Final Evaluation Report

We ask all grant recipients to complete a project evaluation that helps us to gauge the success of your project. This must be sent in **MS Word and not PDF format**. We understand that projects often do not follow the predicted course but knowledge of your experiences is valuable to us and others who may be undertaking similar work – remember that negative experiences are just as valuable as positive ones if they help others to learn from them.

Please DO NOT fill in and submit this form until the project has been completed.

Complete the form in English. Note that the information may be edited before posting on our website.

Please email this report to jane@rufford.org.

Your Details	
Full Name	Tarsh Thekaekara
Project Title	Community Based Lantana Removal and Restoration
Application ID	39884_B
Date of this Report	10/12/2025

1. Indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.

Objective	Not achieved	Partially achieved	Fully achieved	Comments
Develop scalable methods for estimating the density of Lantana in different landscapes				The density of Lantana was measured in BRT, MTR, WWS, BTR landscapes with low, moderate and high density of lantana infestation. The stem thickness, canopy dimensions and biomass were the metrics measured to identify the densities. We found it the sample size/area of 9 hectares was too low, so found additional funding and expanded this to 100+ hectares across 4 parks and 5 sites (compared to the planned 9 hectares across 3 sites).
Cost estimation and efficiency for Lantana Removal in different landscapes				The methods evaluated were – manual, fully mechanised (mini excavator) and semi-mechanised removal using a customised tractor and winch cable. Manual removal proved to be the most efficient option for low-density areas whereas fully mechanised removal was considered the best option for high-density areas. Semi-mechanised approaches offered a compromise with achieving effectiveness similar to mechanised methods in less time while being environmentally considerate
Examine and understand the economic value chain around selling Lantana biomass				Analysis of the broader economic value chain, including the processes of transportation, processing, market linkages for harvested biomass were examined. Interviews with multiple companies using biomass were undertaken, and it was found the market market value for biomass was very low, prompting us to setup a new entity to create Lantana biochar.

2. Describe the three most important outcomes of your project.

a) The Stem thickness can be used as a proxy for Lantana biomass per hectare. Our study showed a significant relationship between stem thickness and Lantana biomass (R^2 = 0.13, p <0.001), demonstrating that stem measurement can be a reliable indicator for understanding the infestation severity. The extent of Lantana cover from drone orthomosaics is also a useful indicator from an ecological perspective, since it shows how much area is available for native vegetation, but this is only feasible in area with low tree canopy, as drones can't visualise what vegetation is growing under canopy.

b) Effectiveness of removal methodology depends on density: The study demonstrated that no single method works best everywhere and establishes strong evidence for density-dependent management approach. We concluded that manual removal was the most cost-effective approach for low density areas and mechanised for high-density areas, with semi mechanised removal performing best in moderate to high density areas *(Figure 1)*. The drone orthomosaic for sites MTR, BRT and BTR show the extent of Lantana cover. For some plots, the vegetation was mixed and hence the Lantana cover could not be calculated (*Figure 2,3 & 4*)

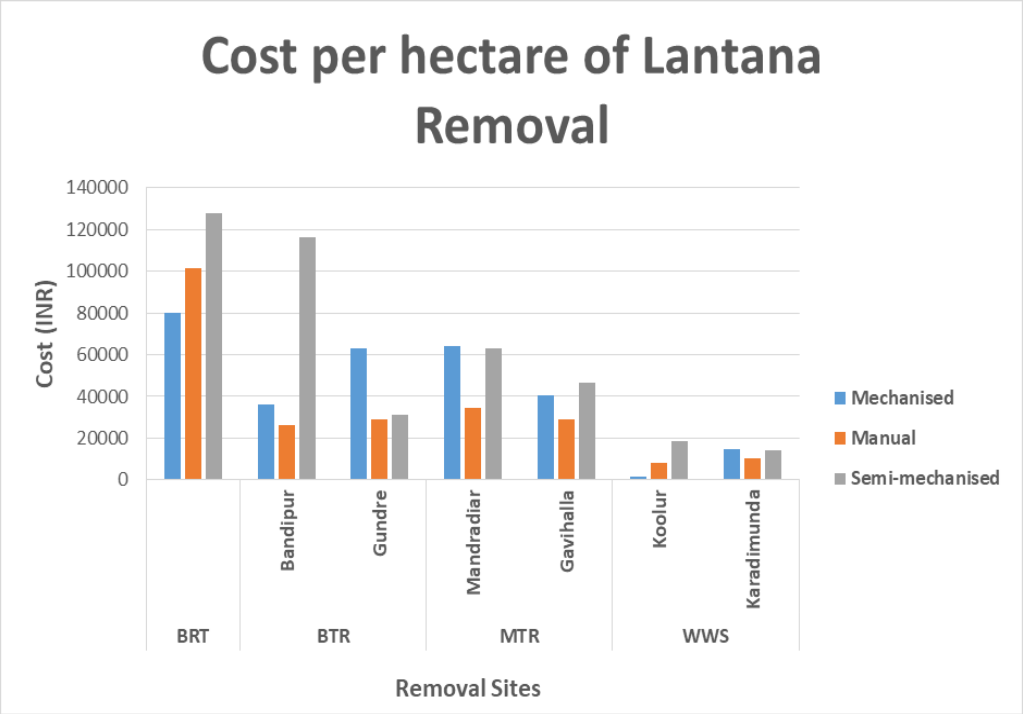

Figure 1: Cost per hectare of Lantana Removal at removal sites (BRT, BTR, MTR & WWS). Shredding was not undertaken in sites with low density.

(Further analysis is being done and the numbers might vary in the final paper publication)

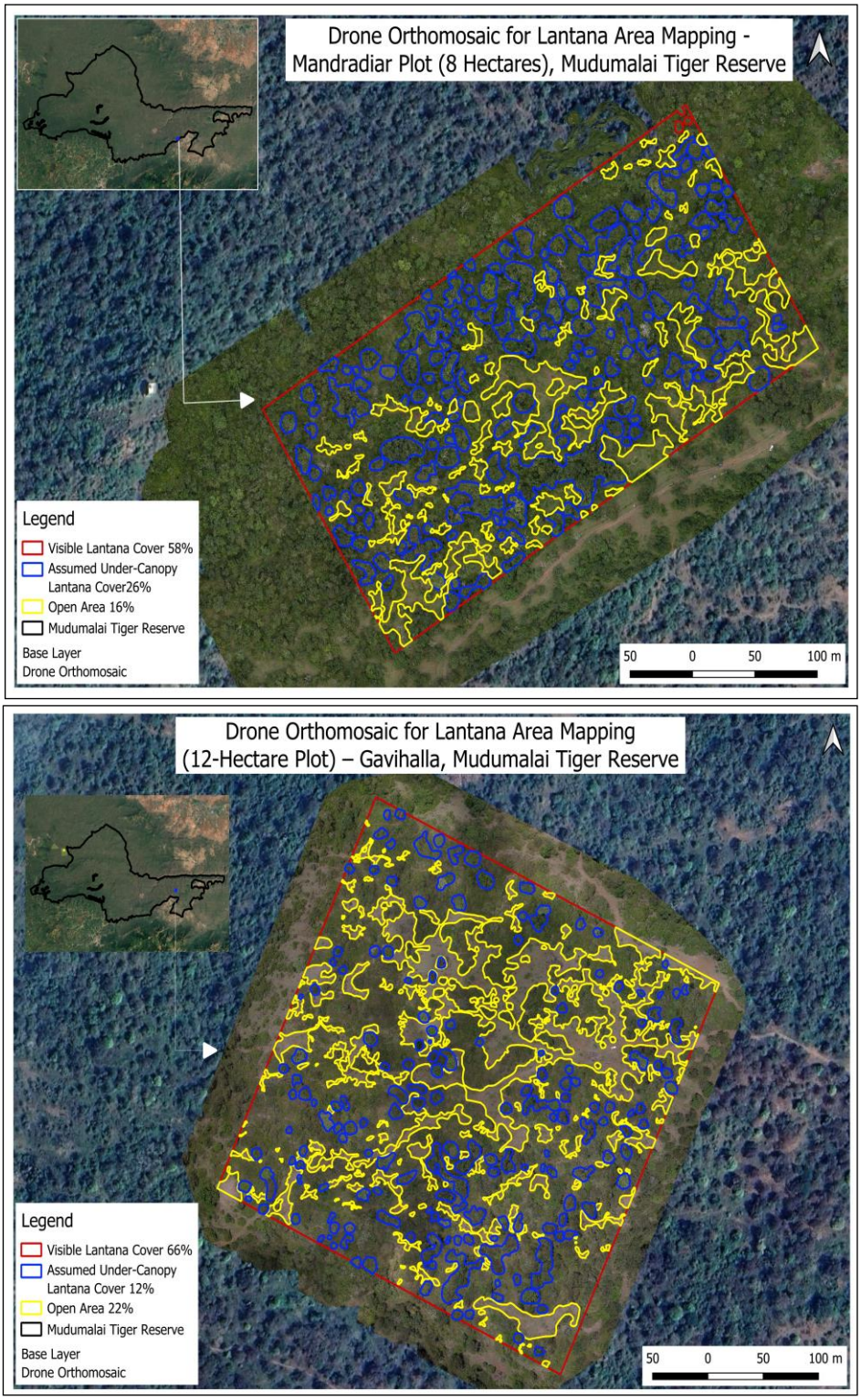

Figure 2: Drone Orthomosaic for Lantana Area Mapping (Mudumalai Tiger Reserve)

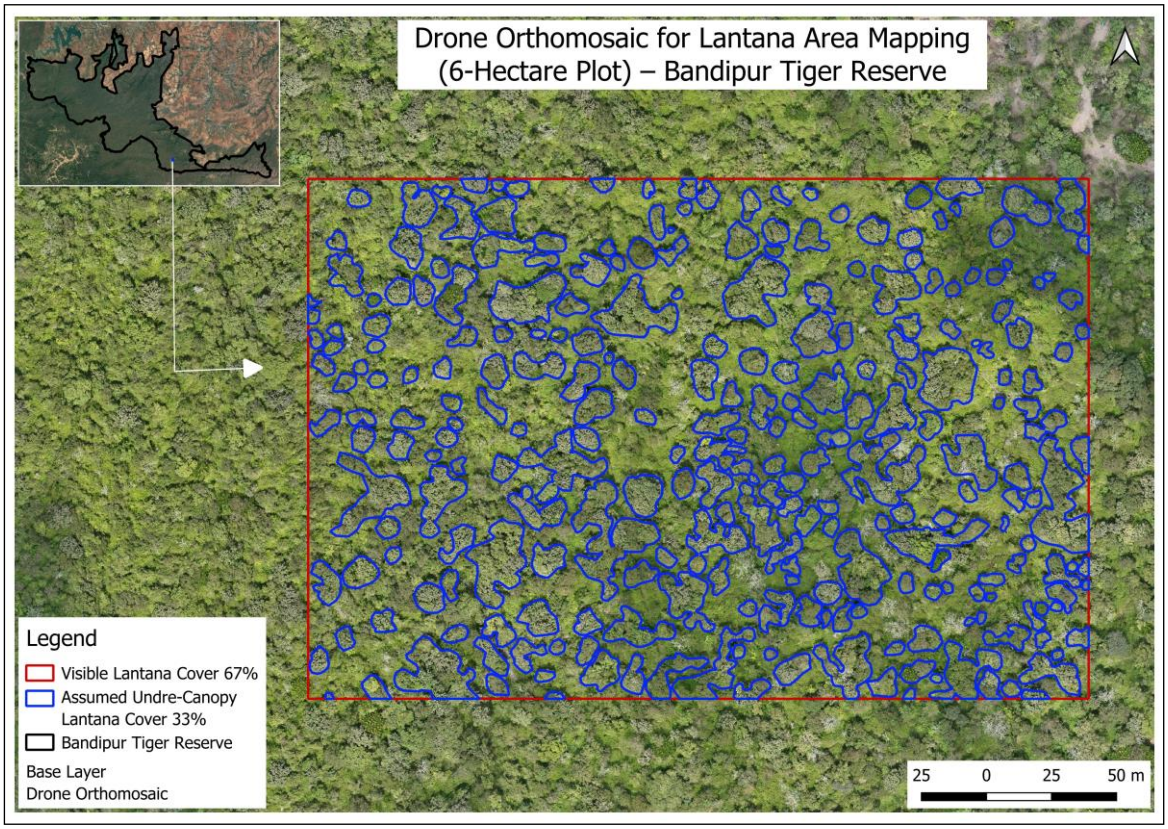

Figure 3: Drone Orthomosaic for Lantana Area Mapping (Bandipu Tiger Reserve)

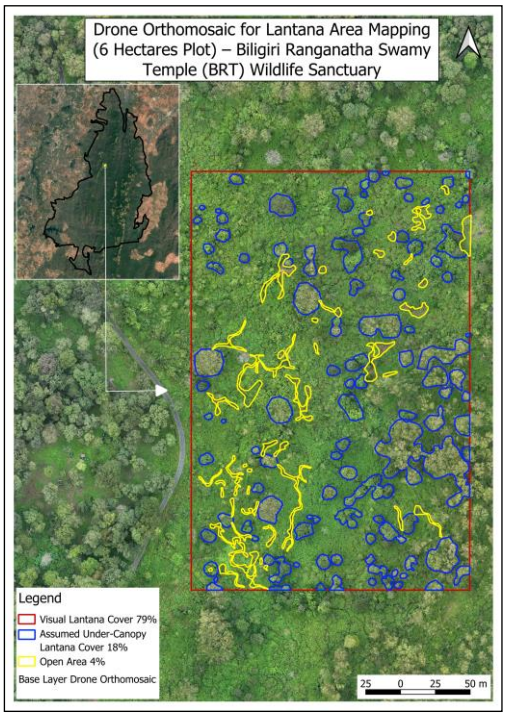

Figure 4: Drone Orthomosaic for Lantana Area Mapping (Biligiri Ranganatha Swamy Wildlife Sanctuary)

c) The market price for biomass is low—around ₹3 per kilogram—while the cost of removing Lantana from dense forest areas is closer to ₹5 per kilogram. As a result, existing biomass users are unwilling to pay a premium for Lantana biomass, making large-scale removal economically unviable under current market conditions.

   To address this gap, we have decided to set up a new entity, Wild Carbon Conservation and Livelihoods Private Limited, which will focus on scaling the use of Lantana to produce biochar that is then returned to the soil, thereby sequestering carbon. The carbon credits generated through this process can command a premium because they deliver multiple co-benefits: long-term carbon sequestration, livelihood generation for indigenous communities, and the ecological restoration of forests by removing invasive Lantana.
   It is this premium that we hope will fund the full cost of Lantana removal, making forest restoration efforts both economically viable and scalable.

d) Post-removal restoration is essential for the long-term success of lantana removal: The study showed that removal alone is insufficient and must be followed with continuous monitoring and native species restoration to achieve long term success in ecosystem recovery.

3. Explain any unforeseen difficulties that arose during the project and how these were tackled.

A key unforeseen challenge during the project was the extreme physical density of Lantana in certain sites which made the sampling difficult due to restriction of movement and thus affecting the original systematic sampling design. To address this, the methodology was adapted in the field. Existing trials and partially cleared boundaries were used as accessible transects and the sampling points were established at fixed 50m intervals along these routes.
The same measurements as in moderate and low-density areas were taken with adjustments due to the dense nature of Lantana. This flexible and dual approach in sampling design allowed the data collection to continue without compromising safety or data reliability.

4. Describe the involvement of local communities and how they have benefitted from the project.

The project created livelihood opportunities (short term and long term) for the local community members. The members were directly involved in removal activities (manual, mechanised and semi-mechanised). They operated the tractor, winch cables and harvesting units. In addition to the financial benefits, the practical

experience also provided them with an understanding of invasive species management and habitat restoration. Based on the pilot by the Rufford grant to establish costs of removal, we have ongoing removal work happening, leveraging additional corporate social responsibility funds.
About 150 indigenous people are working continuously in three parks clearing Lantana, and they will own the enterprise continuously removing Lantana from the South Indian parks.

5. Are there any plans to continue this work?

Yes, Lantana removal activities will be expanded and refined to make interventions more efficient and scalable across landscapes. We have setup a new entity (www.wildcarbon.eco) to convert lantana into biochar and leverage carbon finance as mentioned. This is a private enterprise that is part owned by the local community, and will be built up over time to be majority community-owned.
The long-term success, of course, depends on the post-removal monitoring and restoration of the cleared plots. Based on our learnings, the following activities are planned moving forward: (1) A grass nursery is to be set up in order to support the restoration efforts. (2) It is impossible to monitor vegetation/biodiversity at scale, so we are pioneering acoustics-based monitoring with collaborators – sounds recorders will listen and give us species checklists to know how the forests are recovering. (3) We want to scale up the intervention around biochar, to show farmers it is useful for soil health and the microbiome, so we want to scale up trials around biochar to create a market for it.

6. How do you plan to share the results of your work with others?

We work closely with government agencies, and we now have MoUs with the state governments of Kerala, Karnataka and Tamilnadu. Our findings are being incorporated into the management plans of these parks on an ongoing basis and influencing the management of Lantana.
We also plan to disseminate the information through published reports in peer-reviewed scientific journals and research articles. The findings will be disseminated through presentations to relevant stakeholders to ensure evidence based on-ground implementation of interventions.
Tarsh also gave an online talk on our approach of finding uses for Lantana through the UN/FAO dryland management programme, and ministers from Kenya, Tanzania and many other African countries were very interested in this approach as well.

7. Looking ahead, what do you feel are the important next steps?

The most important next steps include analysing the economically viable pathways for utilising removed biomass (Biochar production), strengthening post removal

restoration through native species regeneration and establishing long-term acoustics-based monitoring to track reinvasion and ecosystem recovery.

8. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did the Foundation receive any publicity during the course of your work?

Yes, all presentations made had the Rufford Foundation logo at the end.
We are happy to also use the Rufford Foundation Logo on the shola trust and WildCarbon websites if that works for you.

9. Provide a full list of all the members of your team and their role in the project.

1. Tarsh Thekaekara – Primary researcher
2. Subhash Gautam – Managing trustee of The Shola Trust and has been managing the team of 70+ tribal artisans and is involved in helping set up the business around Lantana biomass
3. Mahesha J – from the Soliga community and helping with the setup of lantana biomass business
4. Naveen – Removal coordinator
5. Andrew – WildCarbon co-founder. He is involved in setting up the Biochar production as part of the business model around Lantana biomass

10. Any other comments?

Despite our efforts—and those of many people around the world—the spread of *Lantana* continues unabated. According to the IPBES report released at the end of 2023, Lantana is now the most widely distributed invasive plant species globally.
We strongly believe that large-scale utilisation of the plant may be one of the few viable ways to meaningfully push back against its spread worldwide. In that context, we are particularly excited about the potential of WildCarbon and biochar to take this approach to scale.

However, Lantana removal cannot happen in isolation. It must go hand in hand with robust restoration and long-term ecological monitoring to ensure genuine restoration outcomes. These elements will form the core focus of our future grant-funded projects, and we also hope to apply for an additional Rufford Grant to continue and deepen this work.

ANNEX – Financial Report

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