

“EFFORTS OF COOPERATIVE SOCIETY TOWARDS CLIMATE CHANGE MITIGATION THROUGH AFFORESTATION ON WASTELAND”

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Global warming is an increase in global average atmospheric temperature that results in corresponding climate changes. The ecology all across the world including India is getting disturbed due to global warming or climate change. Each of the component viz; land, air, vegetation, living organism, animal, human being which constitutes ecosystem is becoming unbalanced. This is adversely impacting the human existence and therefore efforts are required to address the issue of global warming/climate change.

1.0 Impact of climate change in India

Scientists from around the world with the Intergovernmental Panel on Climate Change (IPCC) tell us that during the past 100 years, the world's surface air temperature increased an average of 0.6°Celsius (1.1°F)⁽⁹⁾. India is the world's fourth largest economy and fifth largest greenhouse gas (GHG) emitter, accounting for about 5% of global emissions. India's emissions increased 65% between 1990 and 2005 and are projected to grow another 70% by 2020. On a per capita basis, India's emissions are 70% below the world average and 93% below those of the United States⁽⁴⁾.

The effect of global warming on the climate of India has led to climate disasters as it is a disaster prone area, with the statistics of 27 out of 35 states being disaster prone, with floods being the most frequent disasters. India ranked the third highest in the world regarding the number of significant disasters, with 18 such events in one year⁽⁵⁾.

A temperature increase of 2° C in India is projected to displace seven million people, with a submersion of the major cities of India like Mumbai and Chennai. The “glaciers in Himalayas are receding faster than in any other part of the world” and that at current rate of depletion, “the likelihood in Himalayan Ecology is deteriorating and perhaps sooner is very high” if the global temperatures rise unabated. Environmentalists have long warned that the Himalayan glaciers, a source of drinking & irrigation water and also to rivers that flow across India are

melting faster than the glaciers in the rest of the world. Already rising sea levels have submerged two islands on the Indian side of the vast Sundarbans where the Ganga and the Brahmaputra empty into the Bay of Bengal. This has rendered over 10,000 people homeless and a dozen more islands are under threat of disappearing into the sea.

2.0 Impact of Climate Change on Indian Agriculture:

Climate change scenarios include higher temperatures, changes in precipitation, and higher atmospheric CO₂ concentrations. There are three ways in which the “Greenhouse Effect” may be important for agriculture which are as follows:-

- 1) Increased atmospheric CO₂ concentrations can have a direct effect on the growth rate of crops.
- 2) CO₂-induced changes of climate may alter levels of temperature, rainfall and sunshine that can influence plant and animal productivity.
- 3) Rises in sea level may lead to loss of farmland by inundation and increasing salinity of groundwater in coastal areas.

An increase in temperature 1°C may reduce yields of wheat, soybeans, mustards, groundnuts, and potatoes by 3 to 7 percent. Recent studies done at the Indian Agricultural Research Institute indicate the possibility of a loss of between 4 and 5 million tons in wheat production in the future with every rise of 1°C temperature throughout the growing period. Rice production is slated to decrease by almost a ton/hectare if, the temperature rises by 2 degree Celsius. In Rajasthan, a 2 degree rise in temperature was estimated to reduce production of pearl millet by 10 to 15 percent. If maximum and minimum temperatures rise by 3 and 3.5 degrees respectively, then soya bean yields in M.P will decline by 5 percent compared to 1998⁽⁷⁾. According to The Indira Gandhi Institute of Development Research, if the process of global warming continues to increase, resulting climatic disasters would cause a decrease in India’s GDP to decline by about 9%, with a decrease by 40% of the production of the major crops⁽⁷⁾.

3.0 Measures for Climate Change mitigation and Adaptation – Government Efforts:

The rural population in India directly depends on climate sensitive sectors like Agriculture, Forestry, Fisheries etc and on the natural resources land, water, biodiversity, mangroves etc.

for their livelihood. There is immediate need to deal with the adverse impact of the climate change through mitigation and adaptation measures. The mitigation measures require technology and heavy investments therefore; the developed economies choose climate change mitigation measures while the developing economies choose adaptation measures. India recognised the joint approach of mitigation and adaptation together as appropriate way to deal with the climate change issue. National Action Plan Committee on Climate Change (NAPCC) has identified Eight National Missions as Measures of Climate Change Adaption and Mitigation⁽⁸⁾ as given in the following table No. 1:

Table No. 1: Nation Action Plans on Climate Change:

S.No.	National Mission on Climate Change	Objective
1.	National Solar Mission	20,000 MW of Solar Power by 2020.
2.	National Mission for Enhanced Energy Efficiency	10,000 MW Energy Saving by 2012.
3.	National Mission on Sustainable Habitat	Energy Efficient Buildings, transport, Waste Management, Energy Efficient Urban Planning, Improving resilience of Infrastructures, Community Based Disaster Management, Capacity Building.
4.	National Water Mission	Increase Water Use Efficiency, Formulating Basin Level Management Strategies, Water Conservation Measures.
5.	National Mission for Sustaining Himalayan Ecosystem	Understand the Glacial Change through Glacial Monitoring, Participatory Management of the Himalayan Glacier.
6.	National Mission for a Green India	6 million hectares afforestation on degraded land by the end 2017.
7.	National Mission for Sustainable Agriculture.	Drought Proofing, Climate Risk Management, Improving Productivity of Rain fed Agriculture.
8.	National Mission on Strategic Knowledge for Climate Change.	Assess Vulnerability and Identify Responses to Climate Change through High Quality & Focused R&D.

4.0 Importance of Forests in mitigating Climate Change:

Sustainable Forest Management is a means of achieving the goals outlined by the United Nations Framework Convention on Climate Change (UNFCCC) with respect to forests i.e.

using forests for carbon capture and storage, thus reducing the emissions of greenhouse gases and in this way, forests becomes part of a climate strategy for mitigation. Using forests and trees as part of a strategy to cope with impacts of climate change and in this way, forests become part of a climate strategy for adaptation.

In India, forests meet the livelihood demands of around 950 million people and sustenance of around 450 million cattle with nearly 200,000 of India's villages located in or near forests which may affect with adverse effects of climate change. It is therefore; ensuring their livelihoods option is a major responsibility which may be met out through developing sustainable forests by utilizing the unutilized resource i.e. wastelands. As per a joint study of Indian Council Agricultural Research (ICAR) and National Academy of Agriculture Sciences (NAAS) in 2010, total wasteland area in the country is 120.40 million hectares.

5.0 Watershed Development and Climate Change Adaptation:

Watershed Development programme helps in ensuring food security and poverty alleviation by restoring degraded watersheds in rainfed regions to increase their capacity to capture and store rainwater, reduce soil erosion, and improve soil nutrient and carbon content so they can produce greater agricultural yields and other benefits.

6.0 Efforts of IFFDC towards Climate Change Mitigation and Adaptation.

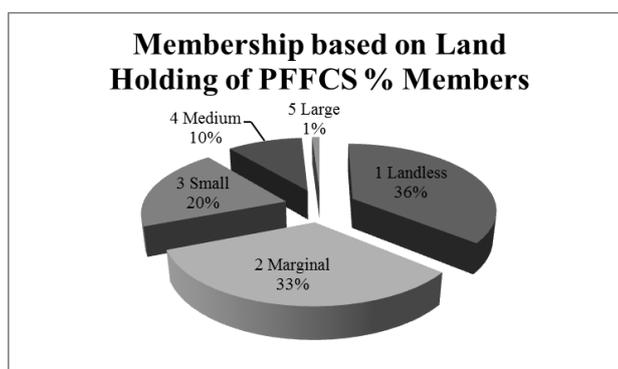
Indian Farm Forestry Development Cooperative Limited (IFFDC) came into existence formally in 1993 although its work had begun in 1986-87. Its promoter, Indian Farmers Fertiliser Cooperative Limited (IFFCO) had launched programmes of eco-restoration and wasteland development through farm forestry in the states of Uttar Pradesh, Madhya Pradesh and Rajasthan and these programmes were subsequently handed over to the IFFDC for being scaled up and integrated with rural livelihood development and poverty alleviation programmes in the country. IFFDC has diversified its portfolio and has broadened its focus to include in addition to Farm Forestry and Climate Change, activities such as Watershed Management, Nutritional and Economic Security, Livelihoods, Seed Production, Agri-Input Supply, CSR initiative, Cross Cutting Interventions like Women Empowerment, Community Institution Building, Capacity Building, Income Generative Activities etc. This has been done by adopting approaches that are participatory in nature and designed to cater to the emerging and evolving needs of the community.

6.1 FARM FORESTRY DEVELOPMENT:

IFFDC's flagship programme of Farm Forestry focuses on mitigating climate change effects through developing participatory forestry on waste and marginalised lands belonging to individual farmers, village panchayats and Government. The concerned communities are organised into Primary Farm Forestry Cooperative Societies (PFFCS), designed as the key community institutions to manage and maintain the developed community forests, on a sustainable basis. IFFDC supports the PFFCS with the necessary technical, financial, capacity building, networking, marketing and resource mobilisation inputs. As a result of its intervention, green cover has not only been improved in more than 500 villages, but degraded lands have also been restored. Economic returns from existing forests, presently restricted to selective felling, grasses and Minor Forest Produce (MFPs) etc., however need to be accelerated for other environmental services/benefits to the community.

IFFDC identified for afforestation large tracts of wasteland, which had been lying almost barren for decades in the states of Uttar Pradesh, Madhya Pradesh, Rajasthan and Uttarakhand. These acquired wastelands are Panchayat lands in Rajasthan, individual lands in Uttar Pradesh & Uttarakhand and Revenue land in Madhya Pradesh. 152 Primary Farm Forestry Cooperative Societies have been developed for management of the community forestry. These PFFCS are owned by 28,500 members of which, about 36% are landless and 53% are marginal & small farmers. It shows that the PFFCS are owned by the Poor people of the rural community. During promoting the Forestry cooperatives, special emphasis has been laid on women participation which constituted 32% of the total membership. The Categorisation of the members based on land holding is presented in Figure below:

Figure-1: Membership Category of PFFCS based on Land Holding:



The project has been designed exclusively for wastelands and marginal lands. In Rajasthan, all the three project districts, viz. Udaipur, Chittorgarh and Rajsamand which are

drought-prone. In Madhya Pradesh, all three project districts i.e. Sagar, Tikamgarh and Chhatarpur are part of the severely drought prone Bundelkhand region of Central India. In Uttar Pradesh, the plantations have been established in salt affected, water-logged and ravine lands in Sultanpur, Raebareilly, Allahabad, Pratapgarh, Unnao etc districts where no agriculture activities had been possible due to problematic soils. In Uttarakhand, the project districts Nainital and Champawat are having fragile ecosystem due to deforestation and climate change.

Such adverse conditions not only take a toll on the survival of the plantations but also on the social fabric of the local populace. Livelihoods are affected due to the failure of farming activities. The vulnerable sections of the society, especially women, are adversely affected. The women are involved in household chores like bringing water, firewood, fodder etc. During drought condition, women are most affected the most as they have to toil even more to gather the resources. Hence, proper space to women has been provided in the membership of these PFFCS. IFFDC has not only had to devise appropriate measures for survival of the plantations, but also encourage and sustain livelihood development initiatives for the local communities through various activities. 5.15 million Workday of employment was generated, which included 2.31 million (45.30%) workdays contributed by women.

The PFFCS and members have taken up various micro-enterprises by evolving revolving fund mechanism at the PFFCS level which is leading towards self-sustainability and also strengthening the inter-relationship among PFFCS, SHGs & members. It has helped in creating a deep sense of ownership in the members thus indicating the signs of institutional sustainability. The State wise wasteland area converted into multipurpose forests is given in the table – 2.

Table No. – 2: State wise details of Wasteland developed:

S.No.	State	District	Wastelands Developed (ha)	Plants (Million)
1.	Uttar Pradesh	Sultanpur, Raebareli, Allahabad, Kaushambi, Pratapgarh, Lucknow, Amethi, Unnao	12,951	6.16
2.	Uttarakhand	Nainital, Champawat	206	0.10
3.	Rajasthan	Udaipur, Chittorgarh, Rajsamand	9,713	3.63
4.	Madhya Pradesh	Sagar, Chhatarpur, Tikamgarh	6,550	4.21
	TOTAL		29,420	14.10

A wide range of tree species has been selected by the community for plantation through Participatory Rural Appraisal (PRA) method which were negotiated with the community on the basis of available land, soil type, soil depth, soil fertility and available plantation technology & water resources etc.

6.1.1 Ensuring Quality Seedling: Quality of the seedling is the key for successful plantation in stressed conditions of wasteland. To ensure good quality seedling, nurseries at PFFCS level (centralised nurseries) or individual / group level by forming Self Help Groups have been developed. IFFDC is facilitating more than 25 PFFCS to take up nursery raising as an enterprise by providing necessary inputs & training. Moreover, IFFDC has also developed strong linkage with India's most prestigious Forestry Institution "Forest Research Institute" (FRI) Dehradun for availability of quality seedlings. During the year 2015-16, FRI has raised 1.70 lakh saplings of *Melia composita* (Burma Neem) and *Bambusa bambose* (Good quality Bamboo) and supplied to IFFDC for plantation in current rainy season (year 2016) at the PFFCS. The grass root level workers of these PFFCS have also been imparted practical trainings by the FRI Scientists to build their capacities on raising good quality seedlings at PFFCS level. Moreover, IFFDC also promoting the plantation of tree species which are on the verge of extinction like *Cardia dichotoma* (Indian Cherry), *Aegle marmelos* (Bel), *P. cineraria* (Khejri), *Manilkara hexandra* (Khirni), *Madhuca indica* (Mahua), *Limonia acidissima* (Kaitha) etc under its plantation programme .

6.1.2 Encouraging Farmers for taking Forestry as Remunerative Enterprise:

Growing trees outside natural forest areas is feasible because of favourable markets. If the business-as-usual scenario continues, natural forests are going to be under tremendous pressure and this may cause damage to them. Growing tree as agro-forestry on farm land may achieve the twin goals of sustainable development in forests and enhancing income of the farmers. The forestry as enterprise may meet the socio-economic and ecological needs of the country. Moreover, the demand for wood and wood products can be met through production under agro-forestry/farm forestry. India's round wood production in 2006 was estimated to be about 240 million m³, while the Supply from natural forests is only about 12 million m³. The estimated share of industrial round wood for industry coming from farm forestry and other trees outside forests is 31 million m³. Official imports of timber accounted for just over 3 million m³ in 2006. Hence, there is a gap between consumption and supply of timber of about 25 million m³ (conservatively estimated). The promotion of agroforestry is likely to

ease the gap between demand and supply therefore; IFFDC is encouraging the farmers for undertaking Agro-forestry on their farm land and also the PFFCS for growing commercial value trees like *Melia composita*, *Bambusa bambos* etc on the available wastelands.

6.1.3 Outcome of Farm Forestry:

- It is estimated that the forests developed by the PFFCS with the facilitation of the IFFDC resulted in a gain net carbon stock of 9.59 Tonnes per hectare in 1996. Now these forests are having net carbon sequestration of 14.27 Tonnes per hectare/year. The total net carbon gained by these forests after afforestation is about 1.76 Million Tonnes.
- PFFCS are serving as nodal agencies for environment up-gradation and catering to the fuel wood & fodder and other agricultural needs of the community.
- The problematic lands (sodic and saline) are now converted into cultivable lands and have proved to be productive assets in Uttar Pradesh.
- The farm forestry activities have helped to bring about ecological balance, generate employment for the rural poor through Integrated Farming Systems and improve their livelihood and women empowerment through inclusion process.
- The developed wastelands are converting into bio-diverse forests with various flora & fauna. The water-logged area now developed in dense forest provides shelter for migratory birds also. The wild animal like leopards, jackals, rabbits etc are growing in the developed forests.
- PFFCS as community institutions at village level are helping in mobilization of various outside resources for the benefit of the community.
- Various income generating activities and micro-enterprises started at PFFCS & individual member level are leading towards self-sustainability of these organisations and improvement of socio-economic status of the community.

6.2 WATERSHED MANAGEMENT (Ecological Resilience)

IFFDC's experience of its watershed programme for improving gender focused rural livelihoods of communities through natural resource management is improving. Village Watershed Committees and Water Users Committees are developed for implementing this programme. Focusing on providing Water and Food Security, a comprehensive set of activities related to land use planning and development and other livelihood generation

activities has been systematically integrated for building up the ‘Ecosystem Resilience’ of the community.

The purpose of watershed development is to rehabilitate and conserve land and water resources in order to develop resilience towards climate change to ensure food and livelihood security. The emphasis has been laid on checking the soil erosion through various measures like Continuous Contour Trench (CCT), Staggered Trench (ST), Gully Plugging (GP), Gabion Structure (GS) etc in the non-arable land and Farm Bunding (FB), Stone Bunding in the arable land. While for water conservation, the measures like construction of Stop Dam, Anicut/Check Dam, Farm Pond, Sunkan Pond, Water Absorption Tanks, Well Deepening etc are being adopted. For this, IFFDC has joined hands with other agencies and is mobilizing resources directly from through convergence for restoration of depleting water resources.

Also the focus is on building capacities of the rural community by developing sustainable community institutions like Village Watershed Committee (VWC) for ensuring active participation with gender equity in all stages of the project cycle. Total 15,667 hectares area has been treated by various Soil & Water Conservation Measures activities for developing Watershed. The details of State wise area treated under watershed is given in the following table No. -3.

Table No. -3: Details of State wise area treated under watershed development:

Support Agency	State	District	Treated Area (ha.)
NABARD	Chhattisgarh	Kawardha, Bilaspur	2,609
	Madhya Pradesh	Sagar, Chhindwara	1,333
	Rajasthan	Pratapgarh, Udaipur	1,837
	Telangana	Adilabad	1,652
State Govt.	MP (MGNREGA)	Bhopal, Sheopur, Chhattarpur	3,417
	MP (IWMP)	Chhattarpur, Rewa	4,819
	TOTAL		15,667

6.2.1 Outcome of Watershed Development:

- Ground water recharged and increase in water table of the nearby wells observed due to that farmers are able to harvest their second crop successfully leading to more returns.
- Harvested surface water in developed 213 Anicut, 1025 ponds and 761 wells helped in irrigating additional area of 15,171 hectares.
- It estimated that the soil-water conservation measures checked soil erosion and saved loss of more than 62,000 metric ton soil per hectare per year.
- Due to availability of water, farmers started tree based farming model which helped in an additional income of Rs 15,000 to 20,000/hectare.
- Additional area has been brought under cultivation by adopting various soil conservation measures.
- Landless farmers and women have been endowed with employment opportunities in the area through various soil moisture conservation activities.
- Treated area has produced good quality fodder for cattle by which health of cattle has been improved.

7.0 NUTRITIONAL AND ECONOMIC SECURITY FOR TRIBAL & ARGINALIZED COMMUNITIES (NEST)

To provide nutritional and economic security for tribal (Indigenous People) and marginalised communities IFFDC has initiated Small Orchard/Wadi development project on the land of tribal families. The project addresses the growing concerns related to malnutrition in women and children in rural areas. and the need to look at these problems in a wider perspective to find appropriate integrated solutions. These projects envisage the mobilisation and organising of tribal families into affinity based groups called 'Wadi Tolee' and building their capacity to grow fruit trees, alongwith inter-cropping and other allied activities, on designated piece of one acre land of each selected family . The emphasis is on up-scaling beyond family consumption to build a value chain that will serve to enhance income and livelihoods. The project has diverse ramifications for integrated rural development from supplementing incomes to increasing land productivity. So far, 8,421 tribal families have been covered under wadies programme in Rajasthan, Madhya Pradesh, West Bengal, Telangana and Jharkhand States by developing fruit orchard of Mango (*Mangifera indica*),

Guava (*Psidium guajava*), Lemon (*Citrus aurantifolia*), Aonla (*Phyllanthus emblica*), Pomegranate (*Punica granatum*), Sapota (*Manikara zapota*), Chesew (*Anacardium occidentale*) etc.

7.1 Outcome of NEST:

- Horticulture plantation in the project villages has created opportunities for additional income in the future on sustainable basis.
- Improved Agronomic practices adopted by the farmers has resulted in better crop production and better income from vegetable production.
- Water Resource Development activities provided opportunities to cultivate additional crop of vegetables as intercropping.
- Farmers are proud at becoming owners of established good quality orchards, which has also increased the value of their field.
- The boundary plantation of forestry species around wadi also help in carbon sequestration and mitigating climate change effects.

8.0 INTEGRATED RURAL LIVELIHOOD DEVELOPMENT

Despite initiatives aimed at inclusive growth in the country, poverty persists because of limited access to productive resources, such as land, water, improved inputs, technology and microfinance, as well as vulnerability to drought and other natural calamities. IFFDC's rural livelihoods approach places people at the centre of development and focuses on building assets and skills, supportive policies, robust institutions and regulatory structures that both encourage growth and protect the most vulnerable, so that, women and men together can access new opportunities for income generation and employment for their sustainable livelihoods. IFFDC is undertaking several measures for increasing productivity, reducing input costs, value addition, marketing support etc. for enhancing livelihood of the marginalised community.

8.1 Outcome of Integrated Rural Development

- Due to increase in water availability in the nearby wells and tube wells, farmers are now able to provide 2-4 times more irrigations to their crops. New crops i.e. Cabbage, Ginger, Peas, Potato, Garlic and Sugarcane have been introduced in the project area.

- Farmers have assured water resource through farm ponds, LDEP tanks and Cemented tanks which can save their first crop through life saving irrigation. These ponds have also helped in recharging the nearby wells which helped in cultivation of second crop.
- Safe drinking water has been made available during scarcity periods to the community near their hamlets due to installation/repair of hand pumps which reduced water borne & seasonal diseases.
- Improvement in the soil health particularly alkaline soils led to increased crop productivity.
- All the project villages are institutionalized through Self Help Groups (SHG) by providing financial support for addressing immediate needs and setting up of Micro-enterprises.
- Enhanced income of members through various Income Generation activities and Micro-enterprises is leading towards their self-reliance.
- Awareness generation has helped in minimising social evils and improving livelihoods of the community.
- Farmers have started cultivating High Yield Varieties (HYV) and cash crops for more production and income leading to better livelihoods.
- Smokeless Chullah helped in fuel wood saving and improving health of the women.
- Use of LED Bulbs, Solar Lights and Solar Street Lights helped in saving energy and also reduced expenditure on electricity.

9.0 COMMUNITY INSTITUTIONS DEVELOPMENT:

Building capacity for collective action is crucial for the successful management of Common Property Resources (CPR) and to provide sustainable mechanisms for continuing the development process after withdrawal of project based interventions. IFFDC has consciously adopted the policy of promoting Community Institutions for institutionalizing its development interventions. Community Institutions provide institutional mechanisms and opportunities for collective management of resources. The promoted groups are strongly rooted in the cooperative principles but differently named depending on the purpose for which formed, under its different projects viz: Primary Farm Forestry Cooperatives Societies

(PFFCS), Primary Livelihood Development Cooperative Societies (PLDCS), Farmer Producers Organisation (FPO), Livelihood Collectives (LCs), Farmer Clubs, Wadi Groups, Self Help Group (SHG), Water Users Committee (WUC) and so on.

Being a Cooperative itself, IFFDC believes strongly in the strength of ‘cooperative action’ to uphold institutions at the local level and to provide support to the development process and help them sustain after withdrawal of the project. The Community Institutions promoted by IFFDC in different projects are as follows:

Table No.-4: Community Institutions Developed and Nurtured under different Projects:

Community institutions developed	No.	No. of Members
Primary Farm Forestry Cooperatives (PFFCS)	152	28,500
Primary Livelihood Development Cooperatives (PLDCS)	78	2,500
Farmers Club	258	2,599
Self Help Groups (SHGs)	1061	11,918
Water Users Committees (WUCs)	181	2,124
Village Watershed Committees (VWC)	61	671
Mazdoor Vikas Samooh (MVS)	25	300
Farmer Producer Organisations (FPOs/LCs)	51	40,482
TOTAL	1867	89,094

10.0 GENDER MAINSTREAMING & WOMEN EMPOWERMENT:

IFFDC’s approach to mainstreaming gender and women empowerment in all its projects is not about adding merely a ‘woman’s component’ or even a ‘gender equality component’ into an existing activity. It goes beyond increasing women’s participation, bringing the experience, knowledge, and interests of women and men to bear on the development agenda. Its efforts for empowering women through transforming unequal social and institutional structures into equal and just structures for both men and women are an essential feature of all IFFDC interventions and constitute the cross cutting thematic area ‘Gender Mainstreaming and Women Empowerment. As a result, the women have created their stack as many as 38% in PFFCS Membership, 92% in Self Help Groups and also at the decision making level as 20 are the Chairperson in the PFFCS. Moreover, IFFDC has 2 women Directors on the Board elected by the members’ cooperatives.

11.0 RECOGNITION - THE EFFORTS OF IFFDC:

The role of IFFDC as a cooperative society in environment protection and development has been recognised with the prestigious Social Impact Award 2015 by Times of India in Environment Sector under Corporate Category for its outstanding performance towards Climate Change. Moreover, the endeavours of IFFDC in improving livelihood of the farmers and poor communities has also been recognised in the country and it has been awarded the “Social Impact Award – 2011” in “Livelihood” Category by the Times of India. Besides the several awards and honours, IFFDC has also been awarded with “Indira Priyadarshini Virkshamitra Award-1999 by Ministry of Forest & Environment, Govt of India for its outstanding contribution towards environment up-gradation through afforestation and wasteland development.

12.0 CONCLUSION:

The efforts of IFFDC proves that Cooperative Society can play an important role in dealing with Climate Change concern by adopting mitigation and adaptation measures by mobilise their members/community and help them to organise for their livelihood through managing natural resources through afforestation on wasteland, watershed development and other livelihood development activities. The existing forest area of the country is being threatened due to the pressure of growing population. The additional area can be brought under forest by bringing forests to the farmers’ fields through encouraging the farmers to undertake Agro-forestry or Farm Forestry. IFFDC is successfully implementing this through Wadi and other Livelihood Projects. Agro-forestry or Farm Forestry not only helps in providing additional source of livelihood to the rural community, it also helps in mitigating climate change effects. However, cooperatives need additional support to replicate this successful forestry cooperative model for ensuring sustainable ecological balance by achieving the target of bringing 33% area under forests of the total geographical area of the country.

It is possible that Cooperatives can contribute towards rehabilitate and conserve land and water resources in order to develop resilience towards climate change to ensure food and livelihood security through watershed development and other need based livelihood development interventions. Promotion of Community Based Organisations (CBOs) under the umbrella of cooperatives may be a successful platform for ensuring the participation of

members and also in sustaining the development intervention on long term basis on their own.

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