The village consists of 900 households where only 21 households practicing it. As, dairy farming requires a huge amount of capital to start dairying practice, hence we can say that dairy farming is highly effected by geographic, demographic, social as well as economic condition of the farmers at the study area.
Keywords: Dairy farming, socio economic status, rural development, environment

Introduction

India is primarily an agricultural economy with more than 75% of its population living in villages depend on agriculture, animal husbandry and allied activities for their livelihood. Though there are various livestock enterprise, dairy farming is the most ancient occupation for India and rural people are practicing it for long time. Generating employment opportunities and helping the small and marginal farmers and laborers in India dairying practice play a crucial role besides providing food security (Patil *et al*., 2009). From the vedic period of time cows are integral part of Indian culture. Products from the milk such as curd, ghee, paneer, sweets and other byproducts are valuable and important nutrient for daily life. Through proper dairying practice dairy farmers could be benefited and the economic will get sustainability.

The development of dairy sector in India is gradually increasing as a result of policy implementation, achieving an annual output of 137.68 million tones (MT) of milk during the year 2013-14, India ranks top among the words milk producing countries (Annual Report Govt of India 2014-15). As India is ranked top in milk producing country contributing 23% of global milk production, National Action for Dairy Development expects to achieve the milk production aiming of 254.5 million MT by 2022 and by 2023-24 to 300 MT from 155.5 MT during 2015-16 which finally lead to the increase in per capita availability of milk (Department of Animal Husbandry, GoI).In India dairy farming is primarily a small production system where nearly 70% of milk producers in India are landless and marginal farmers who produce milk for the masses rather than mass milk production.An average of a herd of only 1 to 3 cow/buffaloes were found in these farmers (Bhasin, 2012). Traditional management practice and low level of knowledge about scientific dairy farming are the possible reasons behind the low milk production. Thus, proper, scientific and improved management practices are one of the important parts of dairying practice which improve the livestock production.Various research works has been done at different regions of the country at different levels. Therefore it is very important to know the process of dairying and its relation with socioeconomic status of the dairy farmers and to know the problems faced by them (Kankare *et al*., 2017).

The present study was performed with the objectives to know (a) socio economic status of the dairy farmers and the process of dairy farming in the Topatoli village of Kamrup (m) districts of Assam, India; (b) to examine farmer's knowledge about scientific and sustainable dairy farming in the study area; (c) To study Environmental impacts due to dairy farming in the study area; (d) To study the issues and challenges associated with dairy farming in the study area and (e) To suggest measure for development of dairy farming activity in the study area.

Materials and methods

Locale of the Research: The present study was conducted in Topatoli village. The village falls under the Topatoli Gaon Panchayat under the Sonapur Circle. Village is situated 47 km from Guwahati to the east direction under the Kamrup (M) district of Assam, India.

Research strategy: The research employed both quantitative and qualitative methods using the questionnaire method to answer the research questions and structured face to face in-depth interviews to complement the quantitative findings.

Research Size: In the Topatoli village there are total 21 households which practicing dairy farming. All these 21 house are concerned for the study of the socio economic status, to know farmers knowledge about scientific and sustainable dairy farming, environmental impacts and issues and challenges face by rural dairy farmers of Topatoli village.

Data collection process: A crucial and important stage of the research is the process of contacting the sample participants and collection of data. The first stage of the research includes gathering information on dairy farming, which was completed by using the website and surveying in household of dairy farmers. Also a questionnaire is made for the Sitajakhala Dugdha Utpadak Samabai Samity Limited (SJDUSSL) to know about the facilities and assistance provide by the SJDUSSL to Topatoli dairy farmers and its role in developing dairy agriculture areas of Assam.

Statistical method used: Collected data was analyzed using simple statistical tools like percentage and frequency.

Significance of the Study: This study will help to understanding of socio-economic status of dairy farmers and process of dairying by the farmers of Topatoli village as well as farmer knowledge about scientific and sustainable dairy farming, issues and challenges face by dairy farmers and environmental impact due to dairy farming in the study area.

Working Hypothesis

Dairy farming is economically beneficial for farmers at the study area.

There is a lack of proper maintenance of cow dung at the study area.

Development of dairy farming is guided by geographical factor such as vegetation cover, availability of land, transportation, irrigation, dairy co operative, climate, population in the study area.

There is environmental effects due to dairy farming

Dairy farming is affected by social and economical condition of the farmers in the study area.

Result and Discussion

Demographic and socio economic status

From the table 1, the respondents were classified into six classes of aged grouped .The biggest percentage was formed by the grouped between 41-50 years old with 33.33 %. The second classes of age range between 21-30 formed 14.29% and the age range between 51-60 forms the same per cent ; i.e. , 14.29%. The grouped age more than 60 formed about 19.05% and the age range between 21-30 forms the same per cent ; i ,e 19.05%. In gender category, 85.71% were male and 14.26% were female. In terms of religion all the 21 respondents are Hindu, i.e. 100%. In terms of

caste ST were 4.76%, OBC were 52.38% and general category form 42.85%. In marital status category 90.47% were married and 9.52 were single.

The respondents were classified into three categories based on their educational background. The highest grouped was secondary level with 42.85%, the second highest grouped was primary level with 38.09%, while tertiary level grouped was 19.04%. Involvement of respondents was divided into two parts. The full time respondents was highest at 85.71%compaired to part time at 14.28%. On experience category 47.62% were involved in dairy farming for between 11-20 years, 23.80% with less than 10 year of experience in dairy farming, while the smallest percentage was 14.28%with the experience year 21-30 and 31-40 years.

The respondents with income more than 50,000 thousand per month constitute 14.28%.Income between 41,000-50,000per months constitute 14.28% and income between 21,000-30,000 and 31,000-40,000 constitute the same percentage, i.e. 9.52%. The biggest percentage with at 52.38% with range between 11,000-20,000 per month.

Table 1: Demographic profile of the respondents (21 No. of respondents)

Demographic profile		Frequency	Percentage (%)
Age	<20	0	0
	21-30	3	14.29
	31-40	4	19.05
	41-50	7	33.33
	51-60	3	14.29
	>60	4	19.05
Gender	Male	18	85.714
	Female	3	14.285
Religion	Hindu	21	100
	Muslim	0	
	Christian	0	
	Other	0	
Caste	ST	1	4.76
	SC	0	0
	OBC	11	52.38
	General	9	42.85
Marital status	Married	19	90.47
	Unmarried	2	9.52
Education	Primary	8	38.09
	Secondary	9	42.85
	Tertiary	4	19.04

Involvement	Full time	18	85.71
	Part time	3	14.28
Experience	<10 years	5	23.80
	11-20 years	10	47.62
	21-30 years	3	14.28
	31-40 years	3	14.28
	>40 years	0	0
Income (per month)	5000-10,000	0	0
	11,000-20,000	11	52.38
	21,000-30,000	2	9.52
	31,000-40,000	2	9.52
	41,000-50,000	3	14.28
	>50,000	3	14.28

Process of dairy farming at the study area

Table 2: Dairy farming activity of the farmer (21 dairy farmer respondents)

Dairying activity		Frequency	Percentage (%)
Practicing of dairy farming (in years)	0-5	3	14.28
	6-10	3	14.28
	11-15	0	0
	16-20	2	9.52
	21-25	0	0
	26-30	9	42.86
	31-35	2	9.52
	36-40	0	0
	41-45	2	9.52
Type of occupation	Primary	19	90.48
	Secondary	2	14.28
Involvement in dairying practice	Encourage by parents/friends/relatives	3	14.28
	Self motivated	9	42.86
	Introduced by Govt.	0	0
	Inherited	9	42.86

Practicing of dairy farming activity (years)

This study reveal that dairy farming activity of farmers in the study area in terms of practicing of dairying activity in years is highest with 41-50 years with 9.52 farmer respondents. Years between

16-20 are 9.52%, 0-5 and 6-10 years of practicing of dairying activity respondents is 14.28%. The highest percentage of respondents with dairy farming activity in years is 42.86% with the period of 26-30 years. 16-20 and 31-35 years of practicing dairying is same, i.e., 9.52%.

Type of occupation

In case of type of occupation, 90.48% dairy farmers primarily involved and dependent on dairy farming, while 14.28% dairy farmer practicing dairying as secondary source of income or occupation.

Involvement in dairying practice

In category of how the respondent involved with dairying practice; 42.86% of dairy farmers are directly inherited, as it is practicing from generation to generation. Again 42.86% of dairy farmers are stated dairy farming practice with their own knowledge and money and are self motivated. While 14.28% of dairy farmers are encourages by friends, relatives, or parents to involve in dairying practice.

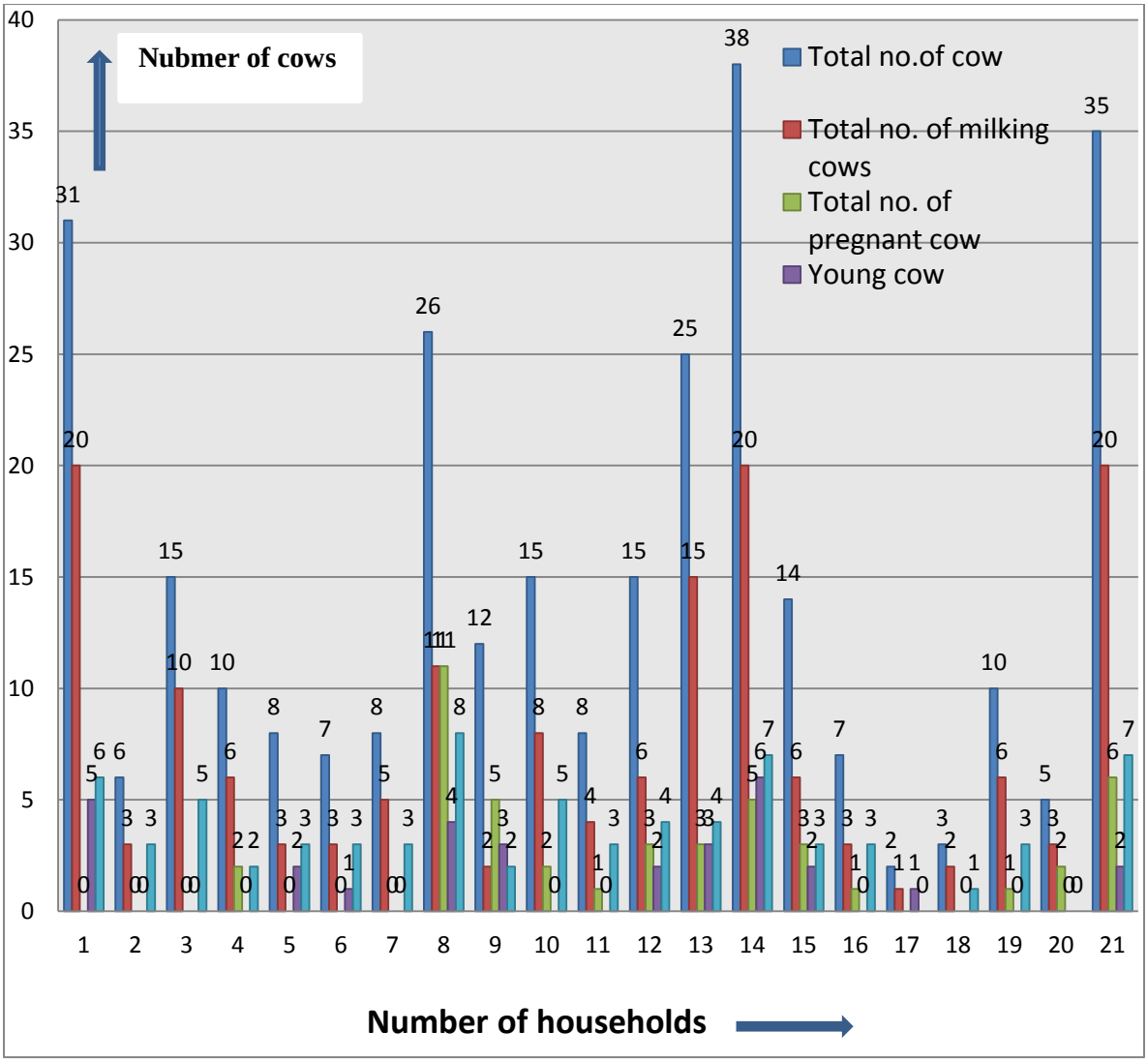

Fig 1: Statistics of dairy animal (cow) at the study area

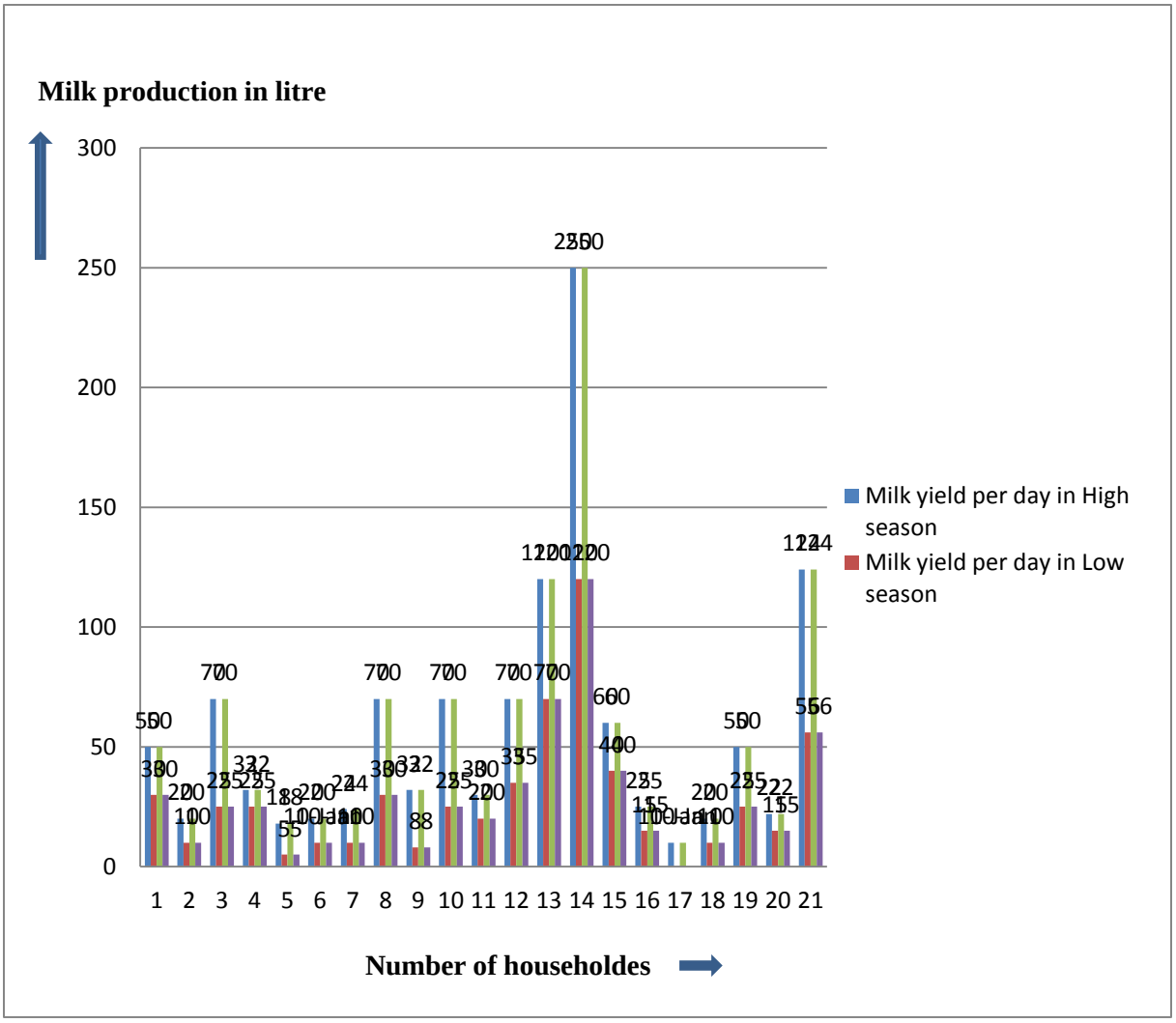

Fig.2: Milk production per day at the study area

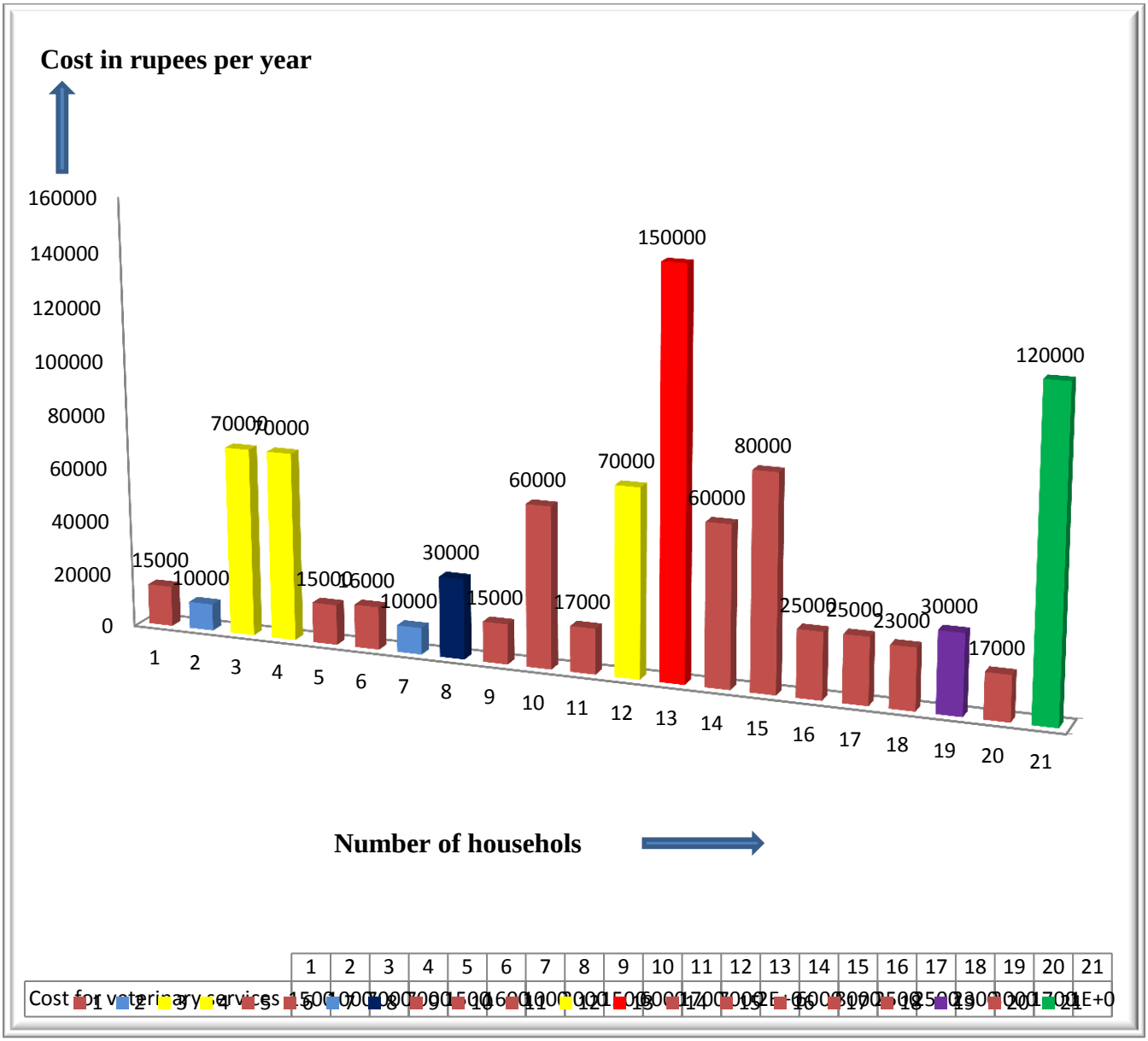

Fig. 3: Cost for extension and veterinary services in last 12 month, recorded during survey period

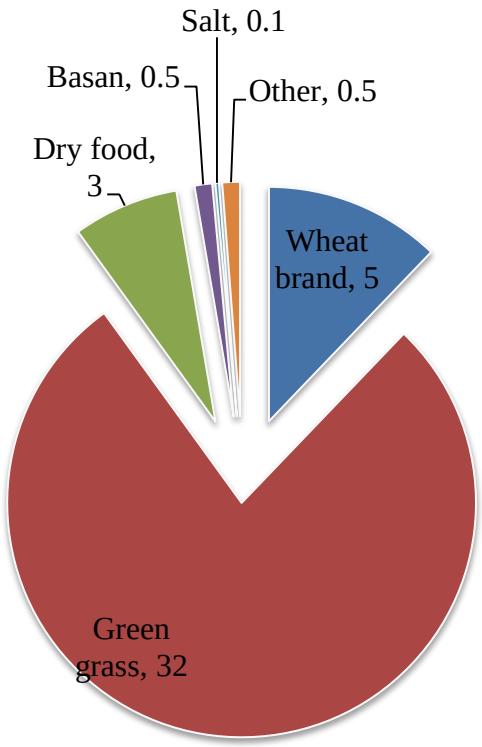

Fig.4: Amount of food required by a healthy milking cow per day (in kg)

Table 3: Farmer's knowledge about scientific and sustainable dairy farming at study area

		Frequency	Percentage (%)
Use of technology	MBG/Dairy cooperatives	16	76.19
	Self (use of internet)		
	Members	5	23.81
	Others		
		0	0
		0	0
Capital	MBG/Dairy co operative		
	Self	0	0
	Inherited	4	19.05
	Loan	9	42.86
		8	38.09
Seminar/Workshop	MBG/Dairy co operative	16	76.19
	Self		
	Members	0	0
	Others	5	23.81
		0	0
Technical problem	MBG/Dairy co operative	16	76.19
	Self		
	Members	0	0
	Others	0	0
		5	23.81

This study revealed the medium that the farmers use in information seeking for dairying practice in several aspects such as technology in dairy farming, how to get capital and, technical problem solving and also the seminars or workshops that they can attend.

Use of technology: In technology aspect, about 76.19% of farmers tend to seek information from the Milk Bulking Groups (MBG) or dairy co operatives and 23.81% on internet.

Capital for dairying practice: For capital aspect, 38.09%seek information on capital source from bank loan , 42.86% farmers get capital assistance for dairy farming from parents, i.e. , inherited , and 19.05% is own capital i.e., self.

Seminar/Workshop: In category of seminar/workshop, 76.19% of surveyed farmer seek information regarding dairy farming from MBG or dairy co operatives, while 23.81% from their members.

Technical problem: In category of technical problem aspect most of the farmers seek information from MBG or dairy co operatives which is about 76.19% and from others is 23.81%.

Environmental impacts of dairy farming at the study area

Positive Impacts

In the study area it has been observed that huge amount of cow dung and urine was generated during dairying practice. Both the cow dung and cow urine are used in the agricultural land for growth and development of crop land as well as crops. Hence, it is purely organic; it has no any adverse effect like chemical fertilizer which is very harmful for the environment and for human being. Cow urine can also be used as pesticides to kill various types of pathogens found in the crop and it is experimentally proved by various researchers and scientists.

Biogas produce from cow dung generate electricity and heat. The gas is rich in methane and used in rural areas of India and Pakistan and elsewhere to provide a renewable and stable source of electricity. In central Africa, Maasai villages have burned cow dung inside to repel mosquitoes. In cold places, cow dung is used to line the walls of rustic houses as a cheap thermal insulator. Most of villagers in India spray fresh cow dung mixed with water in front of the houses to repel insects. It is also dried into cake like shapes and used as replacement for firewood. In the present study, we have found that cow dung is used by the villagers as manure in crop land and there is no household that produces biogas from the cow dung.

Negative Impacts

As dairy farming is related with agricultural practice and it is environmentally beneficial, but there is certain areas in which improper and unsustainable practice of dairying cause damage to the environment .In the time of heavy rainfall, openly spread huge amount of cow dung mix with rain water and this mix runoff cause the degradation of water quality in the surrounding water drainage system and thereby cause damage to local water ecosystem. Due to lack of proper management of cow dung and urine and open spread of it on the surface of the soil cause degradation of local water resources as well as water quality, and cause damaged to the some native plant species, growth and development of harmful factors which ultimately can be harmful for environment and human the human life. In this present study, we have observed the degradation of water quality in the study area due to openly spread of huge amount of cow dung and urine and their mismanagement at the study area.

Hypothesis Testing

Hypothesis testing is done on the basis of data and perception of respondents obtained through household survey and interviewed processes.

Dairy farming is economically beneficial

This hypothesis is true.

In the study area, out of 21 respondents, 90.48% dairy farmers are primarily involved in dairying practice and it is the only source of income for their home. Status of economic profile of the dairy farmers in the study area is well, though they faced some problems regarding dairying practice; Sitajakhala Dugdha Utpadak Samabai Samaiti Limited (SJDUSSL) gives the opportunities to the dairy farmers to know more about dairy farming practice. SJDUSSL collect raw milk from the farmers and thereby facilitating them economic assistance.

The respondents with income more than 50,000 thousand per month constitute 14.28%.Income between 41,000-50,000per months constitute 14.28% and income between 21,000-30,000 and 31,000-40,000 constitute the same percentage, i.e. 9.52%. The biggest percentage with at 52.38% with range between 11,000-20,000 per month.Increased in income is directly related with the living standard of dairy farmers. All the 21 respondents in the study area are economically get benefited and their living of standard is also gradually upgrading. Hence, we can say dairy farming is economically beneficial for the farmers in the study area.

Lack of proper maintenance of cow dung

This hypothesis is true.

In the study area we have seen that there is huge amount of cow dung and urine is generated during dairying practice. All the 21 respondents are not follow any proper maintenance and management practice regarding cow dung and urine and they openly spread it on the surface of the land which caused damaged specifically to the water sources of the farmer household like water of well. No one household generate any biogas from the cow dung .Hence, there is need of proper maintenance and management of cow dung and urine.

Development of dairy farming is guided by geographical factor

This hypothesis is true.

Development of dairy farming is guided by geographical factor such as ; vegetation cover, availability of land , transportation, irrigation, dairy co operative , climate , population etc. in the study area.As the village is situated near the hills of Meghalaya-Assam border, so there is availability of large amount of verities of green grass. Hence, this availability of green grass near the farming area encourages and helps the rural farmers to developed dairy farming practice in that area.Without land, dairy farming is not possible. For a big dairy farm, it requires huge area for dairying, maintenance and management of cow dung and urine and other dairy farming practices. In present study we have found all the farmers have their own land for dairying practices.

Dairy co operative; The Sitajakhala Dugdha Utpadak Samabai Samiti Limited (SJDUSSL), plays a vital role in socio-economic growth and development of dairy farming in the study area. As they collect milk 1100-1200 liter/day in high season (winter) and 600-700 liter/day in low season (summer) from the farmers and financially assist them. Besides this, SJDUSSL also provides dairy farming facilities such as, veterinary services, and live stock extension, feed, veterinary drugs, Artificial Insemination (AI) and other farming inputs. It also provides scientific and sustainable knowledge to the rural dairy farmers on dairy farming practices and also provides general training on veterinary services. Without SJDUSSL, the farmers of the study area are unable to get all these support and help, and hence, dairy co operative as a geographical factor guide the development of dairy farming practices in the study area.

Transportation facility in the study area is well developed and hence all the dairy farmers are easily connected with SJDUSSL and vice-versa. Without the accessibility of transportation, development of dairy farming is not easy and farmers can face various problems.Climate is also most important geographical factor for dairying practice, because farmers have to know the climatic conditions in

which foreign cow species such as Holstein can suitable or exist with the environment where they start farming practices.

Dairying is affected by social and economic condition of the farmer

This hypothesis is true.

As dairy farming requires huge amount of money for purchasing dairy animal, construction of herd, feed, maintenance and management of dairy farming activities and other dairy farming materials, hence, dairy farming is highly affected by social as well as economic condition of the farmer. Due to lack of money, maintenance and management of dairying in the study area is not seen during my observation and surveying period. All the respondent are not able to generate biogas from the available cow dung due to financial problem.

42.86% of the dairy farming respondents were inherited dairy farming and practicing it from generation to generation. Other 42.86% farmer respondents started dairy farming from bank loan. The village consists of 900 household; only 21 household practicing it. As, Dairy farming require huge amount of capital to start dairying practice and most of them are inherited ,hence we can say dairy farming is affected by social and economic condition of the farmer in the study area.

Conclusion and Suggestion

There is need of proper maintenance and management of cow dung and urine in the study area.

Cow dung is major bi product of this activity which could be useful as a raw material for gobar gas plants. But small and economically weaker farmers cannot afford its cost. So here suggestion has been made for government to take initiative to give maximum subsidy to the poor farmers which will help to make a use of non-conventional source of energy to protect environmental pollution and it will definitely improve the health of rural woman.

Proper planning and management of fodder in summer and during drought condition will help to make this activity more profitable.

Maximum use of high yielding variety cows will definitely increase the milk production.

Proper training should be provided by SJDUSSL to the present farmers having their dairy industry to increase the daily production of milk.

Construction of well or tap should be maintain with a reasonable distance from the dairy farm, because most of the water is degraded due to seeping of cow dung and urine.

On the basis of the collected data it was found that other member of the villages have the potentials of dairy farming, which should be developed by giving required loan, information and other required services.

Fig. 5: During survey at the study area, Topatoli village, Kamrup (M), Assam, India.

Fig. 6: Fig 3.23 At Sitajakhala Dugdha Utpadak Samabai Samiti (SJDUSSL), Amlighat, understanding the processing of milk and manufacturing of various milk products, Fig. 4(A)With Human Resource Development (HRD),Officer Mr. Bishnu Upadhyaya Sir, at Sitajakhala understanding the process and development of SJDUSS.

Fig.7: Photographs during survey (A) Open spread of cow dung,(B): Improper management of cow dung

Acknowledgement

We would like to convey our heartiest thank to the Principal of Dimoria College Dr. Biman Kumar Bhatta for providing all the facilities. We also thankful to Dr. Pratap Chutia, HoD of Environmental Management, and supervisor of the research work Mr. Durlov Jyoti Kalita; Dulumoni Talukdar and Bhaskar Dev Swargeary for their continuous support. I want to thank my brother Mr. Raju Tamang for his continuous support during survey time. Last but not the least I would like to thank to all the dairy farmers of Topatoli villager without support of them this research would not be completed.

Authors Contributions

Raghu Tamang: Idea, Original draft preparation, methodology, survey and data recording, statistical analysis

Durlov Jyoti Kalita: Editing of manuscript, supervising

Pratap Chutia, Bhaskar Dev Swargeary, Dulumoni Talukdar: Review and editing

Conflict of Interest: The authors declare no conflicts of interest.

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Agro-based Clusters: A Tool for Effective Management for Regional Development

Dr. Dhriti Das
Assistant Professor
Dept. of M.Com.
Gauhati Commerce College
Contact No: 8638944383

Parijat Bhatt
M.Com 4th Semester
Gauhati Commerce College
Contact No: 8822539829

Abstract:
Agriculture is the livelihood for the farmers. It provides income and job opportunities to people of rural area. Food is all time requirement and has full demand all over the world for which agriculture is the only source. Healthy agriculture environment can raise the economy, will keep people employed and can bring change in the world. This paper highlights the importance of evolving and changing from time to time in agricultural field according to the condition; knowing about new tactics in order to improve to get better results and grow towards betterment and show the path of how agriculture can be pursued as a profession. The study also defines the benefits of cluster towards the farmers and in the field of agriculture and how agriculture scenario can be changed in the present and in future. Cluster formation is beneficial for undertaking business under agriculture. As it reduces the minimal costs that are required in farming and results in high quantity production and helps the farmers to collectively deal in the market and contribute towards regional development.

INTRODUCTION OF THE STUDY

As we all know working alone is tough when we have to go long way. Working together is where we share our risk and cost effective, specifically if its business oriented. Hence here is an idea that has been used in several other sectors called cluster, which can be used in agriculture to make our lives better.

Agriculture for India is the primary earning & employment source. 70% of population's livelihood is dependent on agriculture. It has various scopes and still it has many hindrances, excelling in agricultural field. India is also out of few countries where agriculture is suitable for all 12 months. Different seasons for different crops. Within country a state named Assam is one of the states among other states where cultivation is enriched due to 2 valleys Barak river valley & Brahmaputra river valley which has very fertile soils best suited for agriculture.

Even after having such suitable soil & favorable climate condition, India is not that advanced in comparison to other countries. There are several problems we can point out. All these problems can be solved and strengthen the poor conditions of agriculture. Most of the farmers are landless or holds small or medium land which increases their cost and farmers manages to earn less in comparison to that in such case there is a solution for farmers holding small & medium land or farmers having no land and lacking in modern technologies. Working in cluster will reduce expense burden and helps in earn better profits than usual.

Agricultural clusters are group of small farmers to conduct collective activity were burdens will be split & profits will be earned for individuals. Cluster can be best form of a business planning. Cluster can also be seen as farmer's partnership in agricultural business.

Growth in agriculture & expanding it at a business level can lead to enhanced nutrition & poverty reduction in India. Instead of carrying on agriculture only as a tradition this can be seen from a business point of view. This can help in improving small groups of farmers' livelihood & earn profit that they have never earned before. Agriculture growth can further seen as the growth of poor farmers and it can also be pursued by youth which can save our culture and ethics. Everything is related to soil, agriculture also helps in enriching the quality of soil.

REVIEW OF LITERATURE

David L Barkley, Mark S Henry 1997, During those times regional industrialization strategies encouraged recruitment, small business development, and business retention and expansion efforts to promote industrial cluster development. In this paper they provided an overview of the advantage and disadvantages of promoting industrial cluster as an industrial development alternative for rural areas. Advantage of successful cluster promotion includes stronger external economies, a more adherent environment for industrial reorganization, greater networking among firms, and more logical use of public resources. The disadvantages of an industry cluster perspective are selecting target industries, overcoming late comer disadvantages, and providing supportive institutions. Findings show that an industry cluster strategy is not appropriate for many rural communities. Areas considering cluster promotion should compare costs of commencement or expansive a cluster with the potential benefits of successful cluster development.

Xiaobo zhang, Jin yang, Reardon Thomas 2017 In their study entitled "Mechanization outsourcing clusters and division of labor in Chinese agriculture" explained that despite the farmers holding small lands, a high degree of land fission, and raising their labor cost, agricultural production in china has rapidly increased. If one farm household is treated as a unit of analysis, it would be difficult to explain the riddle. When agriculture is seen from the lens of the division of labor, the riddle can be solved easily. Due to increase in labor cost, farmers install some strong power machine at different stages of production, such as harvesting, which are performed in cluster in few countries and also travel to different countries to provide harvesting service at competitive prices. Through such an arrangement, farmers of small land holdings can stay feasible and workable in agricultural production.

Yiwu Zeng, Hongdong Guo, Yanfei Yao, Lu Huang 2019 Agricultural e-commerce cluster are new circumstances that have been appeared in rural China. In China examining the case of Shuyang County in Jiangsu province, this paper puts forward an integrated model revealing the formation of agricultural e-commerce cluster involves four processes of technology introduction, technology diffusion, quality crisis, and industrial hoard based on elements such as industry bases, e-commerce platforms, network facilities, systematization, entrepreneurial talent, local government, and market demand. Rural social networks and fake behaviors promote technology diffusion by reducing the cost of technology introduction, and industrial hoard is found in the economies exhibiting intensify labour divisions and geographic hoard. Throughout the building procedure, a quality crises may occur reasonable race to the bottom and the expedite behaviour of local farmers. This work shows us that regional e-commerce development is a methodical project. Government of developing countries should not only realize impact that are positive of e-commerce for the development of agricultural industry but also recognize the presumption and dialectic of how e-commerce can play prime role.

Keijiro otsuka, Mubarik ali 2020 world Development perspective 20, 100257, 2020 In their study entitled "Strategy for the development of agro-based Clusters" cluster can help in growing the production and quality of the products in developing countries and also transforms the production of cereal grain to high value products and process them to meet the standard demand in the markets. The production of HVPs is usually area based clusters and, hence, such areas may be termed as agro-based clusters.

Paul stegmann, Marc Londo, Martin Junginger 2020 In meeting global climate targets Biomass is projected to play prominent role. European bioeconomy strategies increasingly consider the concept of a circular bioeconemy (CBE), to achieve a resource efficient biomass. The term was defined as CBE via a review of literature and analyze the concept's role in north-west European bioeconomy clusters through interviews. They identified strategies regarding the clusters' feedstock and product focus, and investigate what role biorefineries, circular solutions, recycling and cascading play. Finally gaps were discussed in CBE literature and the potential contribution of the CBE to sustainability. The analyzed bioeconomy clusters moved towards a CBE by completely considering wastes and leftovers as a resources, developing unified biorefineries and concentrating more on material and high value applications of biomass.

Lyuhang Zhao, jianqing Ruan, Xinjie Shi 2021 In their study entitled "International Food and Agribusiness Management Review24 (1030-2021- 1523), 267-288, 2021" examined the purpose of this study is to compare the effectiveness of local policies and demonstrate the effective industrial policies grant to both the growth and improvement of the cluster in Chinese context, based on comparison advantages and market failures. They had a case study with 30 stake holders in the tea clusters; the case study found out that local industrial policies have played an important role when market failures occur in the development of agricultural clusters. The local government implemented a series of policies to promote the advancement of tea industry at various stages of development.

OBJECTIVES OF THE STUDY

- To study the process of development of the small farmers.
- To identify the linkage between small farmers and Government Schemes.
- To identify the linkage of the Cluster to the market within and outside the region.

RESEARCH METHODOLOGY

RESEARCH DESIGN

The study is descriptive and explanatory in nature in which the primary data is collected from the respondents through schedule.

RESEARCH POPULATION

Here, the population of the study comprises turmeric cluster farmers from the area of Gohpur and Ghogra Basti.

SAMPLING UNITS

A sample unit refers to farmers of agricultural sector those who are working in turmeric agriculture cluster

SAMPLE SIZE

Under this research study, the researcher has originally drawn 15 samples and everyone is responded positively.

SAMPLING TECHNIQUE

In this research study, the researcher has adopted cluster sampling technique as the researcher has fill up the schedule as per farmers point of view.

SOURCES OF DATA COLLECTION

Primary studies of sampled farmers were conducted to gather information through the use of schedule. Primary data are the first data collected directly from the members. The following are the certain points collected from primary data-

Direct personal interview: Here, cluster members were personally contacted and interviewed.

Schedule: In the schedule researcher has put questions to know the socio-economic characteristics, employment generation prospects, effects of cluster farmers in standard of production and their benefits how they are different from individual farmers and differences between the individual farmers and cluster and their growth.

Secondary Data:

The following are certain points from where the researcher collected secondary data:-

Website, Internet, Books

TOOLS FOR DATA ANALYSIS:

The data collected in this study through the questionnaire is analyzed with statistical tools. Results reported primarily using the percentage method. Tables, figures, bar diagrams, pie diagrams and charts are used to get the findings and form conclusions for better understanding.

A BRIEF DESCRIPTION OF THE AGRICULTURE CLUSTER

Elaboration of Agriculture Cluster with special reference to turmeric cluster

Agriculture cluster is all about a group of small farmers working together and turning it into a business. Farmers who cannot afford to grow on large scale and struggle with loans, can make it easier for the small farmers to work with each other and procure seed, requires fertilizers and pesticides from market according to the requirement of the group of the farmers. Cluster makes the expenses easy to bear as they are working together and the expenses are being split among the farmers. When expenses are split it means burden of money is also reduced and the final production is linked to the market in bulk (collective product of cluster).

As we are talking about agriculture clusters, the turmeric cluster that is working at a small level. The turmeric cluster is Gohpur based women farmers cluster, which were growing turmeric in their backyards for their home usage. But when they knew about cluster where they can grow turmeric in little wider space than usual for commercial purpose they took steps toward forming cluster.

Gohpur based turmeric cluster has a total of 28 women farmers who own small land for farming. It is very difficult for women farmers to procure good turmeric roots for plantation. It is seasonal plant which is used in India everyday in every household, which shows the demand of turmeric. In the cluster the main duties of farmers are preparing the seasonal calendar and forecasting challenges that they will be facing.

Idea of cluster is being implemented in many other fields but the idea of cluster in agriculture is very unique. Though the idea of agriculture cluster is used in many other countries to encourage small farmers, Small farmers cluster can bring vast change in the agricultural scenario and agriculture condition.

The cluster includes Business Development Officers (BDO). BDO are the intermediate between the cluster and market. BDO survey the current demand of the product produced by the cluster, contact to every possible buyer of the product in the market and outside the market. To read the situation of the product demand in the market to sell the product when demand is high, they store the final output and wait for the correct time to sell the products to get the best deal which can benefit the farmers. BDO not only helps the farmers to get best price of their product but also earn a percentage or margin from that sale. But the percentage or margin is not earned from farmer, instead they take that from dealers and markets where they sell products. BDO primarily focuses on farmers' profit. This whole plan results in the business of farmers' products.

There are many clusters working in different parts of India like Jammu and Kashmir has Apple farmers cluster, Arungabad Maharastra has cotton and Maize farmers cluster, Rajasthan has Soybean farmers cluster, Bihar has paddy and Wheat farmers cluster, Gujarat has vegetables farmers cluster.The small farmers from all the corners of India are forming cluster and working collectively to reduce their expenses and increase their income from their cultivation.

Turmeric cluster

Women of Gohpur is engaged in turmeric cluster where the group was identified by the survey. Cluster is formed among 28 women who has small land areas like half bigah or 1 bigah land area. Cluster is formed among small farmers so that they can share their burden of expenses. Also share

various expenses that can be worked in a group such as ploughing, purchasing tuber, fertilizer, pesticides etc.

They identify their expenses involved by performing activities like leaky bucket where they show all the expenses that is used or required in cultivation. Secondly they performed exercise of seasonal calendar where the group decide to perform activities according the calender prepared as per season

Advantages of formation of Agricultural Cluster

- Risks are divided
- Expense budget is dived
- Collectively they can enhance knowledge
- Collectively they can avail advanced technologies
- The can tackle the problems of small farmers together
- Disadvantages of formation of Agricultural Cluster
- Cluster can be formed between 20-50 members in a group
- The farmers must be within limited area to form cluster.
- It requires a person for continuous monitoring of performance of farmers.

DATA ANAYSIS AND INTERPRETATION

This sections deals with the analysis and representation of the primary data and its interpretation. The analysis section has been depending upon the nature of analysis.

- Descriptive Analysis
- Statistical Analysis

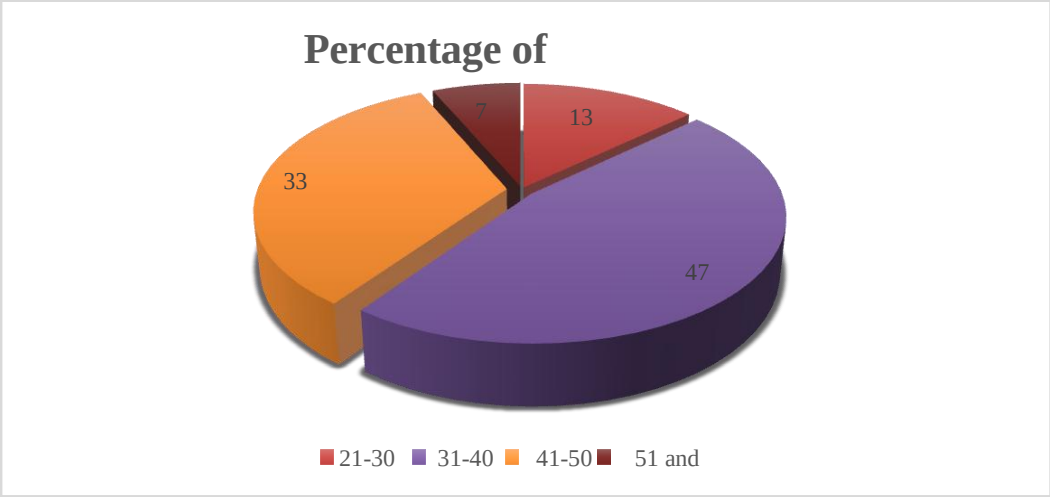
Descriptive analysis gives an idea on the factor based upon which the grouping and classification of data has been made. In this section, a descriptive analysis of the data collected has been done by presenting them in a tabular form and representing them through various diagram. Further we have analyzed the data statistically by the application of statistical analysis in our research study and confirmed to the analysis of data by the use of simple percentage method

Table Showing Age of respondents

Age limits	Percentage of respondents
21-30	13.3%
31-40	46.7%
41-50	33.3%
51 and above	6.7

Source: Field survey, October 2022

Figure Showing age of respondents



Interpretation

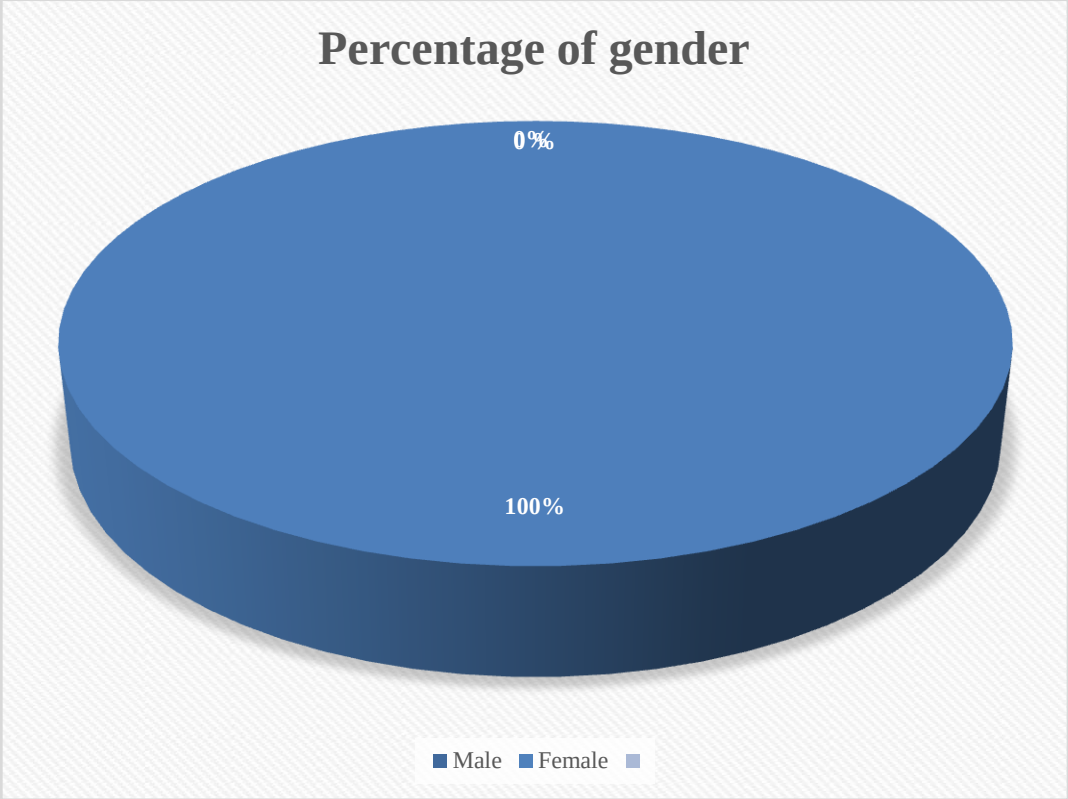
From above table the researcher found that total 13% respondents are from the age group of 21- 30, 47% respondents are from the age group of 31-40, 33% respondents are from the age group of 41-50 and only 7% respondents are from the age group of 51 and above. Where it is found that the highest number of respondents are from the age group of 31-40 i.e 47% and the lowest number of respondents are from the age Group of 50 and above i.e 7%.

Table Showing gender of the Respondents

Gender	Percentage of respondents
Male	0%
Female	100%

Source:- Field survey, October 2022

Figure Showing gender of the respondents



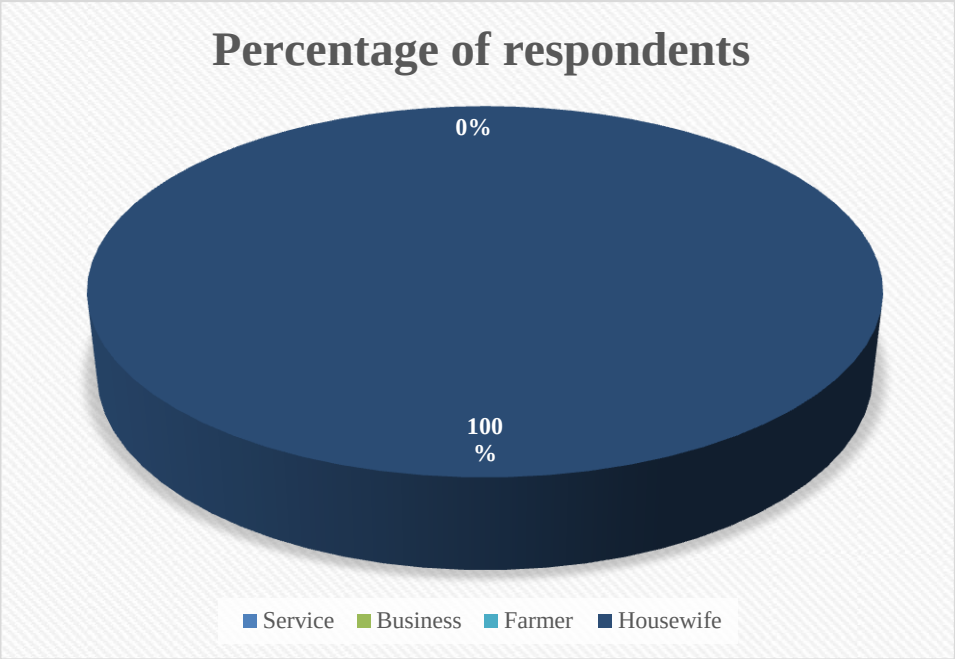
Interpretation

Among the respondents, 100% consist of female Respondents and there is no male respondents. This shows that more female population is engaged in turmeric agriculture cluster.

Table Showing the occupation of the respondents

Occupation	Percentage of the respondents
Service	0%
Business	0%
Farmers	0%
Housewife	100%

Source :- Field survey, October 2022 Figure **Showing the occupation of the respondents**



Interpretation

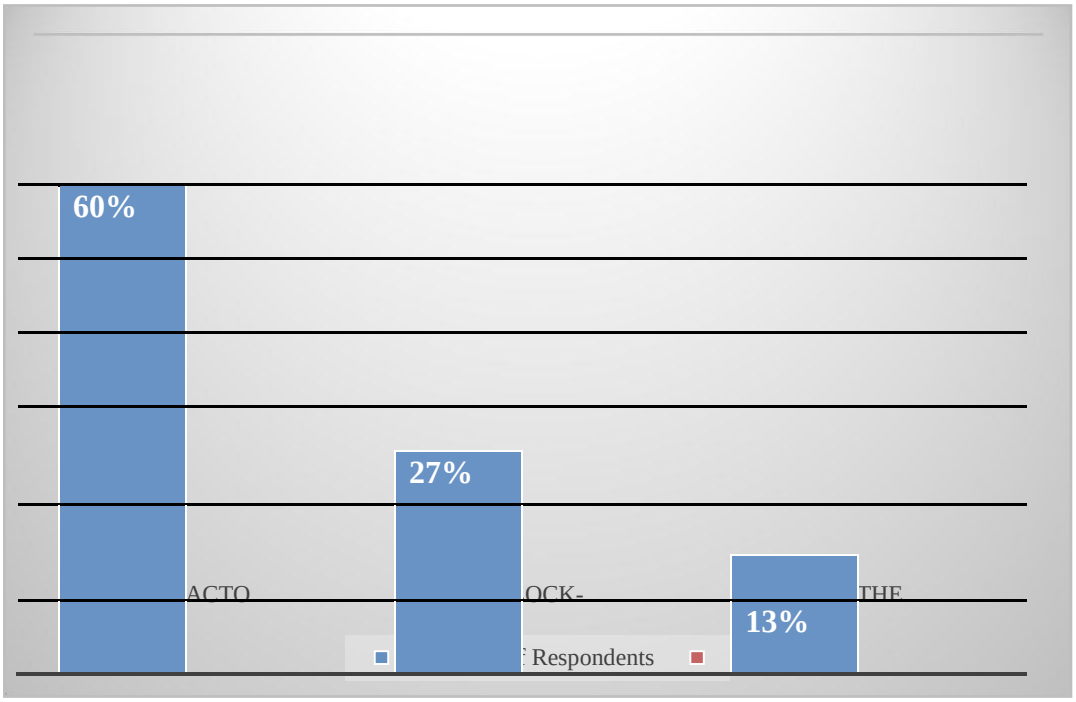
It is seen that from the above table that the turmeric cluster is performed by the housewives as they can manage to do farming in their front yard or back ward. As the activity for the married women is easier to do in their house itself among the other household chores. It also shows that housewives can also manage to do business.

Table Showing the types of techniques used for ploughing

Techniques	Percentage of respondents.
Tractor	**60%**
Bullock-cart	**26.7%**
Other	**13.3%**

Source:- Field survey, September 2018

Figure Showing the techniques used for ploughing by women farmers



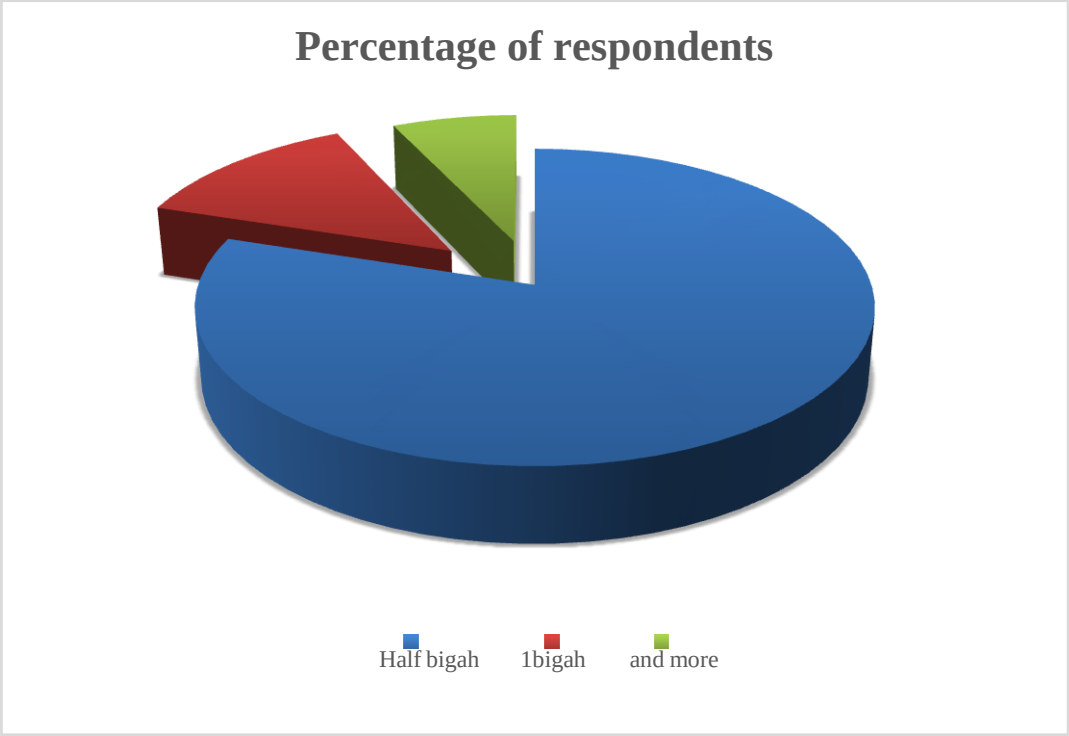
Interpretation of techniques used for ploughing

For ploughing **60%** of women use tractor in their land, 27% still use bullock-Cart and 13% of women other techniques for ploughing. Which means highest percentage of ploughing is done through tractor. We also can't ignore the fact that still bullock-cart is used for ploughing of land in village areas. It is the orthodox method of cultivation which still exist. It also reflects that such type of cultivation is very effective and also cost effective.

Table Showing the usage of land for turmeric

Land used	Percentage of respondents
Half bigah	**80%**
1 bigah	**13.3%**
And more	**6.7%**

Source:- Field Survey, October 2022 Figure Showing the usage of land in turmeric cultivation



Interpretation on Land usage for turmeric cluster

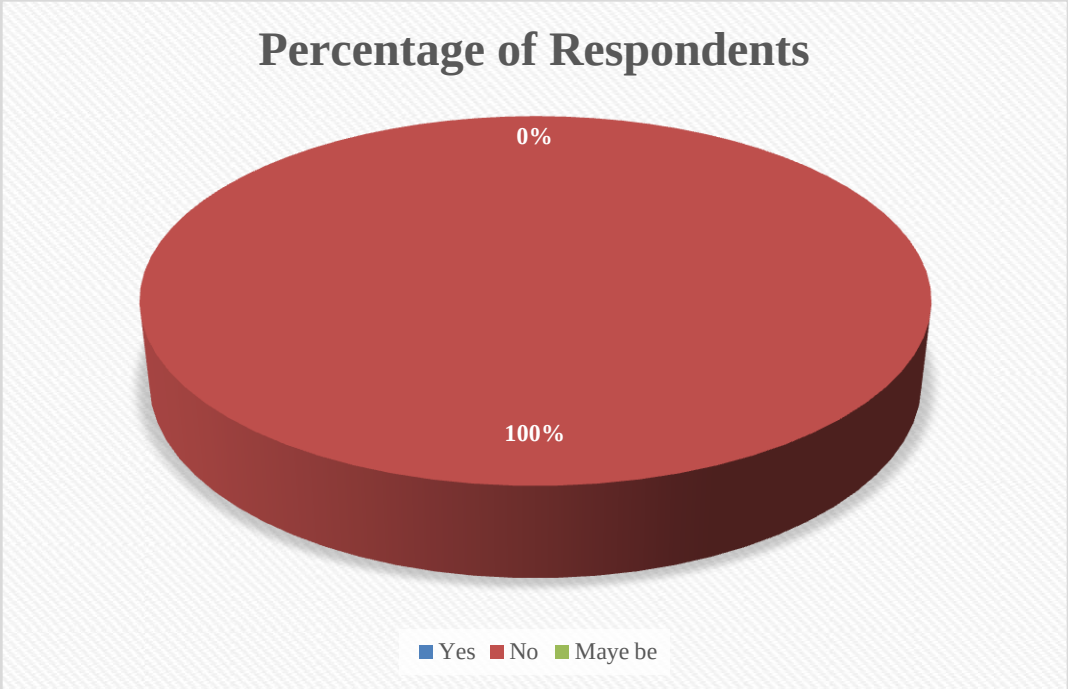
Highest percentage 80% of women has engaged their half bigah land for turmeric cluster it shows that maximum women engaged are small land holders, made cluster for collective work. It also shows that cluster can be beneficial for small land holders for doing agriculture which can give more output.

Table Showing awareness of latest schemes available among farmers

Awareness	Percentage of respondents
yes	0%
No	100%
Maybe	0%

Source:- Field Survey, October2022

Figure Showing the awareness among farmers about the availability of latest schemes



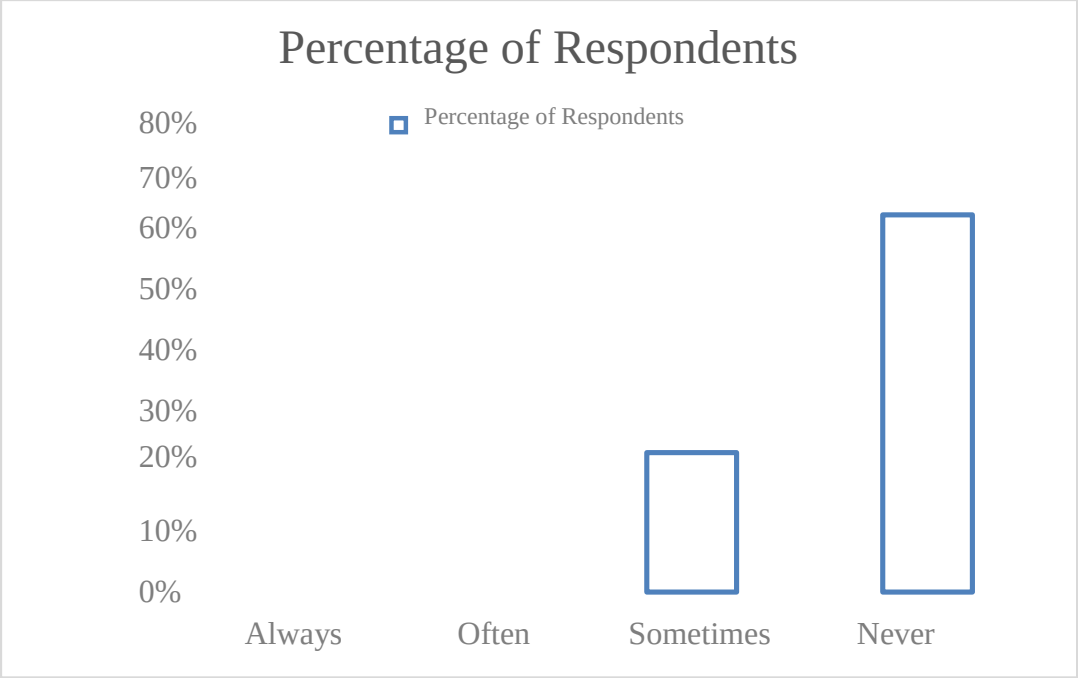
Interpretation

From the above diagram you can see that 100% respondents are not aware about the latest schemes provided by the government for the welfare of the small and poor farmers. This can also be the reason for the backwardness of farmers in village areas holding small land areas. Schemes helps for the advancement of the small farmers. So that they can proceed with no hindrance.

Table Showing the result of loan taken for agriculture

Loans for agriculture	Percentage of respondents
Always	**0%**
Often	**0%**
Sometimes	**26.7%**
Never	**73.3%**

Source:- Field survey, October 2022 Figure Showing the result of loan taken for agriculture



Interpretation for the result of loan taken for agriculture

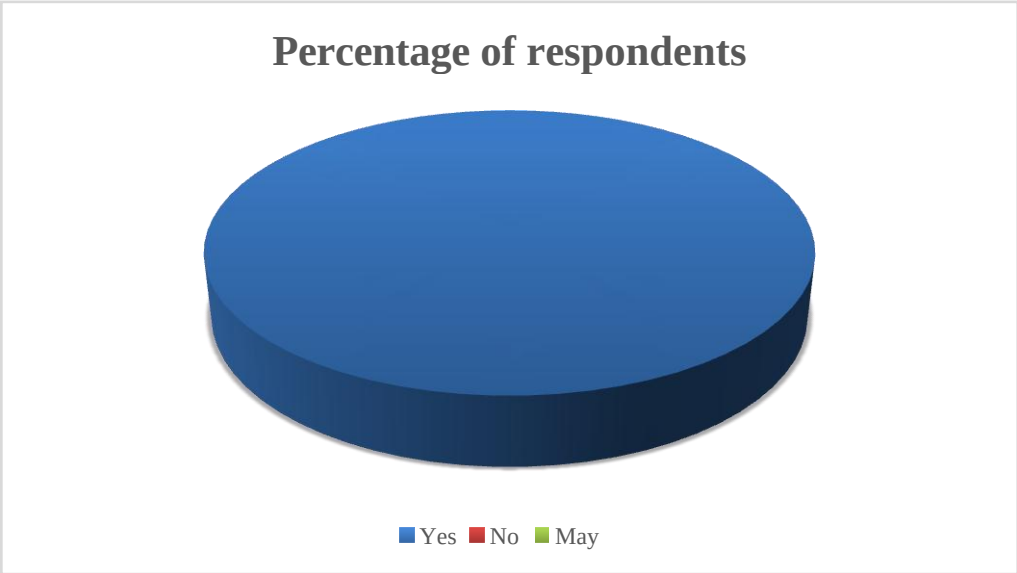
The above chart shows 70% farmers do not take loan for any kind of agriculture which is a good sign that the farmers are not reliable on other for their agriculture. Earlier farmers needed loans for agriculture purpose which pushes farmer in debt which increases more and more every year for agriculture. 30% of farmers take loans occasionally for agriculture purpose.

Table Showing the requirement of farmers for more advance knowledge about agriculture

Requirement of advanced knowledge	Percentage of respondents
Yes	100%
No	0%
Maybe	0%

Source:- Field Survey, October 2022

FIGURE SHOWING THE REQUIREMENT OF ADVANCED KNOWLEDGE FOR AGRICULTURE



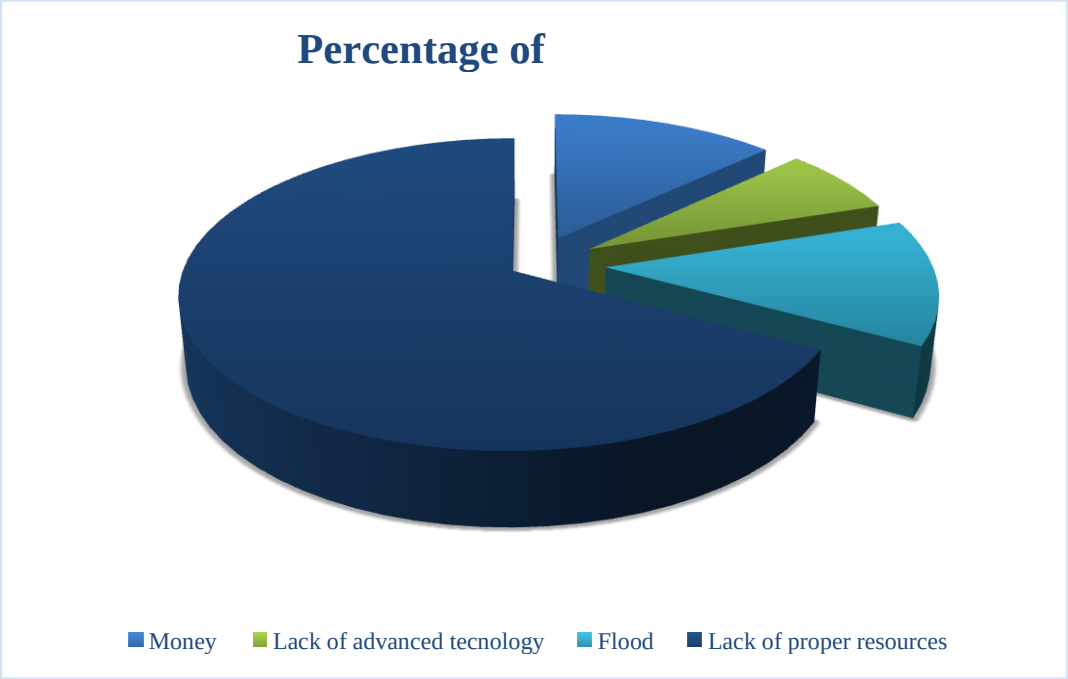
Interpretation of Requirement of advanced knowledge about agriculture

From the chart we can see that maximum farmers need the advanced knowledge that is required for the better agriculture purpose. The farmers need the changing and advanced studies and knowledge about agriculture that is taking place for the betterment of their crops. Changes takes place and adapting changes is required.

Table Showing The kinds of problems the farmers face

Problems	Percentage of Respondents
Money	**13.3%**
Lack of advanced technologies	**6.7%**
Flood	**13.3%**
Lack of proper resources	**66.7%**

Source:- Field Survey, October 2022 FIGURE SHOWING PROBLEMS FACED BY FARMERS



Interpretation on problems faced by farmers

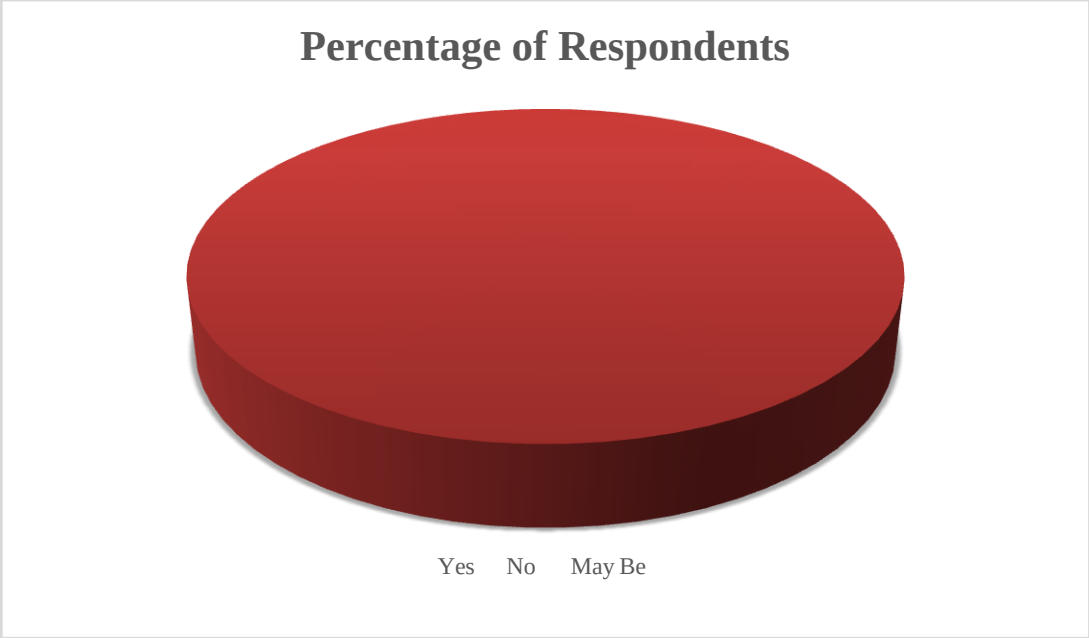
The farmers face many problems and among those major problems 67% farmers face problem of lack of resources. Which includes water as well. Its because crops does not get water at the time of requirement and sometimes water are overflowed for immense rain. Lack of proper resources also include other resources required for cultivation.

Table Showing opinion of Formation of Cluster

Opinion(formation of cluster)	Percentage of Respondents
Yes	100%
No	0%
Maybe	0%

Source:- Field Survey, October 2022

Figure Showing Opinion on formation of cluster



Interpretation on formation of cluster

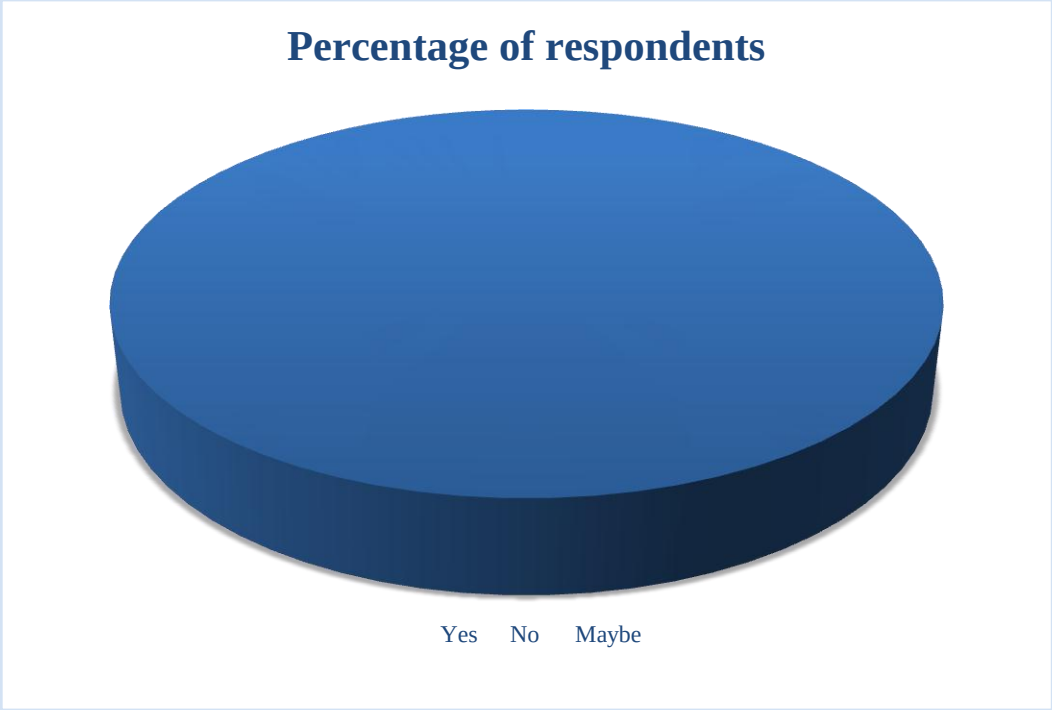
The above chart shows that small land holder farmer agree for the formation of cluster for their betterment. They would like to perform activities in group to share the expenses that will be incurred during the cultivation period. This also enhances knowledge among the farmers in group and problems can be tackle in group.

Table Showing the opinion of farmers taking agriculture as a business

Opinion (farming as a business)	Percentage of Respondent
Yes	100%
No	0%
May Be	0%

Source: Field Survey, October 2022

Figure Showing the opinion of farmers taking agriculture as a business



Interpretation of Opinion of farmers taking agriculture as business

The above chart shows the opinion of farmers taking agriculture as business. The women farmer sees the agriculture as an opportunity for business, instead of doing it for home use.
This also shows agriculture has the potential of growing as a business

FINDINGS

Age wise survey it is seen that mostly women are from the age group of 31-40. it is also noticed that mostly women are under educated and they have the orthodox knowledge of agriculture.

During the survey, it has been found that out of the total respondents 100% are male and there is no male farmer. It can be seen that there is lack of men participation.

From the survey, we get to know that all the women engaged in turmeric cluster are housewives. It hows that they get engaged in group activities where they can find opportunities to do something new.

Through this study we found that the farmers still use bullock cart for ploughing. Even though there are several modern techniques for ploughing. It also shows that women engaged tractors also.

From this study it is found that most of the women using small land for turmeric cultivation and women are using front yard or backyard space for the purpose of cultivation.

During the survey it was found that 100% of the respondents are not aware of the schemes availed by the goverment for the poor and small farmers.

Among the women farmers it can be seen that 30% of the farmers still take loan for the purpose of agriculture.

During the survey it is found that farmers need more knowledge about the advance knowledge of agriculture that is evolving in the present times that can help in improving the results of farmers production

From this study it is also found the problems that are faced by farmers mainly due to lack of proper resources on time like water, fertilizer etc.

During the survey it is found that the small land holder farmers strongly agree with the idea of formation of cluster.

From the survey it is found that 100% respondents wants to grow in agriculture sector and wants to take it further as a business opportunity and work in small groups to make it happen and grow.

SUGGESTIONS

In the backdrop of agriculture, there still remains certain area of concerns proving to be the hindrance in the development and prosperity of agriculture.

To come out of this situation following measures are suggested: As small farmers face many problems, so cluster is one of the small measure that framers can take to tackle small problems.As from the survey it can see farmers have lack of evolving knowledge about the advance technique and solutions in the modern generation. They need to acquire adequate knowledge from the krishi vigyan kendra.From the survey it can see majority of farmers face the problem of lack of resources therefore they can deal with this problem in a group that is the whole idea of cluster.From the survey it can be seen that small farmers from rural area do not have knowledge about latest schemes provided by the goverment. Therefore it is suggested that such majors to be taken by local authorities of agriculture to circulate the information about agriculture periodically.

CONCLUSION

This research aims to find the present scenario of agriculture, problems that are being faced by the small farmers and how we can find solutions to the problems found. Based on the survey we can see that problems of small farmers are very massive but can be identified and can be solved in group which means formation of cluster.

This research illustrates the work of cluster in reference to turmeric cluster. It shows how women in gohpur took initiative of forming cluster for doing the same kind of cultivation. It shows thatfarmers in any area cultivating same kind of cereal, pulses, fruits or vegetables can work together by forming small group of 20 to 50 farmers in a cluster to perform same kind of activity and split the expenses. Small farmers will able to work together and result in immense production of goods which they can sell in market.This research can help small farmers by giving the idea of formation of cluster. Cluster formation could help small farmers to work together and achieve what they can't or could not achieve alone. They can avail the advanced technologies together share their knowledge and also could opt for gaining more advanced knowledge they require that they could not gain it alone due to high expense.

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Sustainable Agriculture: It's much needed implementation presently for a better living and the challenges ahead

Siva P.K. Chetri
Assistant Professor,Department of Botany, Dimoria College, Khetri, Kamrupa (M), Assam, India.
Kuldeep Sharma
Assistant Professor, Department of Botany, Mohanlal Sukhadia University, Udaipur, Rajasthan, India.
Junu Rahang
Assistant Professor,Department of Political Science, Dimoria College, Khetri, Kamrupa (M), Assam, India.

Abstract

Agriculture has changed significantly in the modern era of rapid global climatic changes. Food and fibre productivity has enhanced due to modern technologies, increased chemical uses for enhanced productivity and yield, specialization and government policies that favoured maximizing production and reducing food prices. However, these developments had also some disadvantages such as topsoil depletion, groundwater contamination, air pollution, greenhouse gas emissions, negligence on the living and working conditions of farm labourers, threats to human health due to the spread of new pathogens, disintegration of rural communities, higher economic prices in food and agricultural industries, etc. An emerging movement has grown during the past four decades to question those high costs and to offer some innovative alternatives. Today, this movement for sustainable agriculture is gathering much support and acceptance within our food production systems. Sustainable agriculture encompasses three main goals – environmental health, economic profitability and social equity. Though there are a variety of philosophies, policies and practices regarding sustainable agriculture, in the present scenario only a few with genuine principles have gained relevance. Agricultural sustainability relies on the principle that we must meet the needs of the present without compromising the ability of future generations to meet their own needs. There are different practices used by people working in sustainable agriculture. Growers may use optimal methods for soil health, and minimize water use and pollution levels on farm. Consumers and retailers can look for "value-based" foods grown using environmentally friendly methods or that strengthen the local economy. The researchers cross disciplinary lines with their work combining biology, economics, engineering, chemistry, community development, etc. However, sustainable agriculture in addition to a collection of practices is also process of a push and pull between the competing interests of an individual farmer or of people in a community with reference to solving complex problems about how we grow our food and fibre.

1. Introduction

Sustainable agriculture is farming in such a way for the efficient production of safe, high-quality farm product through the best use of non-renewable resources that protects the environment, improves the social and economic conditions of the farmers and local communities as well as takes care of the health and welfare of all farmed species. Sustainable agriculture involves an integrated system of agriculture practices that will over the long term satisfy human food and fibre needs in a holistic way. It aims to enhance environmental quality and the natural resource base, to efficiently use on-farm resources and integrate natural biological cycles, to sustain the economic viability of farming (Bhardwaj, et al., 2020).

Sustainable agriculture seeks to support farmers, resources and communities by promoting farming practices and methods that are profitable, environmentally sound and good for communities. Sustainable agriculture, a process inspired by the organic farming approach comes under the arena of modern agriculture that rewards the true values of the producers and their farming products (Darham and Mizik, 2021). It works on a variety of farms employing enhanced technologies and renewing the best practices of the past.

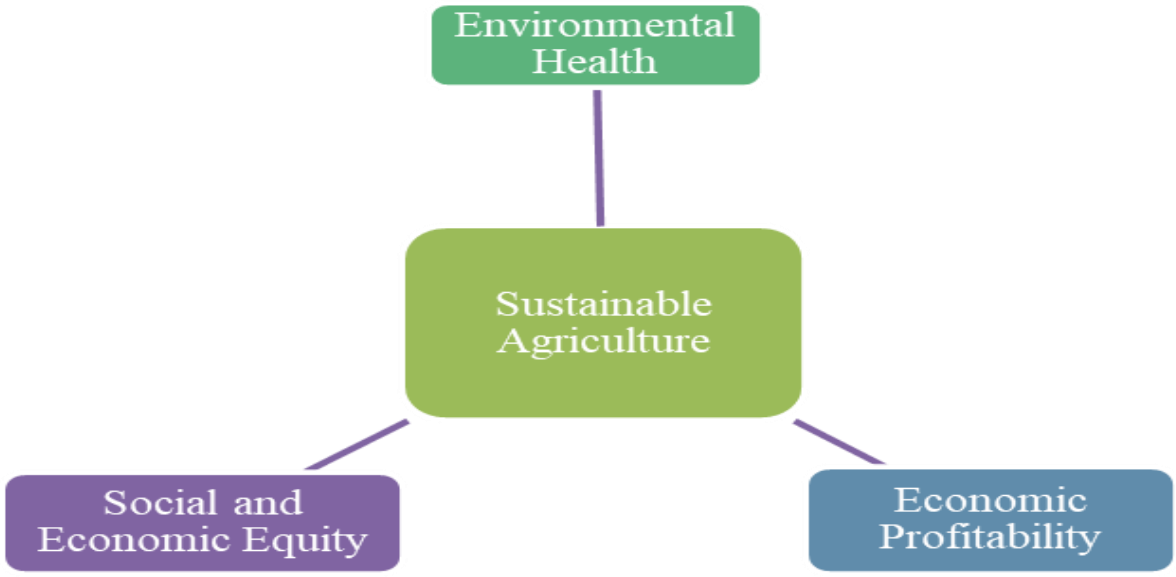

Fig. 1: The basic goals of sustainable agriculture.

The basic goals of sustainable agriculture are environmental health, economic profitability, and social and economic equity (sometimes referred to as the "three legs" of the sustainability stool; Fig. 1).The principle of sustainability relies on the motto that the needs of the present must be met without affecting the ability of future generations to meet their own needs(Moldan, et al., 2012). Therefore, the role of natural and human resources is of vital importance.For farmers, the transition to sustainable agriculture normally requires a series of small, realistic steps which eventually can make a big difference to promote the holistic approach of sustainable agriculture. This paper highlights the importance of sustainable agriculture and its much needed implementation presently for a better living and the challenges ahead.

2. Global Scenario

Rapid global climate changes are evident in the form of abnormal climatic patterns, unusual variation in temperature, warming and rapid melting of glaciers, unusual precipitation, salinity, drought and dry conditionsand leading to harmful effectson the physiology, phenology and productivity of crops everywhere in the world. Yet because of the rapid climatic changes, global warming, harmful anthropogenic activities, etc. have, nevertheless, also significantly impacted the health of the soil, plants, animals, microbes and humans.

Moreover, an unanticipated negative shift in farming, agricultural productivity and prosperity, as well as the sustainability of the global food chain and demand has also been brought on by a growing global population, industrialization and resulting need for SEZs for trade, commerce and economics and subsequently increased urbanization (Bricas et al., 2019). Furthermore, the agro ecosystems are influenced and badly affected due to modern farming practices and technology under the regime of excessive usage of chemical fertilizers, industrial effluents, toxic sewerages, and emerging hazardous contaminants of the soil, water, and air. The entire agriculture sector is under extreme pressure and has shrunk significantly therefore; sustainable agri-horticultural practices are urgently required to feed the world population adequately.

2.1. Urbanisation, Industrialization, and Marketization:

Urbanization is the increasing share of a nation's population living in urban areas in comparison to rural areas. Urbanization is the consequence of the net migration from rural to urban areas. Presently, agriculture provides the livelihoods for around one-third of the world's labour force and generates 2–3% of global value-added- and a vital part of industry and services are involved in the production, processing, distribution of various agricultural products (Satterthwaite *et al.*, 2010).

Agricultural marketing is moving an agricultural product from the farm to the consumer involving the planning, organizing, directing and handling of agricultural produce to satisfy farmers, the intermediaries and consumers. Due to the higher demand for processed food products a value addition in the raw agricultural produce is gaining ground and the movement of food commodities from producer to consumers in the form of value added products is required. The scope of agricultural marketing also includes supply of agricultural inputs (factors) to the farmers.

In the current scenario, the urban inhabitants and poor population are undernourished. Indeed, the majority of the population inhabiting any corner of the world is under the pressure of a variety of newer health hazards and repercussions (Bricas *et al.* 2019, Satterthwaite *et al.* 2010).

2.2 Human Health and need of SA

Sustainable agriculture has a broad connection with human nutrition and health. For healthy nutritious and sustainable diets, whole foods get a priority as they are naturally higher in fibre and lower in fat, sodium, sugar andadditives compared to highly processed foods (Yanet al., 2022; Mozaffarian, 2016). As an approach toagricultural sustainability, whole foods are advantageous with the lower costs of food processing and transportation. Organic farming provides significant benefits to humanhealth by reducing pesticideexposure to farmers and by increasing the nutritional valueof selected food crops (Hurtado-Barroso et al., 2019).

3. Environmental Resilience and Global Climate Changes:

As greenhouse gas emissions continue to rise globally, subsequently the climate change also gets increased. Although if emissions were to stop today, the climate change would continue for some time in response to the prevailing warming by the Earth's system.

Climate resilience is associated with acute events – such as heat waves, heavy rain falls, rising sea levels, worsening air quality, hurricanes, or wildfires – which intensify with the variation in climate (Fisk, 2015). Cities and local communities may respond by investing in infrastructure updates and climate-smart planning to tackle the impacts of such acute events. For example, a combination of nature-based solutions and building improvements, like planting street trees and installing green roofs, to a great extent can tackle extreme heat.

4. Vision and Actions required for Sustainable Agriculture in India

4.1. Monitoring and Effective Management of Pollution

In the past decade, third world countries have expressed an urgent need for enhanced global support on pollution management to respond to the magnitude of the threat to human health and economies. Tackling pollution is a challenge which is though solvable through action within a specific span to save lives at the local, national, regional and global levels. The sources of electricity production for eg., coal, oil, and natural gas have given rise to one-third of global greenhouse gas emissions. By providing cleaner and more reliable electricity the standard of living may be raised (Zabeltitz, 1994). India has a higher energy demand to satisfy the economic development plans. For the economic growth of a country, the provision of increasing quanta of energy is a vital pre-requisite (Kumar *et al.*, 2019). The National Electricity Plan (NEP) (National electricity plan, 2016), by the Ministry of Power (MoP) has developed an action plan to provide electricity across the country, to the citizens efficiently and at a reasonable cost. Climate change might also drastically affect the ecological balance in the world. India is one of the largest coal consumers in the world and imports costly fossil fuel (World Energy Scenarios Composing energy futures to 2050, 2013). So, it is utmost necessary to find alternate sources for generating electricity with a gradual transition to renewable energy sources for a sustainable growth and to avoid a degrading climate change.

4.2 Management of Natural Resources and Necessity of their Conservation

Natural resources are features of the environment that are important and of value to human beings. The rapid rate of modernization has affected our planet's natural resources and therefore, it is very necessary to conserve the natural resources. Natural resource management involves handling of natural resources such as land, water, soil, plants and animals, keeping in focus its after-effects on the life of present and future generations. Natural resource management emphasizes on a scientific and technical understanding of resources and ecology in addition to the life-supporting capacity of those resources. Natural resource management involve the ecological cycles, hydrological cycles; climate, animals, plants and geography etc. which are dynamic and inter-related (Morton et al., 2009). Conservation of environment involves the sustainable use and management of natural resources which include wildlife, water, air, earth deposits, etc. Natural resources may be renewable or non-renewable. Conservation of natural resources emphasizes on the needs and interests of human beings for biological, economic, cultural and recreational values.

4.3. Management of Solid Waste and Industrial Effluents

Industrialization has brought lots of advantages and disadvantages and creation of wastes is amongst one of its major disadvantages. Industrial waste can be solid, gas, or liquid and each type have different modes of management and disposal. Industrial waste management focuses on wastes relating to industrial, biological and household, before, during, or after production, and even after usage by consumers. However, in some cases, these wastes can be a great threat to human health.

Industrial waste management focuses on waste treatment for wastes directly or indirectly originating from industries, and may include corporate sustainability, environmental impact, consideration of the government policy and regulations, recycling, containment, handling and transport, technologies, economics, avoidance and reduction (Kurniawan, et al, 2022).

4.4. Conservation Agriculture(CA) and ecological prosperity of Agri-ecosystems

4.4.1. Soil Health and the need for its conservation

The health of soils depends on the organisms such as bacteria, fungi, protozoa, insects, other invertebrates and vertebrates contributing to the overall soil biodiversity (Yan et al. 2022; Tahat *et al.,* 2020). Soil biodiversity is an important component that drives the carbon, nitrogen and water cycles which are vital for living organisms on earth.

The productivity of land is dependent on its soil biodiversity. When land is degraded, its soil biodiversity is also diminished (Tahat *et al.,* 2020). When soil biodiversity is lost, soil can be eroded easily by wind and water, thereby causing land to produce less food, store less water and release carbon into the atmosphere (Tahat *et al*., 2020).Soil biodiversity on global basis contributes between USD 1.5 and 13 trillion annually to the goods and services provided by healthy ecosystems, including the provision of food, hydrological services and regulation of climate (IUCN, 2019). Soil organisms control the nutrient availability and intake of nutrients by plants, maintain soil structure, etc. The loss of healthy soils reduces agricultural yields which could result in a 25%reduction in food production by 2050 (IUCN, 2019).

4.4.2. Competent Horti-Crop Management and Climatic Actions

Climate change is affecting the global agricultural growth and productivity as per Intergovernmental Panel on Climate Change (IPCC) climate change especially the developing countries. Further, the horticultural production systems suffer especially in the developing countries due to issues like price fluctuations and other economic inflations. The farmers have to tackle the climate change challenges by adapting to climate-smart technologies for sustainable crop yields. Therefore, ensuring food security to Indian population in changing climatic scenario is the major concern and challenge ahead. Participatory approach and on-site demonstrations coupled with location specific technologies may help the Indian farmers accept the present situation of climatic changes. Interventions in quest of climate-smart horticulture integrating location-specific and knowledge-intensive assumptions are required to enhance crop productivity and yield in a challenging environment (Bhatt et al., 2019). So, crop-based adaptation techniques are required in an agro-ecological zone-specific manner considering Integrated Nutrient Management (INM), the crop type, and its carbon sink capacity would help develop a strategy for overcoming climate change- related challenges ahead (Kumar et al., 2022; Hussainy & Arivukodi, 2020; Selim, 2020; Malhotra, 2017). Due to the technological advances in India, the use of computer based simulation models by farmers, agri-professionals and policy makers is expected to increase.

4.4.3. Organic Farming

Organic farming is an agricultural method of beneficial farming that includes the use of pesticides, fertilisers from plant and animal wastes and crops capable of nitrogen-fixation in soil. Modern organic farming offers several ecological advantages and was designed to address the environmental harm caused by the use of chemical pesticides and synthetic fertilizers in conventional agriculture (Yan *et al.* 2022; Ferdous *et al.*, 2021). Organic farming employs fewer chemicals than conventional agriculture, lessens soil erosion, reduces nitrate leaching into groundwater and surface water and recycles animal waste back into the farm (Gong *et al.*, 2022).However, the farmers involved in organic farming face several challenges like high inputs and typically poorer yields(Thakur *et al*., 2022).The yield of organic crops is typically roughly 25% lower than that of conventionally grown crops, though this can vary greatly depending on the type of crop (Alvarez, 2022; Seufert *et al.*, 2012). The challenge for future organic agriculture will be to maintain its environmental benefits, increase yields and reduce prices while tackling the adverse effect of climate change and an increasing world population.

4.4.4. Value Addition and Capacity Building: Vocal for Local

Agriculture and allied activities are important parts of the Indian economy. It is the backbone of the Indian economy providing an income source to two thirds of the working population. The recent government schemes have given emphasis to the 'Vocal for Local' programme, reforms in ecosystem for e.g., infrastructure, skilled manpower, technology and export that would help India to march ahead from local to global and beyond. As per Economic Survey 2019-20, the average annual growth rate of agriculture and its allied sectors has remained almost static (2.9%) in the last 6 years (Express News Service, The Indian Express, 2022).The challenges for e.g., lack of innovation or technological intervention, rural infrastructure support, landless or land fragmentation, topography, input, etc. have causeda decline in growth of the agricultural sector. The agriculture sector stands as a bright spot in the backdrop of the pandemic which would help to escape potential recession of the economy(Express News Service, The Indian Express, 2022). The contribution of agricultural start-ups is also essential for a constructive growth.

5. Policy Recommendations, Implementation, and effective Governance for Sustainable Agriculture in India

The present agricultural challenges in India are three dimensional in nature, one towards doubling of farmer income, another towards enhancing productivity and the third towards reduction of natural resources and affected agro-biodiversity (GOI, 2019).However, the average farm size is positively co-related with income levels. However, in India, the share of large-sized farms (> 5 ha) decreased from 6% to 3%, while small farms (< 1 ha) increased from 59 %to 67 % from 1991 to 2011 (Priyadarshini and Abhilash, 2020). In the past few years, Indian population has diversified their dietary plans with the speedy urbanization and higher income levels gradually. The outcome revealed that the share of cereals inthe total food expenditure fell from 52% in 1972 to 29% in 2006 (FAO,2017). The dietary transition towards non-staple food sources affects the market system dynamics and the food processing systems (FAO, 2017).

The climate change is negatively affecting the agricultural productivity and livelihood in the developing economies (Steffen et al., 2015; Priyadarshini and Abhilash, 2019). Climate change affects the Indian agriculture sector due to its dependence on the prevailing rainfall and temperature variations and water stress conditions in major crop producing states, subsequently affecting the economic status of farmers very much (Abhilash and Dubey, 2014). Sustainability can be the major reason to tackle the climate risks, through a higher adaptive capacity of farmers

and resilience of farming lands (Kareemulla et al., 2017). The major contributors of sustainable agriculture include efficient resource management, use of local and improved seed varieties, employing traditional and modern skill-sets, diminishing use of pesticides and maintenance of soil quality using locally available bio resources.

Effectual policy framing and implementation is a critical component for structuring the path and determining the progress achieved within agriculture in terms of crop productivity, farmer welfare and transition towards sustainability. Therefore, the existing Centrally Sponsored Schemes (CSS), missions and programmes operating under the Department of Agriculture, Cooperation and Farmers Welfare, were reviewed in terms of their focus area, allotted funds and progress attained (AGRICOOP, 2018).

Furthermore, the role of science in agriculture governance was tested by understanding the coherence between the Sustainable Development Goals (SDG's) and proposed agricultural interventions by experts in the 'Report on Policies and Action Plan for a Secure and Sustainable Agriculture' (NITI Aayog,2017). Thus effective policy framing for higher crop productivity, farmer welfare, etc greatly relies on the integration of the factors involving the proposed gaols for sustainability and the agricultural strategies to be adopted.

Conclusion

The era of famine and food shortages is now a thing of the past because India's successful and effective implementation of the Green, White, Yellow, and Blue Revolutions, which have greatly resolved the issues of food scarcity. Unfortunately, it appeared as though the issues faced by smallholder farmers had magnified to become worsen, imposing pressure on their real income and quickly depleting the natural resources. Therefore, a defined strategy and an effective road map of actions that can lead to efficient, sustainable, and profitable, farming is required to buck this trend. Also, boosting agricultural growth is critical in order to achieve the Sustainable Development Goals (SDGs), especially related to environmental security, zero hunger, and no poverty. Hence, greater emphasis on agricultural research and innovation is necessarily required in order to accelerate the growth which is currently hovering around 2.9%, with considerable year-to-year volatility. In spite of a steep fall in the average amount of land holdings, it nevertheless provides a livelihood for half of India's population. But, the two major obstacles still remain: raising farm output and farmers' income. So, for Sustainable Agriculture to be properly adopted, the agricultural industry must prioritize wider agricultural research and innovations while increasing productivity, reducing production costs, and boosting farmers' income by connecting them directly to markets.

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Problems of Tomato and Potato Growers: A study on Paneri, Barbhag and Sontali areas of Assam

Dr. Bidyut Bikash Baishya
Assistant Professor, Department of Economics, Pragjyotish College,Guwahati,bidyut78@gmail.com
Farhana Mafiz
M.A. 4th Semester, Department of Economics, Pandu College, Guwahati, email:farhanamafiz272@gmail.com
Nilakshi Kalita
M.A. 4th Semester, Department of Economics, Pragjyotish College, Guwahati e-mail:kalitanilakshi0@gmail.com
Wahida Parbin
M.A. 4th Semester, Department of Economics, Pragjyotish College, Guwahati e-mail:wahida123445@gmail.com

Abstract

Rural India relies heavily on agriculture to sustain its economy. It is one of the major sources of employment for rural residents. In order for a region to grow economically, rural markets play a crucial role. Still, agricultural marketing is relatively underexplored. Due to this, it is important to highlight the problems surrounding agricultural marketing in Assam. Using primary field data, we explored the problem of agricultural marketing in Barbhag, Paneri and Sontali, respectively, of Nalbari, Udalguri and Kamrup districts. To accomplish this, we used descriptive statistics and t test. Each of the three areas was sampled by 30 farmers such that n=90. Averaging out the incomes of farmers in Barbhag, household expenditure, and agricultural expenditure, we found that farmers in Barbhag earn around Rs. 13333 a month on average. In Paneri, the average monthly household expenditure of the farmers is Rs. 9566, the average monthly income is Rs. 12,700, and the average montshly expenditure on agriculture is Rs.7500. The average household expenditure in Sontali of Kamrup is found to be Rs. 7233, the average monthly income is Rs. 9701, and the average monthly expense on agriculture is Rs. 6500. We found that agricultural marketing systems have a number of bottlenecks, including the lack of education among farmers, inadequate warehouses, the dominance of middlemen, as well as a lack of communication and transportation. Additionally, farmers lack access to new agricultural technologies and are less familiar with online marketing.

Key words: Agricultural marketing, Middlemen, Technologies.

1. INTRODUCTION

The market is defined as a meeting place where buyers and sellers fulfill their individual needs and want. A market operate in response to the demand and supply position, which in turn determines the market price of the commodities being traded. These markets give rise to the concept of marketing. Agriculture satisfies the essential requirement of humanity by yielding and proving food as per the needs. Broadly, rural marketing incorporates marketing of agricultural products,

industrial products and services. Development of rural India is impossible without the effective and efficient rural and agricultural marketing .Rural marketing refers to marketing of goods and services from urban to rural areas and agricultural marketing refers to marketing of goods and services from rural to urban. Agricultural marketing continues to be in bad shape in rural India. In most of the cases, these producers are forced, under socio-economic condition, to carry on distress sale their produce. The farmers usually borrow money to meet their responsibilities and pay their debt, the poor farmer is forced to sell the produce at whatever price is allowed to him. Potato is most widely grown vegetable crop in the country with 25.70% share. Similarly tomato occupies a significant position in vegetable production in India with a share of 10%. India has favourable aground climatic conditions for potato and tomato cultivation but may not fulfill the need of people, when our farmers are not trained with skillful utilization of technology. The farmers face a number of problems in production, marketing and storage of potato like inadequate supply of inputs, unawareness about the improved technology of potato production, use of home produced seed, lack of availability of suffient good quality seed well in time, irrigation problem, non-availability of sufficient finance, lack of storage space etc. It is seen that Rural Credit Survey rightly mentioned that the producers, in general sell their produce at an unfavorable terms. In the deficiency of an organized marketing structure, private traders and intermediaries dominate the marketing and trading of agricultural produce. The payment of the middlemen's services increases the consumer's load, although the producer does not derive a similar benefit.

2. REVIEW OF LITERATURE

Kumar (2012) has revealed from his study that efficient marketing plays a significant role in economic development, while unawareness is the major symptom of inefficient markets.

Vidya Iyer (2010) when it comes to exploring rural markets there are challenges and opportunities the concept of rural markets is developing and is not stationary in growth.

Sun & Wu (2004) said that, rural and agricultural marketing is an untapped opportunity and an unexplored area compared to urban market. Marketers can set up booths in traditional farmer's market to increase awareness, observability, relevance, and trainability to rural consumers. A specific segmentation strategic approach with different product, communication, and distribution will help to succeed.

Acharaya & Agarwal (2010) said an efficient marketing system ensures higher levels of income for the farmers reducing the number of middlemen or by restricting the cost of marketing services and the malpractices. It guarantees the farmers better prices for farm products and induces them to invest their surpluses in the purchase of modern inputs so that productivity and production may increase. This again results in an increase in the marketed surplus and income of the farmers. If the producer does not have an easily accessible market-output where he can sell his surplus produce, he has little incentive to produce more. The need for providing adequate incentives for increased production is, therefore, very important, and this can be made possible only by streamlining the marketing system.

Arneja et at., (2009), Lal et al., (2011) and Katayani et al., (2017). The farmer face a number of problems in production, marketing and storage of Potato like inadequate supply of inputs, unawareness about the improved technology of potato production, high transportation cost, use of

home produced seed, lack of availability of sufficient good quality seed well in time, irrigation problem, non-availability of sufficient finanace non-remunerative market price of the produce, lack of sufficient storage and malpractices exercised by traders.

Biswajit, (2014), Rosegrant et al., (2007) Researchers say that the prevailing agricultural technology and understanding are insufficient to achieve the development in food creation needed to meet the set growth aims modern technologies, policies and practices should be designed and disseminated to the farmers in order to enhance the agricultural production and efficiency.

According to **Birner et al., (2009), United Nations (2019) t**he advancement in dispersion of a noble technology is finally reliant on the competency and efficiency of the agricultural research and extension. Agricultural transformations makes small holders to travel away from conventional manufacturing producers, thus growing the need for a more differentiated extension system local rural markets act as the best option for the small farmers to sell their perishable surplus products to get quick returns. Due to the lack of good infrastructural facilities in the study area, most of the farmers prefer local rural markets instead of going to the specialized markets or nearby town area. Agricultural marketing system in eastern and northeastern state is distinctly different from the other states in the country. It is observed that, the ownership structure and functioning of the market in those states is heterogeneous.

Arora, VPS (1998) the market wise analysis of tomato showed that on an average, the mean prices of tomato varied between Rs 600 and Rs 694 per quintal in the selected markets. Whereas minimum and maximum price per quintal varied between Rs 130 to Rs 268.

3. OBJECTIVE

The objective of this paper is to investigate the problems of rural agricultural marketing in Paneri, Sontali and Barbhag areas of Assam and to offer some suggestions on the basis of the findings.

4. DATABASE AND METHODOLOGY

The study is entirely based on primary source of data collected through field survey through direct questionnaire method using stratified random sampling technique. 30 household from each areas has been selected for detailed study of the potato and tomato growers in the respective areas. The households were interviewed for detailed information regarding transaction loans, insurance, subsidy, types of markets for the produces to be sold.

5. STUDY AREA

For the study, the area of Paneri from Udalguri district, Barbhag from Nalbari district and Sontali from Kamrup district has been selected as study areas. Taking into consideration its agricultural base and economic backwardness. Paneri lies between latitude 26.730876° and longitude 91.910785°. The total geographical area of village is 275.12 hectares and the population is 1,731. Barbhag area of Nalbari lies between latitude 26.370593° and longitude 91.465003°. The population is 89158 and area is 114.16 hectares. Sontali lies between latitude 26.151558° and long 91.149124°. And Sontali has a population of 1135 and area is 58.38 hectares.

6. FINDINGS AND ANALYSIS

6.1 Socio-economic profile of tomato and potato growers

The following table represents the socio-economic profile of the study area

Table1: Socio-economics Status

Variables	Paneri	Borbhag	Sontali
Age	45.80(SD=9.525)	46.77(SD=15.415)	45.23 (SD=11.869)
Gender	Male: 86.7 Female: 13.3	Male:100.0 Female: 0	Male:100.0 Female: 0
Religion	Hinduism:26.7 Islam:73.3	Hinduism:100.0 Islam: 0	Hinduism: 0 Islam:100.0
Education	5.63(SD=5.012)	9.8(SD=3.070)	5.53(SD=4.946)
Income	12700 (SD=3687.00)	13333 (SD=1000)	9701 (SD=5581)
Monthly Household expenditure (in INR)	10,600	8800	7233
Monthly Agricultural Expenditure (in INR)	9566(SD=6111)	5400(SD=3672)	6500(SD=3411)

(Source: primary data)

The study reveals that, the average age of the respondent of potato and tomato growers is 45.80(SD =9.525) in Paneri, 46.77(SD=15.415) in Barbhag and 45.23(SD=11.869) in Sontali areas of Assam. The male percentage engaged in growing Potato and Tomato in Paneri is 86.7% and female percentage is very nominal which is 13.1% whereas in Barbhag the male percentage is 100% and female percentage engaged is zero. Again in Sontali it can be seen that there is no female percentage engaged in the cultivation and the male percentage engaged is 100%. The study

also highlights that the mean year of schooling in the area of Paneri is 5.63(SD=5.012), in Barbhag 9.8 (SD=3.070) and Sontali is 5.53 (SD=4.946). The average monthly income of the households in the areas of Paneri, Barbhag and Sontali are12700 (SD=3687.00), 13333 (SD=1000), 9701 (SD=5581) respectively. The monthly household expenditure in the areas of the study is as Rs 10600, Rs 8800 and Rs7233 respectively. The average amount of monthly agricultural expenditure in Paneri, Barbhag and Sontali is Rs 9566(SD=5041).

6.2 Problems faced by the farmers

The study carried out reveals the followings problems from the study area

Table 2: Proportion of Respondents who ranked the Problems

n=2

SL. No.	Constraints/ Problems	PANERI	BARBHAG	SONTALI
1.	Lack of Crop Insurance	30 (100%)	17 (56.6%)	30 (100%)
2.	Non-Availability of Loan	30 (100%)	22 (73.3%)	30 (100%)
3.	Lack of Subsidy	30 (100%)	6(20%)	30 (100%)
4.	Lack of Cold Storage Facilities	30 (100%)	30 (100%)	30 (100%)
5.	Lack of Agricultural Training	30 (100%)	10 (33.3%)	30 (100%)
6.	Prevelence of Flood	No flood	30 (100%)	30 (100%)
7.	Average Distance to Market	4.43 KM	2.79 KM	3.52 KM

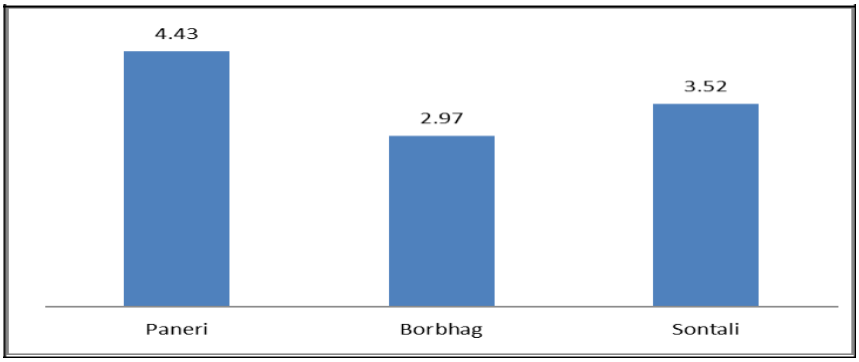
(Source: primary data)

Summing up all the three areas and taking the data together, we get, 14.4 % of the respondents agree to have crop insurance to compensate their losses while 85.4% of the population does not have the same. Again 33.3% of the respondent have received subsidy by government and 66.7% have not received any subsidy according to the study. Again the loan taken by the cultivators in the study areas is 8.9% and the 91.1% have not taken any kind of loan. The overall percentage of the farmers who are trained in agriculture is 21.1% and 78.9% are untrained. In the survey it is found that two areas Barbhag and Sontali are affected by flood while Paneri is not a flood zone.

6.3 Distance to Market

The average distance to the market in Paneri is 4.43kms while in Barbhag is 2.97kms while in Sontali is 3.52kms respectively.

Figure 1. Average distance to the nearest market (in Kms)



***(Source:** field data.)*

6.4 Use of Smart Phone

The average access of smart phone in Paneri is 4.43(SD=2.921) whereas in Barbhag is 2.97(SD=1.629) whereas in Sontali is 3.52(SD=0.905). The average benefit of smartphone in agricultural marketing is the sample areas is 47.

6.5 Place of Sale

The study reveals that 45.6% of the respondent sells their products in daily retail market again 44.4 % of the respondent deals in weekly retail market for their products and 3.3% of the respondents sell in wholesale mandi.

7 SUGGESTIONS

- Market Information: The poor and illiterate farmers need more access to various methods of gathering information about the market for their agricultural goods.
- Low Literacy: The education level in rural areas is very low. There is need of more awareness of education in the rural areas.
- Training facilities: For the improvement of agricultural marketing, it is necessary to make arrangements for appropriate training of the cultivators.
- Loan facilities: The loan facilities should be encouraged in the rural areas. The farmers in the villages should also be encouraged to spend economically and save money so that at the time of need they get money from their savings.
- Storage Facilities: Storage facilities should be made available in the rural areas so that the farmers can store their produces and sell them in market at a reasonable price.

8 CONCLUSION

An efficient marketing system is not only to satisfy the producer but also provide the products to the consumer at reasonable prices. It is an integrated process of moving agricultural products from the farms to the consumers. From the above discussion it is clear that potato and tomato markets are facing various obstacles in marketing of its production. The main reason is the financial crisis among the farmers, which leads them to enter into contracts during cultivation with the middleman at very low price, therefore there is need a active policy action to increase farm productivity, improve technology and better storage facilities. There is a need to conceive a special insurance coverage scheme so that farmers may not suffered during the time of natural disasters like flood and erosion .Also the price variations are different because of lack of market link among the farmers, hence strong interventions in the commodity marketing have become the need of the hour.

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Farm Laws 2020: Problems and Prospects in Indian Agriculture

Junu Rahang
Assistant professor, Deptt of Political Science, Dimoria College, Khetri. E mail: rahangjunu242@gmail.com
K. Neisi Singson
Assistant professor, Deptt of Political Science, Dimoria College, Khetri. E mail: neisisingson@gmail.com.
Archana Saharia
Assistant professor, Deptt of Political Science, Dimoria College, Khetri. E mail: archanasaharia29@gmail.com.
Kakoli Das
Assistant professor, Deptt of Political Science, Dimoria College, Khetri. E mail: kakoli17das@gmail.com

Abstract

Agriculture is one of the biggest sectors of Indian economy. The government of India had passed the Farmers Bill 2020 or Farm Bill 2020 with the objective to reform the agriculture sector and bring better benefits to the farmers in terms of getting them good deals for their produce and to change the way agricultural produce is marketed, sold and stored across the country. The Farm Bill 2020, consists of three bills that are Farmer's Produce Trade and Commerce Bill, Farmers Agreement on Price Assurance and Farm Services Bill, and Essential Commodities (Amendment) Bill. After the assent by the President these bills got passed by the Parliament and became the laws of India on September 27, 2020. The first law- The Farmers Produce Trade and Commerce (Promotion and Facilitation) Act 2020, to give freedom to farmers to sell their products outside the notified Agriculture Produce Market Committee (APMC) market mandis. The second law- The Farmers (Empowerment and Protection) Agreement of Price Assurance and Farm Services Act, 2020- that seeks to grant farmers the sight to enter into a contract with agribusiness firms, processors, wholesales, exports etc. for the sale of future farming produce at pre-assessed prices. The third law- The Essential Commodities (Amendment) Act 2020- that seeks to remove commodities like cereal, pulses, onion, oilseeds and list of essential commodities and will do away with the imposition of stock holding limits on such items falls under extra ordinary circumstances. Though the government had passed the bill for the welfare of the farmers there was opposition in different parts of the country. Some stakeholders and experts have expressed serious notion about the effects of these acts on farmers and the agriculture sector of the nation. But there have been protests against the acts by farmers in many states mainly in Punjab, Haryana. The Kerala government had passed a resolution against the farm reforms and sought their withdrawal. The Supreme Court of India stayed the implementation of the Farm Acts 2020 and constituted a four-member committee to make necessary recommendations.

Keywords: Farm Laws, Agriculture, Farmer, Problem, Prospects.

Introduction

Agriculture is process of cultivating crops and raising livestock that involves the preparation of plant and animal products for people's use and their distribution to markets. India is a country where agriculture is an important sector of the Indian economy with its overall population broadly dependent on its agricultural produce. Around 58% of India's population rely on agriculture for their livelihood that comprises of 70% of rural households out of which a majority (82%) are marginal farmers (Gupta, 2021). As per the Farm Census 2015-16, a majority (86.2%) of small and medium farmers possessed land lesser than 5 acres (Dhaliwal, 2020). The farming community population has often faced the consequences of unfavourable policies of the Government. The agricultural sector has been ignored despite being the primary source of livelihood of the majority of the population (Jodhka, 2006, Acharya, 2006). This sector has faced economic, social and environmental neglect resulting in vast-ranging problems in the overall development of the country (Acharya, 2006, Gupta, 2021).

In 2020, the Union Government with the objectives of freeing up curbs on trade, liberalising regulatory system, providing barrier-free trade and creating a farmer-friendly environment promulgated three new farm bills. They were legislated into Acts by the Indian parliament in September of that year amid a strong opposition and then signed by the President of India. The three Farm Acts are the Farmers' Produce Trade and Commerce Act 2020, the Farmers' Agreement on Price Assurance and Farm Services for Agriculture Act 2020 and the Essential Commodities (Amendment) Act 2020 (Anjani et al., 2021; Gupta, 2021). They are considered to be the most prominent structural reforms in Indian agriculture in the last few decades (Chand, 2020). The broad objective of these Acts is to address the structural weaknesses inherent in the sale, marketing, and stocking of agri-produce in the regulated/wholesale markets being governed under the aegis of the Agriculture Produce Committee Act 1966 and the Essential Commodity Act 1955 (Bathla, & Hussain, 2022). Establishments of privately owned markets in contrast to the existing APMC markets and starting off contract farming and other provisions of the Bills would increase competition, investment and innovation and thereby provide farmers with broader choices to realise better prices for their produce (Anjani et al., 2021).

Since agriculture is a subject on the state list of the Constitution of India, the states are expected to amend the rules, procedures, and codes of conduct for trade in consonance with the provisions laid down by the new national central laws (Anjani et al., 2021). Their enactment, however, had provoked serious discussion, criticism and even protest, to the extent that, in January 2021, the Supreme Court had to intervene and constitute a three-member committee to look into the implications of these laws for farmers' welfare, agricultural economy, and other crucial aspects (Singh et al., 2021). As a consequence, the members of various farmers unions, and APMC market yard traders raised their protest against the aforesaid Bills and demanded a repeal of those three Farm Bills.. This paper highlights the Farm Laws enacted in 2020 and the problems and prospects of these Farm laws in Indian Agriculture as a whole.

The Three Farm Acts:

Agriculture is included in the state list of Schedule 7 of the Indian Constitution. So as to launch improvements in the agricultural sector, the central government had released model farming acts in 2017 (Singh & Shergill, 2021). However, the states had not implemented the said reforms suggested in the model. Subsequently, in June 2020 the centre announced three ordinances known as the Farm Bill 2020. In September 2020, the President gave approval to the three farm acts.

The Farmers' Produce Trade and Commerce (Promotion and Facilitation) Act, 2020: The Act confers setting up of agricultural sale and marketing beyond the notified Agricultural Produce Market Committee (APMC) market yards for farmers, to increase inter-State trade and laid the foundation for electronic trading of agricultural produce. It enhances the range of trading of farmers from a specific area to any place of agriculture production, collection and aggregation of products. It restricts State governments from imposing any market fee, cess or levy outside APMC areas (Kumar et al., 2021). The bill intends to break the control of government-regulated market yards and allow farmers to sell their farm products directly to private clients.

Farmers (Empowerment and Protection) Agreement on Price Assurance and Farm Services Act, 2020: It creates a foundation for contract farming and provides opportunities for farmers to take part in written contracts with companies and start agriculture production for them. The written contracts and agreements, before the production of any farm produce, contains the terms and conditions for supply, quality, grade, standards and price of farm produce and services (Rashid, 2021). It defines a dispute resolution mechanism. The Act empowers for a three-level dispute settlement mechanism that includes the Conciliation Board, Sub-Divisional Magistrate and Appellate Authority (Joseph and Sunny 2020).

Essential Commodities (Amendment) Act, 2020: As per this Act, from the list of essential commodities cereals, pulses, oilseeds, edible oils, onions and potatoes are removed. It will not interfere in the production, storage, movement and distribution of the aforesaid food commodities and will also remove stockholding limits on such items except during "exceptional cases". The central government has the special provision for supply during war, famine, extraordinary price rise and natural calamity and annual retail price rise above 100% in horticultural produce (basically onions and potatoes) and 50% for non-perishables (cereals, pulses and edible oils), while providing exemptions for exporters and processors at such times as well (Dhaliwal, 2020; Bathla & Hussain, 2022). By declaring a commodity as essential, on price rise, war, famine and natural calamity the Government may impose a stock limit. It will allow agribusinesses to stock food articles and remove the government's ability to impose restrictions randomly.

Arguments in favour of the Farm Acts

The acts are being praised as a landmark in the history of Indian agriculture for a complete revolution in agriculture transformation. The new farm acts are expected to benefit the three participants viz., farmers, industry and consumers. The farm acts would help the marginal farmers (86% of total farmers) to get a better price than earlier or invest in technology to improve the productivity of farms (Paramesh et al., 2022). The new acts will help in supporting a much more integrated market, creating competition and improving efficiency and effectiveness of the marketing sphere of the agricultural sector.

Advantages of the Farm Acts: The farmers will have a vast territory and an alternate channel through which they can sell their produces by creating a competitive market favourable as per them. A corresponding market ecosystem for the farmers will do exist. As earlier they could only make deals through the National Agriculture Market (NAM) system. Farmers are not compelled to pay commissions to commission agents to sell their crops and the farmers can have a free and more flexible system. According to an amendment to the Essential Commodities Act, the act will eradicate the unsecured financial state of the farmers. The traders purchasing from farmers should consider that stocks are excess and there are also provisions of heavy penalty for violation of rules and regulations (Shah et al., 2021, Shakeel et al., 2022). Such provisions can avoid losses for the farmers. As per the bill, the minimum support price remains the same and the government procurement will continue (Bathla, S., & Hussain, S. 2022).

Disadvantages of the Farm Acts: The Act is against India's soul of cooperative federalism and also invades the functions of the state. The constitution tells that agriculture and markets are considered as State subject. The Central Government emphasizes that trade and commerce of food items is a contemporary list and constitutional decorum is maintained (Singh, 2021). The State governments no longer can collect the market fee and impose tax charges and this will mostly add to a loss of revenue to the State Governments. With this law, market yards operated under the APMC law of the states will be abolished. After the end of the APMC market yards, the farmers will be forced to sell the crop to corporate companies at a very lower price (Khan, 2011). Due to the scrapping of the market yard system, purchase of crops on MSP will be abolished (Narula, 2022). Earlier, farmers' products moves inter-state and the provisions of the new law are only for the benefit of the corporate than the farmers (Khanna et al., 2023). The farmers will be at the risk of fraud due to new participants without valid license or registration. As per the Farmers (Empowerment and Protection) Agreement of Price Assurance and Farm Services Act, 2020 in case of any dispute with the corporate buyer, there are ample chances of farmers' interests being ignored and thereby farmers fear losing their land and becoming "slaves" to those corporates. According to the farmers, the Essential Commodities (Amendment) Act, 2020 is on the sides of the mega and corporate buyers.

If there are variations in prices then the agreement must include a guaranteed price and remove references for additional amounts and all of this will include bonuses and premiums

(Srivastava and Saxena 2021). Due to the lack of price fixation mechanism, the farmers cannot compete the price exploitation. As the corporate houses are free enough, there are possibilities of exploitation and owing to the unorganized nature of our agro sector (Chaturvedi, 2021). This also might lead farmers to lack resources when they are in need of legal battle with corporate (Saraf et al., 2022). The Essential Commodities Ordinance has removed agricultural produce such as cereals, pulse, oilseeds, edible oils, onion, and potatoes from the essential commodities list. There is a regulation regarding such produce even during the war, famine, extraordinary price rises and natural calamities with only exemptions being exporters and processors (Dhaliwal, 2020; Gunjal, 2021). The exporters, processors and traders might accumulate produces at lower prices and can release only when the prices will go up and States would have no dominance over the handiness of stocks (Chaturvedi, 2021; Kumar & Singh, 2021).

Challenges to Farm Bill 2020

Farm Bill compels the farmers to sign farm agreements, before the production of crops mentioning in priority the price to be paid. In situations such as variations in prices, the agreement must include a guaranteed price and clear reference for additional amounts. This will include bonuses and premiums. Since price fixation mechanism is lacking, the farmers are prone to price exploitation. Since corporate houses are given a free hand, there are possibilities of exploitation, owing to the unorganized nature of our agro sector (Harriss-White, & Gooptu, 2001). Also, farmers will be short of resources required for legal challenges with corporates.

The farmers displayed their uncertainty towards the Central government as the bill was passed without debates. Hence implementation of the Act was a challenge to the government. As the restrictions on accumulation on a few products are repealed, the imports of such products may increase. This again will be a dispute to protect domestic farmers from such imports. Due to poor investment in storage, warehouses and modern technological facilities farmers have been unable to get better prices despite India being in a surplus state in a majority of Agri-commodities (Arora et al., 2022). Further, it is highly centralized law that will limit state's power, as they will not be able to interfere in the commodities menace of storing commodities which might enhance black marketing and inflation affecting the people of the nation.

Farm Laws Repealed: A series of protests were done by the farmers mainly from Punjab and Haryana, on the borders of Delhi for more than a year. The very prime ultimatum of the protesting farmer's organisations was for the repeal of three new agricultural laws by the Central government. As per the farmers, the law was implemented to suit big corporations who seek to dominate the Indian food and agriculture business and will weaken the negotiating power of farmers. Also, big private companies, exporters, wholesalers, and processors may get the advantage. The Government's proposal to enact the Farm Laws 2020 for a period of one to one and a half years was also rejected by the farmers. Earlier, SC stayed the implementation of the Farm Acts 2020 constituted a four-member committee to make recommendations within two months The farm laws were in force for only 221 days — June 5th 2020, when the ordinances

were promulgated to January 12th 2021, when the Supreme Court stayed their implementation. Subsequently, the Prime Minister of India on 19 November 2021 announced that the Centre would repeal the laws in the upcoming parliamentary session in December. On 1st December 2021, the laws were formally repealed. The report of the Supreme Court appointed committee was made available to public on 21st March 2022.

Discussion:

Agriculture contributes to around 15% of our GDP. These three farm bills which have been passed recently by government are steps towards establishing a bigger and better platform for farmer to sell their produce. These bills will increase the growth in agricultural sector by providing farmers better facilities of marketing and storage infrastructure like cold storage chains.

This will definitely give rise to employment and will result in economic prosperity. But on the other hand government should closely monitor that farmers should not be exploited much by entry of private players into the industry as it is the duty of the government to protect farmers as they are the soul of the nation who protected GDP even when all other industries failed to perform well during the 1st two quarters of financial year 2020-21 when this Covid-19 outbreak happened (Narayanan, 2021; Tyagi & Minz, 2023).

Now farmers have their own choice whether they want to sell their produce to APMCs or directly to the private player outside designated market space and there is no guarantee that by passing these three bills farmer's income will increase (Paul and Umamaheswari, 2022). For eg., in the state of Bihar, the farmers associated with APMCs collected much lower prices than the MSP. So instead of letting private player to enter into the system, APMCs has to be strengthened, to assist the farmers for an enhanced income (Bishnoi and Kumari, 2020).

If we consider agriculture as an industry, it will be the largest industry as 70% of our nation is directly or indirectly engaged in it. The farmers came on road to protest against the aforesaid three farm bills passed by Parliament. The government had introduced the three bills on "One Nation, One Agricultural Market" concept giving the liberty to farmers to sell their produce anywhere in the country beyond APMC market yards (Bishnoi and Kumari, 2020).

Within the academia, various arguments have been put forth for and against these laws based on their ability to bring about competition, improve marketing and price efficiency, and increase farmers' level of income (Sekhon et al., 2022). Most of these arguments on the Farm Bills are based on ideological beliefs and imaginary justifications of the stakeholders. Under such circumstances, empirical evidence for the support or oppose of the Farm Bills is of prime importance (Anjani et al., 2021).

Providing the farmers the liberty to sell without middlemen will be of immense utility only if there are roads that link villages to markets, climate-controlled storage facilities, reliable electricity supply to run those facilities and a link to food processing companies who could compete to buy their produce. The government should also bestow the requisite support to the Minimum Support Price (MSP) and government procurement so as to counter the insecurities of farmers.

As there were constant protests by the farmers to repeal the Farm Bills, the Government had to repeal the farm bill before a year span of time with the Supreme Court also providing the verdict in favour of the protesting farmers subsequently. The farm laws provided important lessons to the government, the first being that the process of economic reforms has to be more consultative, more transparent and better communicated to the potential beneficiaries. It is this process of incorporation and consideration showcasing the democratic functioning of India. It takes time and proper consultations to implement reforms, looking into the argumentative nature of our society which subsequently can win everyone's heart.

Conclusion:

Reforms in agriculture have been delayed and are expected to provide better earnings to the farmers, with reference to the economic growth of India after the initiation of New Economic Policy in 1991. However, there is a need for making the farmers aware of the legitimate intentions of the government and to resolve their genuine concerns by the way of revisions. It is to be understood that agriculture forms the backbone of India and opting for any alterations or adjustments should be incorporated in a democratic manner, considering all the factors. It definitely is in need of a reform and the new bill improves farm incomes, attracts investment and technology. However, the middlemen who effectively run wholesale markets and state governments tend to lose their income. Though, the bill may prove to be extensive , the government needs to address farmers' concerns and put an end to their uncertainties by way of open discussions for the sake of removing the drawbacks.

The repeal of the three Farm Bills of 2020 highlights that any future attempts to reform the rural agricultural economy would require a much wider consultation, not only for better design of reforms, but for wider acceptance. What the agrarian structure needs is an assurance that the farmers' interests would not be fastened to immediate compulsions of interest groups, be it political or corporate. Thus problems and prospects exist with the Farm Bills 2020 in Indian Agriculture system which however had to be repealed by the Government under the continuous efforts of the farmer groups who had raised significant opposition to those bills and even had to approach the Supreme Court for a verdict on those bills.

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Economics of Marigold Cultivation in Assam

Dipali Baishya
Assistant Professor
N.N.Saikia College, Titabar

Abstract:

With floriculture being accorded as the sunrise industry, the importance of commercial floriculture has amplified. Many varieties of flowers are grown in Assam. Out of which the commercially grown are marigold, tuberose, gerbera and gladiolus. The objective of this paper is to study the economics of marigold cultivation in assam. Marigold cultivation is spread across Upper and Lower part of Assam and it was found that the producer's share in consumer's rupee was 80.33 percent in Channel I (Producer – Consumer) which was found to be the highest. In Channel II (Producer – Retailer – Consumer) the producer received 43.8 percent of the consumer's rupee in Sualkuchi while it was 31 percent in Hajo. In Jorhat and Dibrugarh, it was found to be 50.9 percent and 59.9 percent respectively. In case of Channel III (Producer- Local agent- Retailer – Consumer) it was found to be 30.71 percent and 50 percent respectively in Hajo and Nalbari respectively. The marketing efficiency was 5.10 in Channel I. The average marketing efficiency in Channel II was 1.92 while in Channel III it was 1.71. The price spread as a percentage of consumer's rupee was 19.6 percent in Channel I. The average price spread in Channel II was 53.58 percent and that in Channel III was 59.65 percent.

Keywords: floriculture, marigold

Introduction:

Floriculture is the art and knowledge of growing flowers to perfection. Being a branch of horticulture, it deals with the cultivation of flowers and ornamental crops from the time of planting to the time of harvesting. It also includes production of planting materials through seeds, cuttings, budding, grafting and marketing of flowers and flower produce. (Ravinath, 2007)

According to nature and form of use, flowers can be classified as Loose flowers and cut flowers. The flowers which are usually harvested without stalk and used for Gajara, Veni and Garland. Example: Marigold, Tuberose, Jasmine, Aster, Crossandra etc are loose flowers. Cut flowers are fresh flower harvested in clusters / spike or in single along with their stem. Example: Gerbera, Gladiolus, Lilium, Anthurium, Orchid, Anthurium etc.

In Assam flowers are grown in Hajo, Rangiya, Nagaon, Morigaon, Jorhat and Dibrugarh. Although flowers are commercially cultivated in Assam, however the local demand cannot be met with the local produce and flowers have to be regularly imported from Kolkata and Bangalore. Thus, a huge gap between demand and supply of flowers exists in Assam. Fulfilling this gap could also mean a

source of employment to the unemployed youths of the state. Understanding the tremendous importance of floriculture in employment generation the Government of India has declared floriculture as a sunrise industry.

To boost the floriculture sector of Assam state government has decided to launch Floriculture Mission with an outlay of Rs 150 crores. The mission proposes area expansion - from 2,200 to 3,288 hectare over a period of 3 years, Open flower cultivation - Summer & Winter Marigold, Gladiolus, Tube Rose, Chrysanthemum, Lotus, Lilium, Flower cultivation under protected condition - Gerbera, Orchid, Green Foliage, Dutch Rose & Anthurium, Post-harvest Management including Pack house & Pre-cooling facilities, Transport vehicles, Refrigerated vans and Plastic crates, Value addition which include Establishment of Agarbatti units, Essential & Aromatic Oil production unit besides development of Wholesale Market facilities and Floriculture Retail Outlets.

Marigold is one of the easiest annual flowers to cultivate and it has wide adaptableness to different types of soil and climate. The plants with their striking flower colours bloom for a significantly long period and the flowers keep outstandingly well when cut. Hence Marigold is one of the most admired annual flowers in India for garden display as well as for commercial farming.

Marigolds can be broadly classified into two groups; viz. African marigold and French marigold. The African marigold has its origin in Mexico and the French marigold is from Mexico and South America.

African marigold: These are tall (up to 90 cm) plants having large round flowers measuring up to 15 cm or more, and in different colours such as lemon yellow, bright yellow, golden yellow and orange. Of late, a white flowered cultivar has also been developed in USA.

French marigold: These are compact in habitat, 30 -37.5 cm tall and flower copiously in singles or doubles. The colour ranges from deep scarlet, mahagony, rusty red, primrose, golden yellow, orange and any combination of these colours.

From a commercial point of view, the African marigold is in greater demand as compared to French marigold.

Marigolds are perfect for cut flowers, especially for making garlands. Marigold probably ranks next only to Jasmine in terms of popularity in India. It is frequently used as a pot plant, cut flower for making garlands, Floral decorations used in mixed herbaceous borders and bedding as well as for medicinal purposes.

Marigold requires a serene climate for abundant growth and flowering. Planting of African marigold is done after the first week of February but before the first week of July; any deviance thereof greatly affects the quality and yield of flowers. Between the above two cut-off dates, planting spread out at monthly interval assures a steady supply of flowers to the market over an

extended period from October to April. However utmost yield can be obtained from a planting done in September.

Marigold can be grown in a wide array of soils, except in water logging situation. The best soil for marigold cultivation is lush sandy soil. (Ravinath, 2007)

The Objective of this paper is to study the economics of marigold cultivation in assam.

Methodology:

Five districts of Assam have been purposively selected. The selected districts are Kamrup, Nalbari, Jorhat, Dibrugarh and Sonitpur. These districts have been selected on the basis of the information obtained from the Krishi Vikash Kendras that commercial cultivation of flowers is practiced in these places. In these selected districts the following marketing channels have been identified.

Channel I (Producer – Consumer)

Channel II (Producer – Retailer – Consumer)

Channel III (Producer- Local agent- Retailer – Consumer)

Marketing Cost is the total cost incurred on marketing either in cash or in kind by the producer seller and by the various intermediaries involved in the sale and purchase of the commodity till the commodity reaches the ultimate consumer.

The difference between the price paid by the consumer and the price received by the producer for an equivalent quantity of farm produce is known as Price Spread.

Producer's Share in Consumer's Rupee: It is the price received by the farmer expressed as a percentage of retail price. If Pr is the retail price, the producer's share in consumer's rupee (Ps) is:

PS= (PF/PR) 100

Shepherd Approach of Marketing Efficiency: The ratio of the total value of goods marketed to the marketing cost may be used as a measure of Marketing Efficiency. The higher the ratio, the higher the efficiency and vice versa. This method eliminates the problem of measurement of value added.

Producer: The flower growers are referred to as the producers.

Local Agent: The middlemen who collect the flowers/garlands from the grower and sell it to the retailer are the local agents.

Retailer: The persons involved in selling of flowers in small quantities to the consumers.

Findings and Discussion: Data collected from the five flower growing districts of Assm revealed the following .

Table 1: Marketing efficiency and Price spread of Marigold.

Particulars	Channel I	Channel II					Channel III			
	Puthimari	Sukreswar	Hajo	Jorhat	Dibrugarh		Sukreswar		Nalbari	
Price received by farmers	15	5	5	10	10		4	5		
Consumers price	15	10	15	15	15	10	10			
Producer's share in consumer's rupee				80.3	43.8	31	50.9	59.9	30.7	50
Marketing efficiency	5.10	1.70	1.47	2.04	2.5	1.43	2			
Price spread	2.95	5.62	10.35	7.36	6.01	6.93	5			
Price spread as a percentage of consumer's rupee					19.6	56.2	69	49.06	40.06	69.3
50										

Source: Primary Data

From the above table it is revealed that in the marketing of marigold three marketing channels, Channel I, Channel II and Channel III were found. Channel I was found to be dominant in Puthimari village of Sonitpur district only. Channel II was found in Hajo, Sualkuchi, Jorhat and Dibrugarh. Channel III was found in certain villages of Hajo and in Balitara village of Nalbari district.

Price received by the farmers was the highest in Channel I which was found to be Rs 15 per plant. In this channel the flowers are not sold separately or in the form of garland. In channel II in the villages of Hajo and Sualkuchi the price received by the farmers was Rs 5 per garland while in Jorhat and Dibrugarh it was found to be Rs 10 per garland. In Channel III the farmers received Rs 4 and Rs 5 per garland in Hajo and Nalbari respectively.

The marketing cost incurred by the farmer was found to be Rs 2.94 per plant in Channel I which was the highest of all the channels. In Channel II the marketing cost was Rs 0.62, Rs 0.34, Rs 2.35, and Rs 1.00 per garland in Sualkuchi, Hajo, Jorhat and Dibrugarh respectively. In Channel III, it was Rs 0.92 in Hajo. The growers of Nalbari did not incur any marketing cost as the local agent came to their farms and collected the produce by themselves.

The net price received by the producer was the highest in Channel I which was found to be Rs 12.05 per plant. In Channel II it was Rs4.38, Rs 4.65, Rs 7.64 and Rs 8.99 in Sualkuchi,

Hajo, Jorhat and Dibrugarh respectively. In Channel III, the net price received was Rs 3.07 and Rs 5 in Hajo and Nalbari respectively.

The price paid by the consumer was Rs 15 in Channel I. In Channel II the consumer's price was Rs 10 in Sualkuchi and Rs 15 each in Hajo, Jorhat and Dibrugarh respectively. In Channel III it was found to be Rs 10 both in Hajo and Nalbari respectively.

The marketing efficiency was 5.10 in Channel I. In Channel II it was 1.70, 1.47, 2.04 and 2.5 in Sualkuchi, Hajo, Jorhat and Dibrugarh respectively. In Channel III marketing efficiency was found to be 1.43 in Hajo and 2 in Nalbari. The average marketing efficiency in Channel II was 1.92 while in Channel III it was 1.71. Thus Channel I was the most efficient marketing channel followed by Channel II and Channel III respectively. This was mainly because Channel I do not have any intermediaries while Channel II had lesser intermediaries as compared to Channel III.

The price spread as a percentage of consumer's rupee was 19.6 percent in Channel I. The average price spread in Channel II was 53.58 percent and that in Channel III was 59.65 percent. Thus Channel I was the most efficient marketing channel followed by Channel II and III.

Even though Channel III was the most inefficient Channel the producers still preferred it because they wanted to devote all of their time in the cultivation of the flowers. The growers were of the opinion that since the flower cultivation is a new venture focus on both the production and marketing will not be beneficial for the business. Hence for the time being they are willing to let go a part of their profit for greater gains in the future.

Conclusion

From the above analysis it is found that commercial cultivation of flowers can be a source of gainful employment and a source of profit. Marigold also had medicinal applications. It is used for skin injuries, eczema and sunburn. The compound carotenes and carotenoids present in Marigold flower are precursors for production of vitamin A. Hence, not only for its aesthetic values marigold can also be useful in the pharmaceutical sector. A concerted effort is thus required from the policy makers and the farmers so that the full potential can be realized. Steps need to be taken not just to raise the area under cultivation of flowers but also for rural transportation, logistics and mobile cold storage facilities and training and entrepreneurship promotion for production of dry flower, the elimination of middle men, so that the growers can enjoy the full benefits.

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4. Dhillon, A, Khatkar, R.K. and Kumar, A. (2005) 'Marketing Costs and Price Spread for Marigold Flower in Haryana', Agricultural Marketing, XLVIII (1): 9-12

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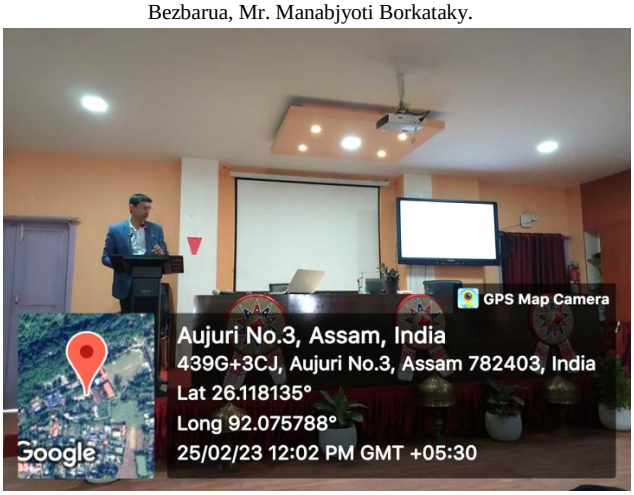
9. Glimpses of National Seminar

Inaugural Session, (From Right) Dr. Biren Das, Professor M. P. Bezbarua, Mr. Manabjyoti Borkataky.

Participants in the Inaugural Session



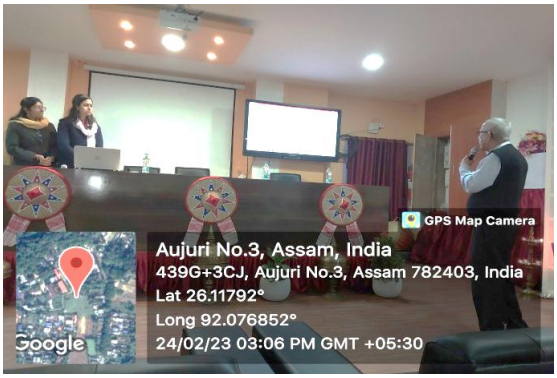
Professor Joydeep Baruah Delivering his special speech on 25th February.

A participants is presenting his paper

Felicitation to the Chief Guest of the Seminar Dr. Biren Das, Registrar, Tezpur Univerity.

A Participant receiving his certificate from Professor Joydeep Baruah in presence of Principal, Dimoria College, Khetri in the Valedictory Session.

Lamp Lighting by ACTA President



Prof. S. Borbora interacting with participants

Valedictory Session

Final Vote of Thanks in the Valedictory Session

Felicitation to Prof. S. Borbora

ডিমৰীয়া মহাবিদ্যালয়ত ৰাষ্ট্ৰীয় আলোচনা-চক্ৰৰ আয়োজন

ক্ষেত্ৰী ঃ নিজা বাতৰি দিওঁতা, ২১ ফেব্ৰুৱাৰী ঃ ক্ষেত্ৰীস্থিত ডিমৰীয়া মহাবিদ্যালয়ত ২৪ আৰু ২৫ ফেব্ৰুৱাৰীত এখন ৰাষ্ট্ৰীয় আলোচনা-চক্ৰৰ আয়োজন কৰা হৈছে। উল্লেখযোগ্য যে আই চি এছ এছ আৰৰ পৃষ্ঠপোষকতাত 'ভাৰতত কৃষি আৰু সংশ্লিষ্ট কাৰ্যকলাপৰ বৰ্তমানৰ অৱস্থা সমস্যা আৰু সম্ভাৱনা' শীৰ্ষক আলোচনা-চক্ৰখন মহাবিদ্যালয়ৰ প্ৰেক্ষাগৃহত অনুষ্ঠিত হ'ব। ডিমৰীয়া মহাবিদ্যালয়ৰ স্নাতকোত্তৰ অৰ্থনীতি বিভাগ আৰু অভ্যন্তৰীণ গুণগত মান মূল্যায়ন কোষৰ উদ্যোগত অনুষ্ঠিত হ'ব লগা আলোচনা-চক্ৰখনত উদ্বোধনী অধিৱেশনৰ বাবে তেজপুৰ বিশ্ববিদ্যালয়ৰ পঞ্জীয়ক ড° বীৰেন দাসক মুখ্য অতিথি হিচাপে আৰু গুৱাহাটী বিশ্ববিদ্যালয়ৰ অধ্যাপক এম পি বেজবৰুৱাক মুখ্য বক্তা হিচাপে আমন্ত্ৰণ জনোৱা হৈছে।

দৈনিক জনমভূমি

News about the National Seminar in a local newspaper of Assam

ICSSR Sponsored Two-Day National Seminar
On
Present Status of Agriculture and Allied Activities in India: Problems and Prospects
24 & 25 February, 2023
Dimoria College, Khetri
Kamrup (M), Assam

PROGRAMME
DAY 1

INAUGURAL SESSION
VENUE: Digital Room

Time: 10:00am	Welcome and Felicitation of Guests	
10:05 am	Welcome Address	Principal, Dimoria College.
10.05-10:35 am	Key note speech	Prof. M. P. Bezbaruah
10:35-10.55 am	Few Lines from the Chief Guest	Dr. Biren Das
11.00 am	Vote of thanks	Dr. Minakshi B. Borah
11.05-11.30 am	Tea Break	

Instructions for the Participants:

- It is mandatory for the participants to be present in all the sessions to get the certificate.
- Certificate will be distributed at the end of the valedictory session
- Paper presenters will get10 minutes for paper presentation and 10 minutes for open discussion.
- Paper presenters have to bring their presentation in PPT format.
- **Paper presenters have to submit a hard copy of full paper before presentation**

Technical Session 1
24 February, 2023
Time: 11.30-1.00 pm
Venue: Digital Room
Chairperson: Prof. M. P. Bezbaruah
Discussant: Mr. Sahadev Mili
Rapporteurs: Dr. Jharna Choudhury & Banani Das

Sl No	Name of Paper presenter	Title of the Paper	
1	Mr. Ankur Gogoi& Dr. Rashida Taahira Noorain	Present Status of Small Tea Growers of Assam – Problems & Prospects	
2.	Dr. Rimjim Bordoloi	Development of Income and Productivity in Potato Cultivation: A Study in Brahmaputra Valley of Assam, India	
3.	Ms. Ipsita Kaushik	The Role of Muga Silk GIIN the Sustainable Development of Assam and Its Related Challenges	
4.	Dr. Dimpal Dekaraja & Mridupavan Chintey	Profitability of Assam Lemon Farming: A Case Study of Assam, India	
5.	Ruhul Amin	COVID-19 Pandemic & Agricultural and Allied Activities: Opportunities and Challenges in the Barpeta District, Assam	
6.	Pallabi Bharali	Organic Farming in India: Its Problems and Prospects	
7.	Farhana Mafiz, Nilakshi Kalita, Wahida Parbin & Dr.Bidyut Bikash Baishya	Problems of Tomato and Potato Growers: A study on Paneri, Barbhag and Sontali areas of Assam	
8	Santanu Kumar Bharadwaj	Growth Experience of Rice Production in Dimoria Tribal Belt	
9	Husniyera Yesmin	A study on the Organic Farming: Challenges in the rural areas of Assam.	
10	Ashok Pradhan,Palashjyoti Das, & Masum Ahmed	What an Untapped Opportunity! Pisciculture in Assam: A Study of South Kamrup and Gohpur	
11.	Arnob Paul	A Review on Export of Spices With Special Reference to India	
12.	Ruhul Amin	A Study on Farmer's Awareness of the Crop Insurance Scheme	
13	Ratumoni Das & Suravi Kaushik	Dairy Farming and Rural Livelihood: A case study in Amlighat, Morigaon, Assam	

LUNCH: 01.00pm-02:00 PM

Technical Session 2

24 February, 2023
Time: 2.00-3.30 pm
Venue: Digital Room
Chairperson: Prof. S. Borbora
Discussant: Dr. Jahidul Haque
Rapporteur: Dr. Keemee Das & Dr. Shivanee Borpatra Gohain

Sl. No	Name of Paper Presenter	Title of Paper	
1.	Dr. Priyanka Borah & Areefa Ahmed	A Study on Inventory Management Practices At Purabi Diary	
2.	Miss MondiraTamuli	Agrarian Crisis and Rural Distress in Flood Affected Areas: A case study on the River Island District of Assam, India	
3.	Raghu Tamang, Dr. PratapChutia,DulumoniTalukdar, BhaskarDevSwargeary, DurlovJyotiKalita	Study on Socio Economic Status of Dairy Farmers and Its Impact on Environment at Topatoli Village of Kamrup Metropolitan District of Assam, India	
4.	Mr Manash Pratim Baruah & Rashmi RekhaRabha	Agricultural Marketing in India: Challenges and Suggestions	
5.	Bhanushree Baishya.Papari Barman, Dr. Namita Das	An overview of agricultural finance in Assam	
6.	Dr. Jyotisikha Dutta	Mahila Kisan Sashaktikaran Pariyojana (MKSP): Its importance and performances	
7.	Manash Pratim Sarma & Bharat Bonia	Overview of PM-KISAN scheme: With special reference to the state of Assam	
8.	Manash Jyoti Bhuyan, Ashish Saikia & NazneenAkhtar	Land Suitability Assessment for Surface Irrigation in Nagaon District of Assam, India using GIS-based AHP and MCDA Techniques	
9.	Ratumoni Das & Dr. Monjit Borthakur	Agricultural Diversification in Morigaon district: A case from Mayong Revenue Circle, Morigaon, Assam	
10.	Dr. Biman Lahkar	Vermicomposting and its importance in Organic farming: A case of Assam	
11.	Hirupjit Hazarika	Agriculture Marketing in India with Special Reference to Assam: Opportunities and Challenges	
12.	Parijat Bhatt & Dr. Dhriti Das	Agro-based Clusters: A Tool for Effective Management for Regional Development	

Technical Session 3

25 February, 2023

Time:10:00-11:30 pm, Venue: Digital Room

Chairperson: Dr. Joydeep Baruah

Discussant: Dr. Lakhimi Nath

Rapporteur: Rashmi Rekha Rabha & Dr. Kakali Das

1.	Kritika Das, Subham Thakur & JahanaraKhatun	A study on Pradhan Mantri FasalBimaYojana (PMFBY) in Kamrup district of Assam	
2.	Dr. Bidyut Jyoti Kalita & Maudud Shakique Ahmed	Agricultural Marketing in Assam: A Descriptive Analysis	
3.	Deepshikha Dutta & Reshminara Begum	Determinants of Informal Dairy Value Chain: A case study in Kamrup district of Assam	
4.	Rintu Deka	Rate of Return in Paddy Cultivation in Assam	
5.	Dr. Jahidul Haque	A Comparative Study on the Profitability of Traditional Crops and Horticulture: Evidence from Assam	
6.	Jyotish Engti	Current status and trend of Organic farming: Evidence from India	
7.	Dr. MrinalGhosh	Agriculture and Its Significance in Assam Economy: A Descriptive Study	
8.	Dipali Baishya	Economics of Marigold Cultivation in Assam	
9.	Bhumika Bori	Determinants of the development of women's labour force participation in Golaghat District,Assam	
10.	Karuna Kalita	Ethno-Tourism And Its Scope In Rural Assam-A Case Study In Majuli District	
11.	Dr Keemee Das	Women participation in the agricultural and allied sector: A overview in context of Assam	
12.	Sanjeev Kumar	Rural-Urban Migration and Agricultural Development	
13.	Daisy Das	A Journey by NEDFi Towards Sustainability on Water Hyacinth	
14.	Pulak Mili & Dr. Abdur Rashid Ahmed	The Impact of Flood in Assam: Role of Biophysical and Socioeconomic Factors	
Tea Break 11.30-12.00 noon			

Invited Speech by Professor Joydeep Baruah At 12 noon-01pm

LUNCH: 2-2:30 PM

25 February, 2023
Technical Session: 4
Time: 10:30 am to 1.30 pm
Chairperson: Dr. H. C. Deka
Discussant: Ms. Kapil Rahang
Rapporteurs: Dr. Manjuri Dutta & Sanchita Chetia

1.	Swagatam Das & ParimitaTalukdar	Organic Farming: A Sustainable Approach to Agriculture in North Eastern India	
2.	Dr. Kasturi Goswami & Dr. ReemaRabha	A General Review of Sustainability in Agriculture to End Hunger	
3.	Dr. Lakhimi Nath	Role of Dairy Farming in Rural Development of Assam	
4.	Dr. Tulika Devi	Food Processing & Organic farming: A study of Policies and Challenges of MSME units of Sikkim	
5.	Karuna Kalita	Ethno-Tourism And Its Scope In Rural Assam- A Case Study In Majuli District	
6.	Sourav Chetia	Agriculture monitoring through the lens of remote sensing	
7.	Nurzamal Hoque	Crop Diversity and Nutritional Status: Evidence from India	
8.	Sanjeev Kumar	Rural-Urban Migration and Agricultural Development	
9.	Mr. Sahadev Mili, & Mr. Kapil Rahang,	The Constraints of Agricultural Credit in India and Government Policy Strategies	
10.	Sujata Medhi	Shifting cultivation in North-East India: A case study of Rongram Block of West Garo Hills District, Meghalaya	
11.	Jugal Kumar Deka	Out-migration of Male Members from Household and its Impact on Left-behind Female Members Autonomy	
12.	Siva P.K. Chetri, Kuldeep Sharma and JunuRahang	Sustainable Agriculture: It's much needed implementation presently for a better living and the challenges ahead	
13.	Junu Rahang, Archana Saharia&K. NeisiSingson	Farm Laws 2020: Problems and Prospects in Indian Agriculture	

VALEDICTORY: 3:30 to 4:00 PM

Who Can Participate

- Teachers, academicians, research scholars, administrators and others who are interested on the theme.

Guidelines for Submission of Paper:

- The paper must be original.
- The paper must be relevant to the theme & any of the sub-themes.
- The abstract should be written within 300 words with at least 3 keywords.
- Full paper should be written within 2500-3000 words excluding abstract and references.
- The paper should be typed in MS word with Times New Roman font, font size 12, justified, line spacing 1.5 with margins of 1 inch from all sides.
- The cover page should contain the Title of the paper, the Author's Name, Designation, and contact details.
- References should be as per the APA style.
- One hard copy of the paper must be submitted on the presentation day.
- Only selected papers will be published as seminar proceedings with ISB Numbers.

Mode of the Seminar

- The seminar will be organized in offline Mode. All the participants will get certificates for the seminar.

Registration Fee

(Non-Refundable)

- Teachers/Faculty with Paper: Rs. 1000/-
- Teachers/Faculty without Paper: Rs. 500/-
- Research Scholar/Students with Paper: Rs. 500/-
- Research Scholar/Students without Paper: Rs. 300/-

Bank Details for Payment

- Account Name:: DIMORIA COLLEGE ICSSR 0877
- Name of the Bank: HDFC BANK LTD.
- Branch: Jagiroad, Morigaon, Assam
- Account Number: 50100567682265
- IFSC Code: HDFC0002942

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E-mail for abstract & full paper submission

seminarecodck23@gmail.com

Important Dates

- Last Date of Abstract Submission: 15th Feb. 2023.
- Last Date of Full Paper Submission: 20th Feb. 2023.
- Last Date of Registration: 20th Feb. 2023.

For any Queries, please contact

- Dr. Bipul Kumar Das, Convenor (7002592163)
- Dr. Minakshi B. Borah, Head & Organizing Secretary (9854748506)
- Mr. Kapil Rahang, Assistant Secretary (8638879207)
- Mr. Sahadev Mili, Assistant Secretary (9365548801)
- Dr. Lakhimi Nath, Assistant Secretary (7002141912)
- Ms. Masuma Ahmed, Assistant Secretary (7002407587)
- Dr. Jahidul Haque, Assistant Secretary (7002341957)

Azadi Ka Amrit Mahotsav

ICSSR *Sponsored* National Seminar on Present Status of Agriculture & Allied Activities in India: Problems & Prospects

24th & 25th February, 2023

Organized by

PG Department of Economics

Dimoria College, Khetri, Kamrup (M)

in collaboration with

Internal Quality Assurance Cell, Dimoria College, Khetri, Kamrup (M) Assam-782403

Invitation

We are extremely glad to inform you that the PG Department of Economics, Dimoria College, Khetri, Assam is going to organize a two-day ICSSR-sponsored national seminar on "Present Status of Agriculture & allied activities in India: Problems & Prospects." which is scheduled to be held on 24th & 25th February 2023. The seminar intends to provide a platform for academicians, researchers, scholars, students, and other distinguished participants to interact and exchange their views on the said theme. Therefore, we cordially invite your active participation in the seminar with a research paper and make it a grand success.

With warm regards
Dr. Biman Kumar Bhatta
(Principal & Chairman)
Mr. Manabjyoti Barkakaty
(Coordinator, IQAC)
Dr. Bipul Kumar Das
(Convener)
Dr. Minakshi B. Borah.
(Organising Secretary)
Mr. Kapil Rahang, Mr. Sahadev Mili ,
Dr. Lakhimi Nath , Dr. Jahidul Haque ,
Ms. Masuma Ahmed
(Assistant Secretaries)

About the College

Established on 29th August of 1979, Dimoria college is one of the leading provincialized colleges of Assam affiliated to Gauhati University. The college is located at the belt area of Dimoria region of Khetri in the district of Kamrup Metro, Assam and is about 44 km from Guwahati, the capital city of Assam. It is well connected with train and bus services. The college, at present, has 22 departments in both Arts and Science streams at the undergraduate level. Apart from this, the college also imparts 5 post graduate courses. Since its establishments the college has been imparting quality higher education with its competing teaching and non-teaching staff.

The college possesses a beautiful green campus of about 24 bighas of land including built-up areas, a spacious auditorium, digital hall, library, well-equipped laboratories, girls' hostels, and canteen along with other facilities. The college has been awarded A grade by NAAC (2nd Cycle).

About the Seminar

India has witnessed a silent revolution evolving from food deficient and import dependent nation during the early nineteen sixties to a global agricultural powerhouse today. India has emerged as the world's largest producer of milk, pulses, jute and spices, and has the world's largest cattle herd (buffaloes). It is the second largest producer of rice, wheat, cotton, sugarcane, tea, groundnut, fruits, vegetables and goat meat. Although the share of agriculture and allied activities has been declining in overall gross value added (GVA) of India, it continues to grow in absolute terms and employs almost 49 per cent of the total households (PLFS, 2020). The production and productivity centered approach of India is not only to become self-sufficient in foodgrain and non-foodgrain production but to become an exporting country of the same. There has always been a varying degree of increase in the production and productivity of food crop and various non-food crops. The increase in the production of foodgrains and other crops, however, did not result in a commensurate increase in farmers' income which is seen from their low level of income and incidence of poverty as compared to those employed to non-farm sector of the economy. Indian agriculture and allied activities faces issues associated with adaptation to climate change disturbances, fragmented landholdings, low farm productivity and high food price volatility, insufficient credit, absence of organized marketing facilities and crop insurance which call for next generation reforms like adoption of environmentally sustainable and climate resistant new farm technology, development of market for land consolidation, strengthening institutional credit and improvement in post-harvest practices.
In this context, the seminar aims at discussing present status of agriculture in India in general and Assam in particular, and how to improve it's production, productivity and it's contributions to income, employment and exports.

THEME:

Present Status of Agriculture & Allied Activities in India: Problems & Prospects.

Sub Themes:

- Agricultural Diversification
- Cooperative farming
- Corporatization of agriculture and allied activities
- Post-harvest management, storage and marketing.
- Crop insurance
- Agricultural credit.
- Dairy farming
- Organic Farming
- Sustainable Agriculture
- Farm industry linkage
- Farm Size and income
- Investments in Agriculture
- Mechanization and Agricultural technology.
- Agriculture marketing & APMCs
- Farm Laws
- Horticulture
- Agriculture and exports
- COVID-19 pandemic & Agriculture and Allied Activities.
- Any other issues related to the main theme.