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SUPPORT IMPLEMENTATION OF NATIONAL AGROFORESTRY POLICY BY ENHANCING TREE COVER & PRODUCTION OF WOOD

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SDGs:



Country: India

Project Code: TCP/IND/3710

FAO Contribution: USD 170 000

Duration: 14 July 2020 – 31 December 2021

Contact Info: FAO Representation in India
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Implementing Partners

Ministry of Agriculture & Farmer Welfare (MoA&FW), Department of Agriculture, Cooperation & Farmers Welfare (DA&FW), National Rainfed Area Authority (NRAA).

Beneficiaries

Extension officials at Krishi Vigyan Kendras'; Policy-makers; Farmers and rural youth in the states of Uttar Pradesh and Karnataka.

Country Programming Framework (CPF) Outputs

CPF (2018-2022) Output 4.7: Support implementation of national agroforestry policy by enhancing tree cover and production of wood.



BACKGROUND

Agroforestry has significant environmental and potential economic benefits for farmers as a sustainable land-use management practice. It has an established tradition in the Indian subcontinent, and there is a recognized ecosystem of scientific institutes and universities researching the integration of trees in agricultural landscapes in India. In 2014, India adopted a dedicated National Agroforestry Policy (NAP), one of the first countries to do so. As the government has set to double farmers' income by 2022, agroforestry represents a potential sustainable income source for rural communities.

In 2020, FAO launched the project TCP/IND/3710 to support NAP's implementation by creating grassroots-level extension mechanisms, including delivering trainings to rural youths and farmers in the states of Karnataka and Uttar Pradesh, by developing tradeable parameters of select agroforestry produce to generate greater revenues for the beneficiaries. In addition, although not foreseen in the project conceptualization, the application of geospatial technology using high-resolution satellite images and machine learning to map and monitor various agroforestry land-use systems has also been integrated in the project. All these activities will support the Department of Agriculture & Farmer Welfare's (DA&FW) capacity to assess the scaling up of agroforestry practices in the country.

IMPACT

The project tried to support the wider adoption of agroforestry systems by farmers and rural youths in two states in the country. These integrated practices reduce agricultural pressure on forests, provide more timber and non-timber agroforestry products and underpin climate mitigation targets. Furthermore, tradeable parameters were for the first time developed, for better price realization by the farmers. Assessing agroforestry land-use systems in a more continuous manner was also explored through satellite imagery, and new geospatial methodologies were developed.

ACHIEVEMENT OF RESULTS

The project achievements have contributed to supporting the implementation of NAP by enhancing tree cover and production of wood. With regards to strengthening extension services, in consultation with the Indian Council of Agricultural Research-Central Agroforestry Research Institute and state forest departments, farmers, staff of agricultural extension centres' Krishi Vigyan Kendras (KVKs) and 140 rural youths in 70 villages followed trainings on agroforestry practices and taking care of trees outside of forests.

Adapting the project design in the face of the COVID-19 pandemic, the team explored the potential of remote sensing technologies to assess agroforestry land-use systems, in line with FAO's recognition of innovative technologies and approaches, such as agroforestry, as triggers of change to transform agrifood systems. These efforts will assist the Department of Agriculture & Farmers Welfare (DA&FW) in monitoring the effectiveness and outreach of various programmes on agroforestry and trees outside forests.

Furthermore, agroforestry represents a growing income stream for farmers. In consultation with governmental, private, academic and civil society stakeholders, tradeable parameters identified for select agroforestry produce were fully realized. The commercial criteria identified for select timber and non-timber agroforestry produce constitute instruments for negotiation for farmers in the Karnataka and Uttar Pradesh states for better price realization of their products.



IMPLEMENTATION OF WORK PLAN AND BUDGET

The implementation of the project was carried out within the expected time, although the COVID-19 pandemic impeded the full implementation of the project. The planned activities to arrange a state-level, inter-ministerial dialogue, bringing together agroforestry stakeholders, and to organize exchange field visits for policy-makers, were not carried out as expected. In the face of these constraints, the project team adapted its scheduled implementation. In consultation with implementing partners, it considered activities not planned in the design phase that could be useful to strengthen DA&FW's capacity to monitor agroforestry programs and trees outside forests across the country in the future. Notably, they have explored how to map areas under agroforestry land-use systems with innovative technologies such as high-resolution satellite imagery and machine learning, with the support of the National Remote Sensing Centre (NRSC).

FOLLOW-UP FOR GOVERNMENT ATTENTION

The government should consider scaling up the project's outcomes to other states to render agroforestry a more established source of livelihood for farmers and rural youths seeking employment. The research and application of satellite imagery, coupled with machine learning, to monitor agroforestry results, projects' scaling up efficacy and climate commitments should also be further explored by DA&FW with the relevant space agencies and research centres. Additionally, the protocol for developing tradeable parameters may be replicated for other agroforestry produce as well.

SUSTAINABILITY

1. Capacity development

The project significantly tried to support to the implementation of the NAP by enhancing tree cover and production of wood. The project's design and implementation were embedded in DA&FW initiatives to support the NAP's implementation and to ensure the sustainability of the project's outputs/outcomes. The project developed relevant capacity development tools to inform farmers and rural youths on the economic and environmental benefits of the agroforestry sector.

2. Environmental sustainability

Agroforestry practices have significant environmental benefits; among those are carbon sequestration and tree cover extension, as well as soil and water conservation.



Furthermore, by ensuring agroforestry tradeable parameters, the project has strengthened the conditions for the possibility to improve the productivity, quality and environmental sustainability of tree and agricultural products to support farmers' livelihoods in the states of Karnataka and Uttar Pradesh.

3. Technological sustainability

Technological sustainability was ensured through the production and dissemination of evidence-based tradeable parameters, which previously did not exist for agroforestry produce in India, an agroforestry extension framework and capacity building manuals (for more information, please see the list of documents and outreach products from the project). Furthermore, a geospatial methodology has been elaborated, leveraging satellite imagery and machine learning processing ability, which can be useful in the future to transparently estimate agroforestry land-use systems and evaluate agroforestry programmes' efficacy. Tradeable parameters for selected agroforestry produce, which were non-existent earlier, were developed under this project, and a protocol for development of tradeable parameters was established, which will help in the development of tradeable parameters for other agroforestry produce.

4. Economic sustainability

The implementing partners have recognized the potential of agroforestry practices for the livelihoods of farming communities. There is a good likelihood of getting further support from the government and other agencies, as they contribute to various national and international commitments by the Government of India, including climate change mitigation and adaptation commitments. The National Rainfed Area Authority (NRAA) is committed to presenting the results achieved in the two states of Karnataka and Uttar Pradesh to MoA&FW to scale up the project's approach in other states.

DOCUMENTS AND OUTREACH PRODUCTS

- ❑ **A. Dalwai, T. Shichiri, A. Arunachalam, R.B. Sinha et al.** 2022. *Agroforestry extension framework*. Jhansi, Uttar Pradesh, India. 40 pp.
- ❑ **A. Dalwai, T. Shichiri, A. Arunachalam, R.B. Sinha et al.** 2022. *Training manual for Agroforestry upscaling & Entrepreneurship building of youth*. Jhansi, Uttar Pradesh, India. 2022. 76 pp.
- ❑ **A. Dalwai, T. Shichiri, A. Arunachalam, R.B. Sinha et al.** 2022. *Workbook for Agroforestry upscaling & Entrepreneurship building of youth*. Jhansi, Uttar Pradesh, India. 98 pp.
- ❑ **M. Yadav, A. Verma, Dz. Bhaskar et al.** 2022. *Report on identification of tradeable parameters for select agroforestry produce*. Bhopal, Madhya Pradesh, India. 146 pp.
- ❑ **C.S. Jha, K. Chandrasekhar, R. Hebbar, H.M. Ravishankar, A.O. Varghese, D. Chakraborty, A.K. Bera et al.** 2022. *Report on spatial inventory of agroforestry resources using geospatial technology and AI with high resolution images*. NRSC, Hyderabad, India. 158 pp.



ACHIEVEMENT OF RESULTS - LOGICAL FRAMEWORK

Expected Impact	Improved tree cover outside forest and augmented farmers' income		
Outcome	Strengthened extension machinery at grass-root level and efficient value chains of agroforestry products		
	Indicator	Trained rural youth.	
	Baseline	0	
	End Target	140 Number of youth trained (Cluster of villages in two states-Uttar Pradesh and Karnataka. Each cluster will have 35 villages. 70 youth will be trained in each state).	
Comments and follow-up action to be taken	Achieved: Yes. 140 rural youths have been trained in the pilot states of Karnataka and Uttar Pradesh. The trainings were conducted in the local languages.		
Output 1	Cadre of rural extension workers in agroforestry trained		
	Indicators	Target	Achieved
	Module of capacity building of KVKs, rural youth and trained rural youth.	One module developed. KVK staff and youth trained (in all 140 persons; Cluster of villages in two states – Karnataka and Uttar Pradesh. Each cluster will have 30 villages, with 2 youth per village).	Yes
Baseline	0		
Comments	The task has been undertaken by ICAR-CAFRI. One module was envisaged to be produced in the design phase of the project, however, in order to develop the extension competencies and capacities of the extension staff and concerned officials as well as rural youths, three documents have finally been prepared under this output, which were: <ul style="list-style-type: none"> – Agroforestry extension framework. – Capacity building manual on “Agroforestry upscaling & Entrepreneurship building of youth”. – Capacity building field workbook on “Agroforestry upscaling & Entrepreneurship building of youth”. 		
Activity 1.1	Capacity building of KVKs and rural youth to strengthen the extension machinery. This will be carried out in selected cluster of villages in two states - Uttar Pradesh and Karnataka. Each cluster will have 30 villages with 2 youth per village. A total of 140 persons will be trained		
	Achieved	Yes	
	Comments	This activity was completed by ICAR-CAFRI in collaboration with the state forest departments. Training was imparted to rural youths in Karnataka and Uttar Pradesh.	
Output 2	State level agroforestry models, policy obstacles and opportunities for addressing constraints to enhance tree cover and production of wood and related products outside of forests identified		
	Indicators	Target	Achieved
	Common platform established to synergize agroforestry models and stakeholder efforts.	Establishment of one platform at state level.	Partially
Baseline	0		
Comments	Database on existing agroforestry models (state wise) in the country were compiled by the in-house team through desk research. This database will be submitted to the NRAA, DA&FW and MoA&FW, the implementing partners of the project. The NRAA may further disseminate it through their website or the website of DA&FW.		
Activity 2.1	Support level inter-ministerial and multi-stakeholder dialogue to support, convene and engage with forestry and agricultural universities and research institutes to operationalization of the Agroforestry Policy with regards to enhancing tree cover and production of wood outside of forests. This will be done in the selected pilot sites in the states of Uttar Pradesh and Karnataka		
	Achieved	No	
	Comments	This could not be achieved due to COVID-19 as the complete machineries of the state governments were fully focussed on controlling the pandemic.	

Output 3	Policy-maker capacity strengthened with regards to addressing policy and other constraints to production of wood and related products outside forests		
	Indicators	Target	Achieved
	Exchange visits to study best agroforestry practices.	One exchange visit.	No
Baseline	0		
Comments	Owing to the onset of COVID-19 pandemic and travel restrictions the exchange visit could not be planned. Considering the non-utilization of funds allocated under this activity the project team in consultation with the implementing agencies, NRAA, MoA&FW, DA&FW, the Government of India agreed to use these funds for additional activities to develop geospatial methodology for assessment of agroforestry systems using high resolution satellite imageries and machine learning technology. This task was assigned to the NRSC, Indian Space Research Organization, and India's Department of Space, which have successfully completed the activity.		
Activity 3.1	Strengthen capacity of policy-makers and others through exchange visit to a successful smallholder forestry initiative		
	Achieved	No	
	Comments	Due to COVID-19 pandemic and related travel restrictions, the planned activity was not completed. In lieu of it, another activity was successfully conducted, wherein a geospatial methodology was developed for the assessment of agroforestry systems in the selected six districts of the country, using high resolution satellite imagery and machine learning technology. This was an activity that would help develop a proof of concept for the DA&FW to map and monitor the efficacy of agroforestry programs across the country, take remedial measures for better implementation by scaling up lessons learned from this pilot study. Hence, this activity, which was not foreseen at the design stage, was included in the project in order to efficiently use the funds and contribute to strengthening the capacity of policy-makers to monitor the effectiveness and outreach of various programmes on agroforestry and trees outside forests.	
Output 4	Tradeable parameters identified for select agroforestry produce		
	Indicators	Target	Achieved
	Identifying tradeable parameters for select agroforestry produce.	5 agroforestry products.	Yes
Baseline	0		
Comments	Indian Institute of Forest Management (IIFM) was entrusted with the task of developing tradeable parameters. The institute has successfully developed tradeable parameters for the following agroforestry produce (timber and non-timber) for the Uttar Pradesh and Karnataka states: For the state of Karnataka, the agroforestry species (timber) identified were: (i) Sandal wood (<i>Santalum album</i>) and (ii) Melia (<i>Melia dubia</i>). The agroforestry species (non-timber) identified were: (i) Amla (<i>Emblica officinalis</i>); ii) Neem (<i>Azadirachta indica</i>) and (iii) Karanj (<i>Pongamia pinnata</i>). For the state of Uttar Pradesh, the agroforestry species (timber) identified were: (i) Poplar (<i>Populous deltoides</i>) and (ii) Melia (<i>Melia dubia</i>). The agroforestry species (non-timber) identified were: (i) Amla (<i>Emblica officinalis</i>) and (ii) Neem (<i>Azadirachta indica</i>).		
Activity 4.1	Supporting development of tradeable parameters for agroforestry produce in consultation with relevant stakeholders, including research institutions and agroforestry produce-based industry		
	Achieved	Yes	
	Comments	IIFM developed the tradeable parameters in consultation with different stakeholders. Some of them are listed hereafter: farmers, minor forest produce collectors belonging to tribal communities, DA&FW, MoA&FW, Ministry of Environment Forest & Climate Change, state forest department (Karnataka and Uttar Pradesh), National Medicinal Plant Board, Karnataka State Timber Federation, Institute of Wood Science and Technology, Indian Plywood Industries Research & Training Institute, Trans Disciplinary University (Bengaluru), large- scale Adivasis Multi-Purpose Society, industries (such as ITC Limited, Century Ply, Dabur India) and various other traders and industries in Karnataka and Uttar Pradesh.	

Partnerships and Outreach

For more information, please contact: Reporting@fao.org

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