BUILDING OUT A TOOLKIT FOR RESTORATION: ECONOMIC ASSESSMENTS FROM PERU, INDONESIA, AND CAMBODIA

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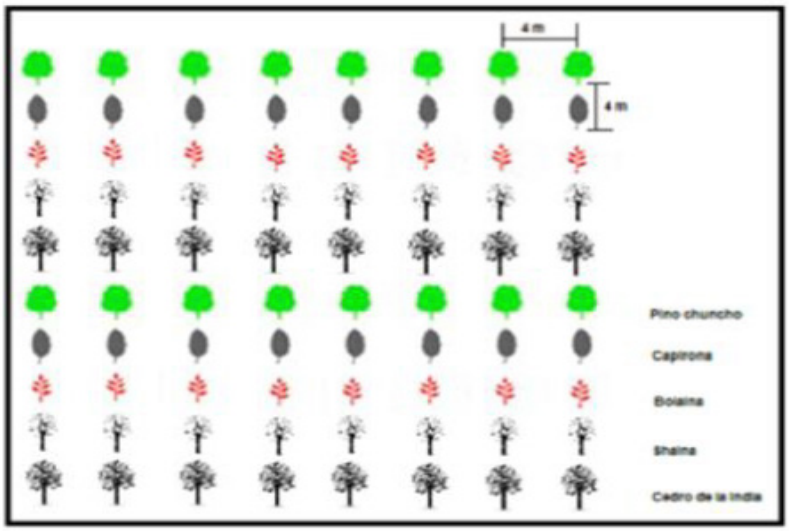
In partnership with Conservation International, Conservation Strategy Fund created a Forest Restoration Toolkit to provide key information on investment costs and benefits for forest restoration in three countries: Peru, Indonesia, and Cambodia. Using real case studies from these countries, this Toolkit provides insight into alternative restoration methods, their potential challenges, and opportunities related to economic returns, local policies, and technical capacities.

For the Toolkit, nine forest restoration models were selected in total; three case studies were selected per country: two models that demonstrated a combined economic and ecological value, and one that focused solely on the ecological value. Each of the models selected in the Toolkit had to follow three main criteria: (i) to improve ecosystems conditions; (ii) to generate positive economic returns to the necessary investors; and (iii) to be scalable and practical to implement at the local level (with respect given to the technical, political, economic and social factors of each country). These models were developed based on data collected in the field from actual initiatives combined with projections about how the models could be developed, adapted, and scaled up in the long term to yield better economic results.

This Toolkit fills in an information gap on restoration costs and benefits, and the models we selected may serve as some of the first economic records of forest restoration initiatives in these countries. Ultimately, the purpose of the Restoration Toolkit is to encourage the implementation of large-scale initiatives to stabilize anthropogenic climate change, similar to initiatives like the Bonn Challenge and the demands indicated by the IPCC (IPCC 2014). [1]

Cases from Peru: Cacao and silvopastoral; Coffee, cacao, guaba and jacaranda

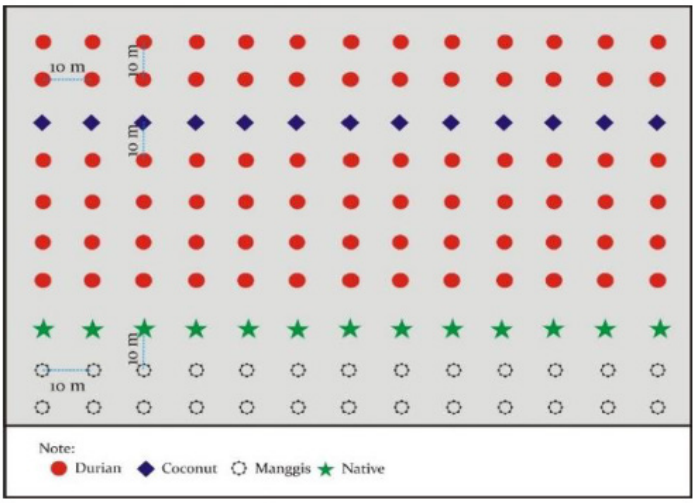
The selected models in Peru are variations of silvopastoral and agroforestry models, based on native perennial species with annual harvests, such as cacao and coffee. Soil conditions for the selected models were very favorable, demanding little investment to enrich or correct its composition, also yielding good production. Other examples with more degraded soil were found, demanding larger investments and having worse productivity, which led to unfeasible economic results. However, the Peruvian model suggests a high potential for planting agroforestry systems in degraded areas with very low investment costs and a promising market for the selected species.



[1] *Intergovernmental Panel on Climate Change – IPCC. Climate Change 2014: Impacts, Adaptation and Vulnerability. IPCC Working group II contribution to AR5. Available at https://www.ipcc.ch/report/ar5/wg2/. 2014.*

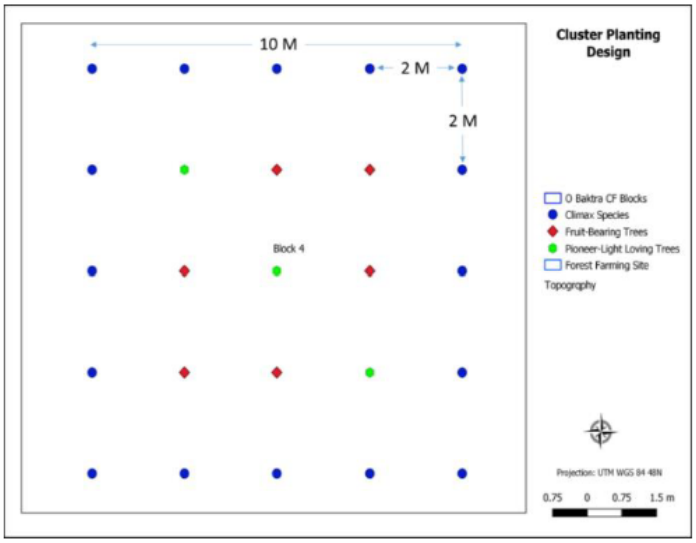
Cases from Indonesia: Sea cypress and Ketapang; Durian, mangosteen and coconut

The selected models in Indonesia are divided in two different focus landscapes: lowlands and highlands. Lowlands encompass coastal and peatland areas. In the highlands, the proposed restoration model seeks to tackle issues related to the main degradation driver in the country: the expansion of the palm oil industry. Here we presented the models that are considered to yield the greatest ecological gains and species diversity.



Cases from Cambodia: Turmeric, ginger and lemon grass as forest farming crops; Rattan and Bamboo as forest farming crops

The models selected in Cambodia seek a combination of local traditional agricultural activities with annual crops, combined with restoration using native species with ecological functions. Soil preparation and mechanical hole-digging showed to be important cost components that were necessary for the proposed restoration models.



Final Remarks

The assessment of seeds dispersal models focused only on the ecological restoration without economic production. The necessary investment per hectare was $1,494 USD in Indonesia, $1,600 USD in Cambodia, and $3,350 USD in Peru – with an overall average of $2,148 USD per hectare.

Considering only the agroforestry models, we found economically feasible results in all the three countries. Our study found that the total deployment costs per hectare of agroforestry models varies from $208 USD to $7,786 USD – with an overall average of $1,719 USD per hectare. In addition, we found that five out of the six restoration models that were developed with the goal of generating economic returns were capable of paying back their initial investments, inputs and labor costs, presenting positive net economic returns. The average NPV of the feasible agroforestry models was $881 USD per hectare.

This Restoration Toolkit demonstrates how differences in the original state of the soil are an important factor in determining the restoration model's economic feasibility. Additional investments are necessary in places with poor soil conditions. However, degraded areas with fertile soil not only require less investment, but also present higher productivity. Therefore, restoration models that demand lower investments due to soil conditions can be economically promising, while models with higher initial investments tend to be less economically feasible. Finally, the studies indicated that landowners and communities, in general, are inexperienced in conducting forest restoration. Thus, a potential large-scale action plan would depend heavily on the provision of technical assistance, essential for this kind of initiative to evolve successfully.

Models		Area (ha)	NPV/ha (US$)	IRR
Peru				
1	Cacao and silvopastoral (with native and exotic trees)	5.8	2,705	40%
2	Coffee, cacao, guaba and jacaranda	3.0	2,494	88%
3	Seed dispersal	1.0	-	-
Indonesia				
4	Sea cypress and ketapang	2.0	224	22%
5	Durian, mangosteen and coconut	2.0	1,819	26%
6	Seed dispersal	1.0	-	-
Cambodia				
7	Turmeric, ginger and lemon grass as forest farming crops	1.0	536	11%
8	Rattan and Bamboo as forest farming crops	1.0	-1,511	6%
9	Taungya	1.0	-	-

Table 1: Restoration Models Area and Species

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