

Trees outside forests – an economic and environmental opportunity in the face of climate change

Alka Bhargava

Trees outside forests, including agroforestry, are the major source of wood produced in India. Keeping in view their direct benefits, inter alia livelihood security, climate-resilient agriculture for small and marginal farmers, and sustained supply of quality feedstock to the industry, a multidisciplinary approach in a mission mode is suggested for optimizing the impact of various programmes initiated by the Government and private sector. This would reduce import dependency on basics like paper pulp, newsprint and timber. A natural spin-off is conservation of germplasm in the forests and increased carbon sequestration by the trees and that locked in wood products, thereby contributing to India's international climate and land restoration commitments.

Trees outside forests (TOF) are the major source of wood produced in India, especially subsequent to the judgement of the Supreme Court of India in the landmark Thirumulkpad case¹. The benefits of TOF, including agroforestry, are multifarious by way of direct benefits *inter alia* livelihood security, climate-resilient agriculture for small and marginal farmers, and sustained supply of quality feedstock to the industry. To optimize the benefits, a structured link is imperative with the wood-based and herbal industry, thereby reducing current dependency on imports for basics like paper pulp, newsprint and timber.

To recapitulate, agroforestry and private forestry were included in the Union Budget 2022 within the section on 'Transition to carbon neutral economy', recognizing the importance of trees for combating climate change. It touched on two major issues imperative for its growth – policy and legislative changes and making available institutional finance to the farmers. To incentivize farmers to take up agroforestry, a broader bouquet of species, viz. timber, bamboo, medicinal, oilseeds, silk and lac host needs to be propagated, as against only about a few softwood species at present, along with skilling for primary processing and entrepreneurship development. The *Restoration Opportunities Atlas of India* by the World Resources Institute India (WRI India) identified an area of over 50 million hectares (m ha) for ToF, referred to as mosaic restoration². The greatest potential for agroforestry is on wastelands and the bunds of vulnerable rainfed agricultural lands.

Despite progressive policy decisions in the recent past and funding through a plethora of tree-planting schemes by both the Central and State Governments, the commensurate spurt in adoption is low. What is missing is a strong partnership with the in-

dustry to support plantations according to the needs and assured buyback of the produce. To illustrate the potential, two major consumers of agroforestry products – paper and furniture industries – are focused upon. The vibrant support of the paper industry to the farm forestry by way of *inter alia* development of new clones, supply of quality planting material to farmers and a buy-back agreement, exemplifies success possible which should be replicated in other industry-farmer connect. Per capita consumption of paper in India will increase from the present 13 to 17 kg by 2024–25, for which 1 million tonnes per annum (TPA) of integrated pulp, paper and paperboard capacity will be needed. The current demand for pulplable wood is around 11 million TPA, with only 9 million TPA available domestically. A major bottleneck is the high mill-delivered prices due to transport distances being 150–2000 km compared to 50–200 km globally³. This can be eased by subsidized transport for agri produce – the network of Kisan Rail, use of inland waterways, and incentivizing 'contract farming' by farmer groups in industrial hinterlands by extension of appropriate agroforestry models developed in the research institutions, together with a simple cost-benefit analysis. Encouraging peer learning would be a great mode of outreach.

Older bamboo-based paper mills have switched to softwood or supplemental bamboo, which is also being phased out. On the other hand, there is a high demand for virgin paper and packing paper in the aftermath of growing e-commerce post the COVID-19 pandemic. New-gen bamboo paper provides a solution. Sustainable packaging material and eco-friendly products are being manufactured in India by a new technology from imported bamboo pulp, sugarcane and seaweed, and recycled 'made

in India' pulps and alternate pulps such as bamboo, which are imported. The cost of production would reduce drastically if this pulp could be manufactured within the country. This illustrates the infusion of new technology according to consumer demand since speciality papers can replace single-use plastics. Hence R&D on indigenous bamboo species needs to be stepped up and translated to the farmers' fields since this green gold has a much higher potential for carbon sequestration, production of oxygen and quicker returns to the farmers.

Furniture is one of the priority sectors identified for increasing exports, but largely dependent on imported wood. The import of wood in rough (HS 4403) has the largest share in India's total import of wood and wood products – mostly from South Asia, Europe, the Caribbean and New Zealand, and with a nil duty under the India-ASEAN free trade agreement. Despite agro-climatic conditions conducive to major industrial species, the industry finds importing timber from across the globe cheaper and logistically simpler than sourcing it from within the country. So there is no incentive for the farmers to spend time and money on long-gestation tree crops, hence this trend needs to change. A corollary should be drawn from when India was a food-deficit country to now being a major agri-produce-exporting country. Research and policy should go hand in hand to encourage the growth of trees, just like other crops. Increasing import duty should be considered, particularly for wood in rough. The import duty on furniture (HS 9403) is 25% with no bound duty and hence could be increased to at least 50% to minimize import, thereby supporting our production for domestic and global markets. An immediate example was the dramatic positivity on the small agarbatti stick units when imports of raw batti were shifted

from the free to a restricted category in August 2019, and import duty on round sticks was uniformly increased to 25% in June 2020.

Bamboo needs a special focus for mainstreaming products and entering global markets commensurate to our resource base. The restructured National Bamboo Mission launched in 2018 did catalyse the ecosystem. However, a complete change of discourse is imperative due to the slow convergence of sectors and the need to develop new technology for high-end uses. At 2% of the furniture industry, the scale of the bamboo furniture industry is small. Furniture made from bamboo wood, some of which is do it yourself (DIY) and suitable for online suppliers, needs to be mainstreamed. While we look at global markets, research and lab-to-field connectivity are required for developing and standardizing processes that meet international requirements for the complete value chain.

With climate change hitting Indian agriculture through reduced *kharif* rice production predicted to fall in 2022, it is the

opportune time to encourage agroforestry as a fall-back option for farmers in cases of crop reduction and/or failure. Laudable is the initiative of the Government of Assam for setting up an Assam Agroforestry Development Board as a Section 8 Company for need assessment-based operationalization to increase investment by industry and backward linkages to encourage tree growing on private lands. 'Trees Outside Forests in India' (TOFI), the five-year joint initiative of United States Agency for International Development and Ministry of Environment, Forest and Climate Change, Government of India, being implemented in seven states, viz. Andhra Pradesh, Assam, Haryana, Odisha, Rajasthan, Tamil Nadu and Uttar Pradesh, seeks to expand the area of TOF by 2.8 m ha, sequester 420 million tonnes of CO₂ equivalent and benefit 13.1 million people with improved livelihood and environmental services⁴. With a supportive Union Budget and initiatives by States, a multidisciplinary core team must delve into policy bottlenecks, incentives, adoption of Forest Stewardship Certifica-

tion for establishing the chain of custody, skilling and branding for agroforestry in a holistic mission approach to tackle the multitude of issues hampering its growth.

1. Supreme Court of India, T. N. Godavarman Thirumulkpad vs Union of India & Ors, 12 December 1996.
2. Duraisami, M., Singh, R. and Chaliha, S., Roadmap for scaling trees outside forests in India: learnings from select states on policy incentives, enabling conditions and barriers, World Resources Institute India, Delhi, 2022.
3. Indian Paper Manufacturing Association, Webinar on 'Linking agro-forestry farmers with industry', Department of Agriculture, Cooperation and Farmers Welfare, Government of India, 13 June 2020.
4. ICRAF, Trees Outside Forests in India, 2022; cifor-icraf.org

*Alka Bhargava lives at Sector Chi IV, Greater Noida 201 310, India.
e-mail: alkabhargava87@gmail.com*

COMMENTARY

Assessing the export potential of Nagpur mandarin: the promising citrus fruit of Central India

Dinesh Kumar, Sangeeta Bhattacharyya and Dilip Ghosh

Globally, citrus is acknowledged as one of the most important perennial fruit crops. India is the third highest citrus producer in the world after China and Brazil. Worldwide, citrus is grown in more than 150 countries, of which 53 cultivate it commercially. India contributes about 7–8% of the global citrus production. Citrus ranks third in the country after mango and banana and is cultivated in 10.86 lakh hectares with an annual production of 142.62 lakh tonnes¹. The genus *Citrus* belongs to the family Rutaceae. Citrus fruits have a distinct aroma, taste and are storehouses of several important nutrients like vitamin C, phytochemicals and dietary fibre, which are vital for human health due to their antioxidant properties and protection from various chronic diseases².

There exists a wide range of species in this citrus genus across the globe, but the commercially important ones cultivated in

India are mandarins (santra/narangi), sweet oranges (mosambi, sathgudi), acid limes (nimbu), lemons, grapefruits and pummelos. Amongst all cultivars, mandarins (*Citrus reticulata* Blanco) are produced in the highest quantity in India (Table 1). These fruits secure a special place in the dietary platter of Indians, mostly as fresh fruit. Different varieties of mandarin are found throughout the length and breadth of the country. Nagpur mandarin is widely cultivated in the Vidarbha region (Nagpur and Amravati divisions) of Maharashtra and some parts of Madhya Pradesh. Kinnow mandarin is grown in Abohar and Ganganagar regions of Punjab, and parts of Haryana. In Karnataka, Coorg mandarin is popular, while Khasi mandarin is popular in North East India.

Amongst all, Nagpur mandarin (Nagpuri santra) is considered one of the finest mandarins in the world, with a unique acid-sugar

blend that imparts a sweet-sour flavour; it also has an unmatched aroma. The Amravati and Nagpur districts of Maharashtra contribute about 80% of the total area under mandarin orchards in the state, sharing 48.88% and 31.45% respectively. With regard to the production of mandarin, Amravati district occupies 37.36% while Nagpur occupies 23.87% share in the Vidarbha citrus market³. Further, Vidarbha is India's only citrus-growing region with two fruiting seasons (Ambia and Mrig). The fruit available from September to December is Ambia, which has a slightly sour taste. This is followed by the sweeter Mrig crop in February. Hence Nagpur mandarin enjoys favourable climatic conditions to provide bulk production twice a year.

Nagpur mandarin received the Geographical Indicators (GI) tag 385 in 2014 under the Geographical Indication of Goods (Registration and Protection) Act, 1999.