



DABUR INDIA LTD

HERBAL KINGDOM

IMPACT ASSESSMENT REPORT



IMPLEMENTED BY



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PREPARED BY

PROJECT YEAR : 2020-21

ASSESSMENT YEAR: 2022-23



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1. Executive Summary

India is home to a rich diversity of flora and fauna, including many endemic and rare species of medicinal herbs. These plants have been used for centuries by communities for their therapeutic properties, and their conservation is essential for the well-being of both people and the planet. However, many of these species are now endangered due to habitat loss, over-harvesting, climate change, and pollution. The loss of these plants not only affects their traditional use but also jeopardizes the ecosystem services they provide, such as soil conservation, carbon sequestration, and biodiversity conservation. Therefore, there is an urgent need to conserve and protect endangered species of herbs in India through sustainable management practices, research, and community engagement.

As a part of its CSR Policy, Dabur India Ltd is supporting interventions to protect endangered species of herbs & plants and enhance livelihood of farmers in the process. The 'Herbal Kingdom' program is implemented by Dabur India Ltd's CSR arm Jivanti Welfare & Charitable Trust. For this intervention, Jivanti has partnered with 12 NGOs

pan-India to establish nurseries for sapling cultivation of endangered herb species, and make them available to farmers for subsequent cultivation. They have also supported the livelihood of tribal farmers who harvest the wild forest products by training them on harvest techniques and procuring their produce. The CSR outlay for the program in the FY 2020-21 was ₹ 2.05 Crores.

The intervention addresses SDG 15 of the UN SDGs, Agenda 2030. Nationally, it targets activity (iv) of Schedule VII of the Companies Act, 2013.



The objectives of the Herbal Kingdom program by Dabur India Ltd are:

- Promotion of herbs cultivation through free distribution of quality planting material
- Income enhancement of farmers and awareness generation through capacity-building programs
- Restoration and Conservation of forest ecosystem, including their biodiversity



Despite the challenges, the income of forest collectors from Odisha was reported to have increased significantly (₹ 40,000 pa), and farmers' income is expected to rise between 15% to 50%

- Promotion of Ayurvedic and traditional medicines in India

The project was implemented pan-India, and the impact evaluation was carried out in 6 states of Gujarat, Tamil Nadu, Maharashtra, Chhattisgarh, Uttarakhand, and Odisha, where a total sample size of 188 stakeholders comprising 164 beneficiaries were covered. The study reveals that the efforts of various NGOs in establishing sapling nurseries and planting trees have been highly successful with a target achievement of 80-90% of sapling plantations and bringing 740+ acres of land under cultivation in FY 2020-21. In FY 2020-21, Dabur and Jivanti's Herbal Kingdom program has benefited a total of 8,975 farmers and tribals, and brought 5,247 acres of land under cultivation.

However, there are several challenges that need to be addressed to sustain the positive impact of these efforts. One of the major challenges identified is the mortality of plants due to climatic conditions, unsuitability of soil, and lack of water resources. Additionally, farmers in Maharashtra and Uttarakhand reported destruction of

saplings by wild animals and monkeys which poses a threat to the success of the project. Furthermore, lack of machinery and inability of the farmers to afford labour is making it difficult for them to harvest roots which require 3-5 feet digging in Chhattisgarh.

Recommendations include re-evaluating the suitability of plant species for current climatic conditions, providing partial funding for boundary walls or biological fencing and chemical repellents, and screening farmers' financial capabilities before selecting them as beneficiaries or arranging labour support during harvest season. Despite these challenges, the income of forest collectors from Odisha was reported to have increased significantly (₹ 40,000 pa), and farmers' income is expected to rise between 15% to 50% depending on the type and number of trees planted, highlighting the success of sustainable forest management practices and the promotion of agroforestry in addressing ecological and economic challenges.





2. Introduction

For centuries, various cultures and communities around the world have relied on medicinal plants for their therapeutic properties. These plants are rich in biologically active compounds that can effectively treat a range of illnesses and diseases. Medicinal plants can take many forms, including teas, tinctures, capsules, creams, and oils. They are versatile and have a wide range of applications, from treating acute and chronic diseases to healing wounds, improving skincare, and boosting the immune system.

The cultivation of medicinal plants can bring economic, social, and environmental benefits to communities. However, unfortunately, the number of medicinal plant species is decreasing globally. This reduction is due to a variety of factors, including habitat loss, over-harvesting,

climate change, and pollution. To address this issue and augment the livelihoods of farmers, Dabur India Ltd., through its CSR arm Jivanti Welfare and Charitable Trust, launched this program pan-India in collaboration with 12 NGOs.

The Project was implemented with the goal of forest ecosystem restoration and improving the livelihood of farmers in India by providing them with an alternative source of income beyond traditional crop farming. Through the provision of saplings, resources, and specialized training, farmers were equipped to efficiently cultivate these unique plants. The saplings/seedlings provided to the farmers were indigenously grown by the NGOs in their professional nurseries that were also established as part of this program.

Key Informant Interviews (KIIs) were conducted NGO program teams across all the locations to understand the rationale behind the program activities and the intended impact of the program.



The list of partner NGOs and the states where they implemented the projects in FY 2020-21 are listed below.

Partner NGO	States
Kovel Foundation	• Andhra Pradesh • Telangana
Covenant Centre for Development	• Tamil Nadu • Chhattisgarh
Umiya Majur Kamdar Sahkari Mandli Limited	• Gujarat
Human India Society	• Uttarakhand
Forest Research Institute (FRI)	• Uttarakhand
Ladakh Environment and Health Organisation (LEHO)	• Jammu & Kashmir
Baitarani Initiative	• Odisha
Alaknanda Ghaati Shilpi Federation (AAGAAS)	• Uttarakhand
Vikas Bharti Bishunpur	• Jharkhand
Dr.Balasaheb Sawant Konkan Krishi Vidyapeeth (KKV)	• Maharashtra
Institute of Integrated Resource Management (IIRM)	• Assam
High Altitude Plant Physiology Research Centre (HAPPRC)	• Uttarakhand

As part of the assessment process, the GIVE team physically visited the nurseries and interacted with the farmers of Chhattisgarh, Gujarat, Maharashtra, Uttarakhand, Tamil Nadu, as well as the forest collectors of Odisha and Chhattisgarh. In addition to this, the team conducted in-depth Key Informant Interviews (KIIs) with NGO program teams across all the locations and a virtual interview with both the Dabur CSR team and the Dabur scientists' team to understand the rationale behind the program activities and the intended impact of the program.

The focus of this impact assessment report is to analyze the current status of both sapling cultivation by farmers and the progress of the nursery created. Additionally, the report will evaluate the impact on livelihood of the beneficiaries, identify any remaining challenges, and examine the overall achievement of objectives. Furthermore, the report will investigate the barriers hindering the cultivation process and preventing program expansion.





3. Objectives and Scope of Study

The study aims to understand the implementation pathway of the project, the impact it has had on its primary beneficiaries (farmers and forest collectors) across Chhattisgarh, Gujarat, Maharashtra, Tamil Nadu, Uttarakhand and Odisha and the effectiveness of the interventions in improving the livelihood of the farmers and increasing the medicinal plant species count in their area through successful plantation of the saplings. The impact assessment study tries to map the program implementation against the proposed plan and draws focus on how the intervention has progressed against its predefined objectives.

3.1 Objectives of the Study

The major objectives of the study are as follows:

- **Assess the relevance and efficiency of the**

intervention in ensuring that stakeholder challenges are addressed by the project and to review the implementation pathways

- **Understand the effectiveness of the intervention:** How each activity has led to creating the desired outcomes
- **Understand the major success factors and challenges** in the intervention
- **Find the areas of improvement** across all the factors from program design to implementation
- **Provide an assessment framework** to be able to capture impacts in a manner that is effective recommendation



3.2 Limitations of the Study

- The impact of the intervention on the livelihoods of farmers could not be gauged properly as only a very small sample of farmers have started receiving yields, due to the long gestation period of the plants provided. The true impact on their livelihood can be measured after the plants have grown and are ready for harvest.
- Due to lack of motorable roads in certain villages of Uttarakhand, the GIVE team could not conduct a physical visit to the plantations of the beneficiaries from those regions.





4. Assessment Framework

To create an overall framework for the impact assessment, following activities were undertaken. We began by establishing the scope of the assessment in terms of type of stakeholders to be engaged and topics to be discussed with them. Based on this and the understanding of the project activities, we developed stakeholder-wise

questionnaires to ascertain factors including rationale for supporting the program, the implementation process, challenges encountered and stakeholder feedback about the efficacy of the program. The findings and recommendations arising out of this process are mentioned in the subsequent sections of the report.

4.1 Theory of Change

The THEORY OF CHANGE FRAMEWORK (ToC) for the given program is illustrated below:





Theory of Change (ToC)

Need	Input	Output	Outcome	Impact
<ul style="list-style-type: none"> Improving the livelihood of farmers and restoring forest ecosystem by increasing the cultivation of medicinal plants 	<ul style="list-style-type: none"> Establishing sapling nursery Providing saplings to the farmers Training session on the cultivation method for farmers Training sessions on proper harvesting techniques and harvest time for forest collectors 	<ul style="list-style-type: none"> Sustained supply of saplings Proper planting and cultivation of saplings by farmers Efficient wild harvesting by forest collectors 	<ul style="list-style-type: none"> Healthy growth of saplings resulting in maximum yield Improvement in income of forest collectors 	<ul style="list-style-type: none"> Creating a sustainable source of income for the farmers, while also promoting conservation of biodiversity and traditional medicinal practices.

4.2 Logical Framework Model

A LOGICAL FRAMEWORK MODEL is created against the identified ToC to reflect the identifiable indicators, means of verification, and assumptions, as given below:




Log Frame Analysis (LFA)				
	Project Summary	Indicators	Means of Verification	Assumptions
Impact ↓	<ul style="list-style-type: none"> Creating a sustainable source of income for farmers, while also promoting conservation of biodiversity and traditional medicinal practices. 	<ul style="list-style-type: none"> Improvement in quality of life of farmers and forest collectors No. of saplings planted/ area brought under cultivation 	<ul style="list-style-type: none"> Beneficiary survey KIIs with NGO program teams KII with Dabur Scientists' team 	<ul style="list-style-type: none"> N/A
Outcomes ↓	<ul style="list-style-type: none"> Healthy growth of saplings resulting in maximum yield Improvement in income of forest collectors 	<ul style="list-style-type: none"> % of yield per plant % increase in income of farmers and forest collectors 	<ul style="list-style-type: none"> Beneficiary surveys KIIs with NGO program teams KII with Dabur Scientists' team 	<ul style="list-style-type: none"> Farmers have adequate market linkage to get a fair price for the yield
Output ↓	<ul style="list-style-type: none"> Sustained supply of saplings Proper planting and cultivation of saplings by farmers Efficient collection and selling of forest products by forest collectors 	<ul style="list-style-type: none"> No. of nurseries created Mortality rate of saplings Changes adopted in forest product collection methods and sales channels 	<ul style="list-style-type: none"> Beneficiary surveys KIIs with NGO program teams 	<ul style="list-style-type: none"> Climatic conditions are in favour of healthy growth of saplings
Input	<ul style="list-style-type: none"> Establishing sapling nursery Providing saplings to the farmers Training session on the cultivation method for farmers Training sessions on proper harvesting techniques and harvest time for forest collectors 	<ul style="list-style-type: none"> No. of nurseries established No. of farmers reached. No. training sessions conducted 	<ul style="list-style-type: none"> Beneficiary surveys KIIs with NGO program teams 	<ul style="list-style-type: none"> Farmers have sufficient resources to cultivate saplings properly



4.3 Three-Point Assessment Framework

Based on the ToC and the LFA created, we examined the relevance of services, the preparedness for program activities, qualitative and quantitative assessments, efficiency, and effectiveness of delivery of services as well as any innovations that may have been implemented on the ground.

The impact assessment findings are further anchored around **GIVE's Three-point Assessment Framework** as illustrated here

Program Design	Program Delivery	Impact & Sustainability
 <ul style="list-style-type: none"> ● Relevance of the intervention ● Preparedness for the intervention ● Qualitative & Quantitative assessments 	 <ul style="list-style-type: none"> ● Efficiency of program implementation ● Effectiveness of program implementation 	 <ul style="list-style-type: none"> ● Depth of impact ● Sustainability of impact
<p>We study program design through program strategies, inputs and resources, assumptions, outreach mechanisms, and much more. We also consider if the program design attends to specific needs of the stakeholders, program locations, social categories, site and situation, among other development needs. GIVE's Impact Assessment approach for program design is based on Assessment criteria like Relevance and Preparedness using methodologies such as assessment of baseline survey.</p>	<p>GIVE assesses the Program Delivery to understand the success of the program delivery mechanism in attaining the overall objectives such as cost effectiveness, resource efficiency, equity in service delivery, best practices and challenges, perception about the services among the relevant stakeholders, among other actors.</p>	<p>The program's impact potential was assessed to ascertain whether a change or the desired outcome can be attributed to the program intervention. GIVE uses criteria such as scale of Impact and sustainability of impact to understand the impact potential of the projects.</p>



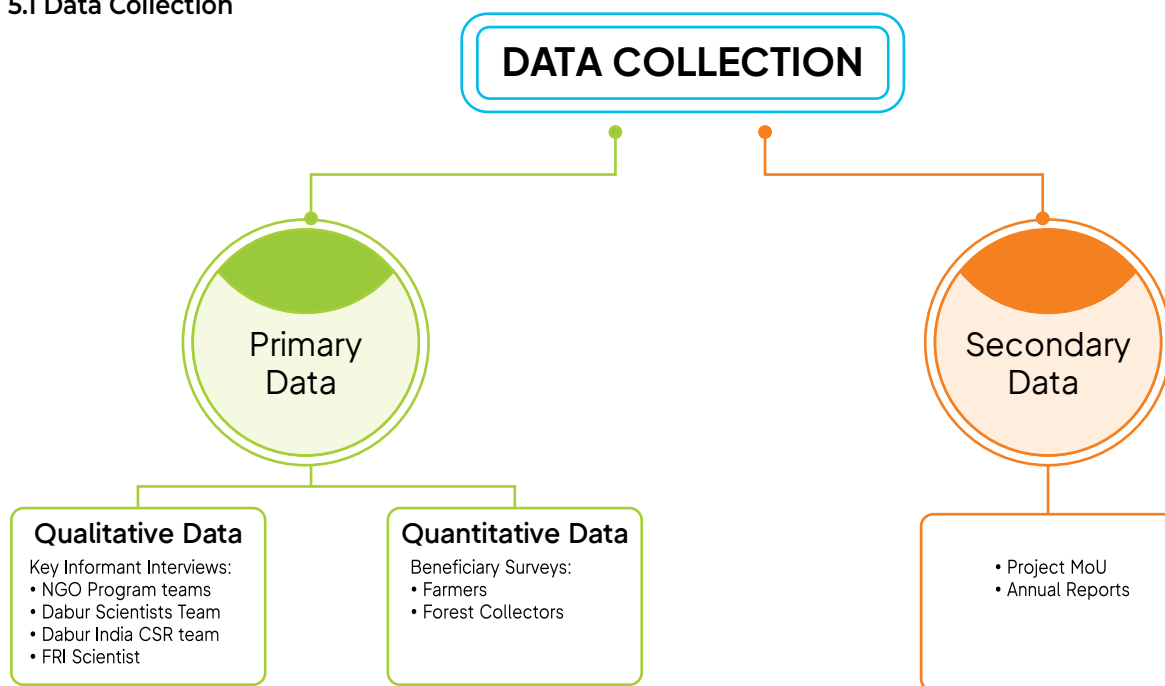
5. Methodology Adopted

We initiated the impact assessment study by identifying the key stakeholders for the project. These stakeholders were ratified in consensus with the implementing partner. The study takes a 'mixed method' approach which includes both qualitative as well as quantitative data capture and analysis.

The quantitative tools provide values to key indicators related to awareness, adoption, quality. It also maps the outputs against the targets and outcomes perceived

by the beneficiaries. On the other hand, the qualitative method and approaches provide a better understanding and help to build a storyline for the achievements and gaps in the program from the lens of immediate stakeholders involved in the program implementation, other than the beneficiaries. A qualitative study gives substantiated evidence for a better understanding of the processes involved in the program implementation. Thus, the 'mixed method' approach also helps in developing a framework for gap identification and course correction.

5.1 Data Collection



Primary Data: Primary data is the key to collecting first-hand information as evidence from the beneficiaries and stakeholders on the interventions. It allows us to understand the benefits delivered, its effectiveness and key challenges to assess the impact created by the program and arrive at recommendations that enhance it.

Secondary Data: For secondary data collection, the project MoU, and annual program reports were referred. These documents gave high-level insights about the projects, including the inception and implementation phase along with the processes followed.

5.2 Sampling Strategy

Considering a confidence interval of 95%, and 5% allowable margin error, the study planned for data collection of 263 stakeholders. However, due to the unavailability of beneficiaries during the assessment period, the study was able to achieve a sample size of 188.

The following formula details out the sample size calculation process with the assumptions considered.

$$\text{Sample size} = \frac{z^2 \times p(1-p)}{e^2} \div \left(1 + \left(\frac{z^2 \times p(1-p)}{e^2 N} \right) \right)$$

- N = Total stakeholder population
- z = Z Score (Z-score is the number of standard deviations a given proportion is away from the mean and 1.96 here corresponding to a 95% confidence interval)
- e = Margin of Error (Percentage in decimal form; here taken as 0.05 (+/- 5% error))
- p = sample proportion (0.5)

The sample size of 188 was distributed amongst the beneficiaries and key stakeholders: farmers, forest collectors, NGO program teams, Dabur Scientists' Team and the Dabur CSR team. For quantitative data collection, random sampling of beneficiaries was conducted.

Following table elaborates the sample size and distribution as per the strategy.

Stakeholders	Sample size achieved	Remarks	Mode of interview
Farmers	121	Chhattisgarh: 9 Gujarat: 5 Maharashtra: 3 Tamil Nadu: 25 Uttarakhand: 79	Physical
Forest collectors	43	Odisha: 40 Chhattisgarh: 3	Physical
Total	164		

The study was conducted over a period of 9 days, from 11th February to 22nd February 2023.

Key informant interviews: Questionnaires were designed for each stakeholder interview. All relevant questions were asked to the respondents and were captured. This was done through purposive sampling.

Stakeholder Group	No. of Interviews (Achieved)	Mode of interview
NGO program team	16	Physical
Dabur scientist team	5	Virtual
FRI scientist	1	Physical
Dabur CSR team	2	Virtual
Total	24	



6. Analysis & Findings

Descriptive statistic (basic features of the data, including frequencies, counts, percentages), comparative analysis (before and after comparisons), and content analysis (for qualitative data to interpret and analyze unstructured textual content into manageable data) were done to analyze and interpret the data collected. The findings for the program are organized as per the three-point assessment framework described earlier.

Basic Profile of the Beneficiaries

The farmers surveyed as part of the study had a family strength of 4-5 on an average. Agriculture was the primary source of income for all of them. 70% of the forest collectors from Odisha and Chhattisgarh reported wild fruits collection to be their primary source of income. The rest were engaged in farm labour in addition to wild harvesting. The state-wise current monthly income of the farmers and forest collectors was reported to be as follows:

State	Average Monthly Income (In ₹)
Chhattisgarh	7,600
Gujarat	12,000
Maharashtra	12,000
Tamil Nadu	For 50% of the farmers, it was 12,000 and for the rest it was 35,000
Uttarakhand	7,000 with income range being 1,000-20,000
Odisha (Forest Collectors)	5,000

6.1 Program Design

Relevance of the project is analyzed based on how relevant the project activities are with respect to the needs of the community and the issues prevalent prior to the intervention. The rationale behind the implementation in the select locations is scrutinized to check if the most underserved are being benefitted through the program or not. The preparedness of the NGO team is assessed on the basis of the implementation methods adopted and the strategies in place for handling envisaged challenges during execution.

Relevance and Preparedness

GIVE found that the NGO teams collaborated with Dabur scientists to decide on the plant species to be cultivated based on the climatic conditions and the suitability of the available land for those plants. The Dabur scientists reported that the plants selected were niche species that can contribute to growth of local forest cover, has multi-purpose use, are fast-growing, and known to the local people. These plants were selected for being high-value plants. Besides, they require less space for storage and have a long shelf life. They avoided selection of exotic plants. The soil condition, future demand and ability of the plants to increase income of farmers were also considered before finalization. This ensured that the selected plants had the highest chance of survival and served the dual purpose of increasing forest cover and income of farmers.

The NGO program teams considered several parameters while selecting land for establishing the nursery, such as:

- The availability of electricity, manpower, and water
- The presence of large trees near the nursery to protect the saplings from direct sunlight.
- The land registration status

While most of the NGOs relied partially on rented land for the nursery, three NGOs established nurseries on land they owned. All NGOs procured seeds from local vendors, but two also procured seeds from Dabur.

GIVE found that in most states, the nurseries were located 1-2 km away from the villages. However, in Chamoli (Uttarakhand) and Durg (Chhattisgarh), the nurseries were located further away, 25-30 km. Farmers in Uttarakhand reported receiving the saplings in batches every year, while in Tamil Nadu and Maharashtra, different sets of farmers received saplings at different points in time from 2020-2022. In Gujarat, farmers received the saplings in 2017, and in Chhattisgarh, they received the first batch in 2018 and the next in 2022. The saplings were generally delivered all at once, except in Tamil Nadu, where they were delivered in two batches.

The study found that the delivery mechanism of saplings in Uttarakhand and Chhattisgarh could be improved, as farmers reported damage of 20% saplings in Chhattisgarh and 20-50% saplings in Dasholi and Joshimath blocks of Uttarakhand. The same was corroborated by the respective NGO teams. These were also the only two states where saplings were first brought to regional nurseries and then delivered to the farmers. The nursery of AAGAAS was also found to be at a distance of 25-30 Km, as stated previously. This indicates that logistical processes should be strengthened by NGOs with longer delivery chains.

The study found that 89% of the farmers were not involved in growing the plants and trees provided by the NGOs before the intervention, highlighting the importance of the training component. The following table lists the primary crops cultivated by the farmers, the type and average number of saplings received from the NGOs, and the average land area brought under cultivation as part of the project in each state.

State	Key Crops Cultivated	Plants Received from NGO	Number of saplings received	Average Land Area
Chhattisgarh	Paddy, Millets	<ul style="list-style-type: none"> · Bael (<i>Aegle marmelos</i>) · Padal (<i>Stereospermum suaveolens</i>) · Shyonak (<i>Oroxylum indicum</i>) · Gambhari (<i>Gmelina arborea</i>) 	Total of 20,000 to 60,000	5-6 acres
Gujarat (Bhuj)	Wheat, Moong, Bajra, Mustard	<ul style="list-style-type: none"> · Guggul (<i>Commiphora wightii</i>) 	50% received around 5,000. The others received around 30,000	All saplings were planted as farm bunds along the boundaries of agricultural fields
Maharashtra	Mangoes, Cashew	<ul style="list-style-type: none"> · Bael (<i>Aegle marmelos</i>), · Tetu 	6,000-12,000 saplings of each	1.5-2 acres
Tamil Nadu	From October to January- Paddy; Other times: Horticultural trees like Coconut, Groundnut, Mango	<ul style="list-style-type: none"> · Beechwood (<i>Gmelina asiatica</i>) · Gamhar (<i>Gmelina arborea</i>) · Mahua (<i>Madhuka longifolia</i>) · Teak (<i>Tectona grandis</i>) · Vilva (<i>Aegle marmelos</i>) · Ashoka (<i>Saraca asoca</i>) · Sweetina Mahogany · Fig · Red Sandal (<i>Pterocarpus santalinus</i>) · Guava (<i>Psidium guajava</i>) · Lemon (<i>Citrus sp.</i>) 	Total number of saplings provided ranged from 10-200	Saplings were planted on 1-4 acres of land and also as farm bunds around 1-2 acres of agricultural land.
Uttarakhand	Rice, Wheat, Millets	<ul style="list-style-type: none"> · Kachnar (<i>Bauhinia variegata</i>) · Lodhra (<i>Symplocos racemosa</i>) · Timru (<i>Zanthoxylum armatum</i>) 	<ul style="list-style-type: none"> ● Kachnar: 120-150 saplings and 400 gm of seeds (~1,600 seeds) ; some received 10-75 saplings along with Lodhra. ● Lodhra: 500 to 1,400 saplings ● Timru: 20-30 on average with some receiving 100-750 saplings 	Varied from 0.05 acre to 2.5 acre

The NGO program teams reported planting the saplings in government land, forest land and rented land in addition to beneficiary farms.

The forest collectors of Chhattisgarh reported receiving training on the best methods for seed collection and correct harvest time for different seeds. The forest collectors of Odisha were found to be working for the NGO. In addition to receiving training, they also received labour charge and compost charge. The wild fruits/seeds harvested by the forest collectors in Odisha and Chhattisgarh was reported to be the following:

State	Product
Odisha	<p>Jan to May:</p> <ul style="list-style-type: none"> · Harda (<i>Terminalia chebula</i>) · Baheta (<i>Terminalia bellirica</i>) · Anola (<i>Emblica officinalis</i>); <p>Jan-end to April:</p> <ul style="list-style-type: none"> · Dhatki flower (<i>Woodfordia fruticosa</i>) <p>Dec- March:</p> <ul style="list-style-type: none"> · Shatavri (<i>Asparagus racemosus</i>) · Vidharikand (<i>Pueraria tuberosa</i>) · Talmuli (<i>Curculigo orchioides</i>)
Chhattisgarh	<p>March:</p> <ul style="list-style-type: none"> · Padal (<i>Stereospermum suaveolens</i>) · Shyonak (<i>Oroxylum indicum</i>) <p>April:</p> <ul style="list-style-type: none"> · Bael (<i>Aegle marmelos</i>) · Gambhari (<i>Gmelina arborea</i>)

GIVE found that the forest collectors of Chhattisgarh had to travel a great distance of ~30-40 Km to reach the forest. In comparison to that, the ones from Odisha had to travel only 1-2 Km. It was observed that both the groups had access to motorcycle/bike for this commute.

Stakeholder	Parameter	Ratings (out of 5)
NGO Program Teams	Suitability of the plants selected for cultivation in the intervention geography	4.4

6.2 Program Delivery

Efficiency of the intervention is analyzed based on how well resources were used in terms of the activities conducted. Effectiveness is analyzed based on the extent to which the intervention has achieved its objectives as outlined in the project proposal. The lens adopted for the scope of the impact assessment is to analyze both efficiency and effectiveness through each of the project objectives.

Efficiency and Effectiveness

The NGO program teams reported periodic monitoring visits (mostly, monthly) to ensure that the farmers are cultivating the plants properly. They also use WhatsApp for monitoring the plantations through photos/ videos. Two of the NGO have deployed community resource

persons/ field staff in the beneficiary locations for regular monitoring. For villages in Uttarakhand which are not connected by motorable roads, telephonic monitoring is done.

According to the survey, 66.4% of the farmers reported that they relied on rainwater for plant cultivation, while the remaining farmers used borewell, dam, or drip irrigation methods. The Dabur scientists team reported that they selected plant species keeping in mind the limited irrigation options available to the farmers. But the farmers of Tamil Nadu and Uttarakhand reported challenges with irrigation due to water scarcity.

20% of the farmers reported experiencing mortality of saplings while cultivation. The table below summarizes the plant species that experienced high mortality and the reasons reported for the same.

State	Plant Species	Reason of Mortality
Chhattisgarh	<ul style="list-style-type: none"> · Padal (<i>Stereospermum suaveolens</i>) · Bael (<i>Aegle marmelos</i>) 	Due to heavy rains and inability of the farmers to provide proper care, rapid colour changing of leaves reported
Tamil Nadu	· Ashoka (<i>Saraca asoca</i>)	Poor adaptation to prevalent climatic conditions (heavy rain and heat), unsuitability of soil
	· Teak (<i>Tectona grandis</i>)	100 saplings died due to wrong transplantation timing
	<ul style="list-style-type: none"> · Amla (<i>Mangifera indica</i>) · Lemon (<i>Citrus sp.</i>) 	Damaged due to lack of water resources
	<ul style="list-style-type: none"> · Ashoka (<i>Saraca asoca</i>) · Gambhar (<i>Gmelina arborea</i>) 	Insect Infestation
	· Gambhari (<i>Gmelina asiatica</i>)	Unsuitability of soil

GIVE found that most of the plants were still in their gestation period and thus, not ready for harvest. 7.5% of the farmers (cultivating plants with shorter gestation periods) reported that their plantations were ready for harvest. They also reported an increase in their income as a result of it. The following yield was reported per plant for the following species:

Plant Name	Yield per plan	Price received for it
Padal (<i>Stereospermum suaveolens</i>)	150 g	90/Kg
Bael (<i>Aegle marmelos</i>)	180g	100/Kg
Shyonak (<i>Oroxylum indicum</i>)	120-500g	50/Kg

The farmers reported selling the products to the NGO and the open market.

45.5% of the farmers reported using fertilizers/insecticides for their plantations. They mostly used organic fertilizers like cow dung, vermicompost and farmyard manure. The others reported that there was no need for them to use fertilizers as the plants were growing well naturally.

All the forest collectors reported that the training provided to them had helped them in becoming more efficient in seed collection. The forest collectors from Odisha sell their harvest directly to Dabur as well as in the open market with support from the NGO. The Chhattisgarh forest collectors reported receiving no support related to market linkage from the NGO. They sell their seeds to the community resource person.

In Odisha, a machine for primary processing of the seeds has been provided but the forest collectors face challenges in using it as it ends up breaking the seeds. In Chhattisgarh, lack of proper vehicle makes it difficult for the forest collectors to commute to the forest (~30-40 Kms away).

GIVE found that the NGOs achieved their objectives for FY 2020-21 to a great extent. Although every NGO

had slightly varying objectives, the common objectives were local forest ecosystem restoration/conservation and supporting farmers with saplings for livelihood enhancement. Most of the NGOs reported 90% achievement of the said objectives in terms of tree plantation target and support provided to farmers. Inclement weather was found to be the most common reason stated for underachievement of targets.

The common challenge faced by the NGOs was difficulty in convincing the farmers to participate in this initiative as the plant species were very new for them and the increase in income would only happen after a minimum of 2-3 years for some and 15-20 years for others. The NGOs did not face any challenge in establishing the nurseries.



Stakeholder	Parameter	Ratings (out of 5)
NGO Program	Teams Quality of seeds procured	3.9
Farmers	Quality of training/workshop on cultivation, harvesting and post harvesting methods	4.3
	Quality of saplings provided (yield of saplings)	3.8

6.3 Impact & Sustainability

Case Study: Partnership with Forest Research Institute to develop clonal propagation technique for *Pistacia integerrima*

Pistacia integerrima (Kakarsringi) is a unique plant which can develop medicinal properties upon infestation by a particular type of galling aphid (*Baizonzia pistaciae*). However, the ability of the plant to reproduce reduces upon infestation (seed production reduces). Therefore, Dabur partnered with Forest Research Institute (FRI) to develop a clonal propagation technique through which the plant can be reproduced even after infestation. This would ensure both a sustainable supply of the plant, and liberty to use the aphid infestation for producing the medical part. The medicinal part produced on aphids infestation (*Karkatshringi*) is used for producing ayurvedic medicines for respiratory issues.

The FRI team was successful in both identifying the particular type of aphid, upon whose infestation, the medicinal part is formed on the plant and developing a clonal propagation technique that can successfully propagate the plant. Once the propagation technology is transferred to Dabur, FRI will train the Dabur team as well as farmers involved in the cultivation of *Pistacia integerrima* on the propagation technique.

The scientist associated with this project demonstrated the propagation technique during the visit by the GIVE team. The process was found to be very simple (took ~10 mins) that can be easily reproduced by farmers, upon training. However, the prevalence of proper climatic conditions was highlighted to be a crucial parameter for ensuring success after propagation. Thus, special care should be taken in regard to plantation and propagation timings to get the most out of this development.

The study found that the efforts of various NGOs in establishing sapling nurseries and planting trees have been highly successful. The targeted number of trees has been achieved to a great extent (80-90%), paving the way for various ecological and economic benefits. The income of forest collectors from Odisha has increased significantly (INR 40,000 per annum), and farmers' income is expected to rise between 15% to 50% depending on the type and number of trees planted.

84.6% of the NGOs interviewed reported that they have been able to achieve in-situ seed production for the plants in the nurseries. The others stated that they could not achieve in-situ seed production as the plants were not mature enough to produce seeds. GIVE found that

the assessed NGOs and farmer have been able to bring 740+ acres of land under cultivation in FY 2020-21 as part of this project. In FY 2020-21, Dabur and Jivanti's Herbal Kingdom program has benefited a total of 8,975 farmers and tribals, and brought 5,247 acres of land under cultivation.

These initiatives have not only contributed to environmental conservation but have also led to the improvement of the livelihoods of local communities. Overall, the success of these collaborative efforts highlights the importance of sustainable forest management practices and the promotion of agroforestry in addressing ecological and economic challenges.

Stakeholder	Parameter	Ratings (out of 5)
Dabur Scientists' Team	Potential of the program to increase earnings of the beneficiaries	4
NGO Program	Teams Potential of the program to increase earnings of the beneficiaries	4.1
Forest Collector	Contribution of the NGO in increasing your income	4.4





7. SWOT Analysis

A SWOT analysis is carried out to understand the program's strengths, weaknesses, opportunities, and threats. It was conducted from the responses received from the program team and other implementation-level stakeholders, at the same time considering the beneficiary feedback

Strengths

- Promotes cultivation of indigenous herbs and thereby addresses to maintain the ecological balance.
- Possesses potential to upscale the farmers' income by 15%-50%.
- The program has been successful in establishing sapling nurseries and a huge majority (~90%) have also attained in-situ seed production in the nurseries.
- Over 740 acres of land has been brought under cultivation in the 6 locations visited thus successfully contributing forest ecosystem restoration.
- The program has been successful in augmenting the income of forest collectors.

Weakness :

- There is potential to improve sapling transplantation process to ensure all saplings are delivered in a good condition.



Opportunities:

- Program may identify climate resilient species of herbs based on the target geographies that can be cultivated, will require minimal supervision and bears fairly profitable market price.
- Establishment of nurseries near the beneficiary villages to reduce mortality of saplings during transportation.

Threats

- Mortality of saplings due to unavailability of resources (water for irrigation, fertilizers/ insecticides) required for proper care of the saplings





8. Conclusion and Recommendations

GIVE feels that the achievements of the project in FY 2020-21, such as establishing sapling nurseries and planting trees, can contribute significantly to its long-term objectives of restoration of forest ecosystem and augment income of farmers.

By establishing sapling nurseries, the project has ensured a continuous supply of tree saplings, which can be used to restore degraded forests and enhance forest cover. As these trees grow, they can provide several ecosystem services, such as carbon sequestration, soil conservation, and biodiversity conservation.

Furthermore, once the plants are ready for harvest, farmers can diversify their income sources and increase their economic resilience. Depending on the type of trees planted, farmers can generate income from timber, fruits, nuts, or non-timber forest products and medicinal tree

species, such as padal (*Stereospermum suaveolens*), or shyonak (*Oroxylum indicum*). This income diversification can reduce their dependence on a single crop or activity, which can be vulnerable to market fluctuations or climate variability.

Overall, the activities conducted in this project, if sustained over the long term, can lead to a significant restoration of forest ecosystems and augmentation of farmers' income. These outcomes can improve the well-being of local communities, enhance ecological sustainability, and contribute to global efforts to address climate change and biodiversity loss.



Recommendations

The following recommendations have stemmed from on-ground observations and interactions with the beneficiaries/ stakeholders.

Challenges/ Observations	Recommendations
Mortality of plants due to climatic conditions, unsuitability of soil and lack of water resources	The plant species being currently cultivated should be re-evaluated based on the current climatic conditions of the location and their suitability for the same. Alternatively, more climate resilient species can be chosen for cultivation.
Farmers reported destruction of saplings by wild animals and monkeys in Maharashtra and Uttarakhand	Dabur can add an additional program component geared towards partially funding farmers with the cost of building a boundary wall and purchasing chemical repellents like Butanethiol for repelling monkeys.
Lack of machinery and inability of the farmers to afford labour is making it difficult for them to harvest roots which require 3-5 feet digging in Chhattisgarh	The NGOs should screen the financial capabilities of the farmers before selecting them as beneficiaries. Alternatively, labour support can be arranged by the NGOs during harvest season.

Annexure - I



Farmer plantation in Dapoli



Nursery at KKV, Dapoli





Farmer Plantations in Bageshwar



Nursery and wild harvest collected in Chhattisgarh



Annexure - I



Sapling nursery in Bhuj



Sapling nursery and farmer plantation in Tamil Nadu





Timru tree in Chamoli



Mist chamber and field lab at FRI, Dehradun





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