Scaling Up the Financing for Restoration based on the Economics of Ecosystem Restoration (TEER)

by Daowei ZHANG

Achieving global restoration goals and ambitions, there is a need to attract more investment. Such investments need to come from both public and private sectors at local, national and global levels. Yet, the rate of return on restoration is unclear. Knowing the actual costs and benefits of a restoration project would bring a plus in obtaining funding.

Why are the economics of ecosystem restoration needed?

The Bonn Challenge calls for the restoration of 350 million hectares of the world's degraded land by 2030. On 1 March 2019, the United Nations General Assembly proclaimed 2021–2030 the United Nations Decade on Ecosystem Restoration, further highlighting the importance of supporting and scaling up efforts to prevent, halt and reverse the degradation of ecosystems worldwide and raising awareness of the importance of successful ecosystem restoration

In order to achieve global restoration goals and ambitions, there is a need to attract more investment. Such investments need to come from both public and private sectors at local, national and global levels. Yet, the rate of return on restoration is unclear.

This is because cost and benefit analysis of restoration projects is rarely done. Less than 5%, or 94 out of 2000 restoration projects, provided both cost and benefit data (TEEB, 2009). Less than 50% of studies provided sufficient cost information to allow for a coarse modeling of an estimated cost per hectare for different biomes (De Groot *et al.*, 2013). A group of professionals and consultants (including myself) looked at 45 restoration project documents in the drylands of 5 African countries—Burkina Faso, Ethiopia, Morocco, Niger, and Senegal (Table

Table 1: Number of restoration projects consulted in the 5 countries. *Source FAO.*

Type of sources	Number of projects
Technical report	12
Projet reports	22
Scientific publication	11
TOTAL	45

1). We found that only 3 of them show the comprehensive records of the costs, benefits and area of the projects (less than 7%) (Table 2). This is astonishing as the costs and benefits of a restoration project should be their first concern before investing.

More importantly, the few existing estimates of the costs and benefits of previous restoration projects, have not been reliable. For example, the FAO and UNCCD once wrote a report, citing TEEB (2009), stating that the costs of restoring tropic forests are $3,450/ha and of other forests $2,390/ha on average (presumably in 2008 real dollar values), and that the cost-benefit ratio of forest landscape restoration is 37.3. Verdone and Seidl (2017) also revealed that the cost-benefit ratio of restoring forests is between 7 to 30.

I know for a fact that buying a hectare of the best timberland (without trees) in the southern United States, which has some of the best timberland in the world (because the region produces some 16% of global industrial roundwood), costs less than $2,390 in 2008 real dollar values. This begs a question: why would put money into an investor restoration elsewhere instead of simply buying timberland in the southern United States where there is a favorable investment climate for forestry and rate of return on timberland investments are comparable to, or even better than, traditional investment vehicles such as stocks, bonds and other real estates?

Another obvious question is--if the rate of return on restoration is so high, why would we have more than 2 billion hectares of degraded lands remaining un-restored? Should there not be a flood of money invested in restoration activities?

Something simply does not add up. First, since cost-benefit analysis is conducted on only 5% of restoration projects, the results are biased as 95% of the projects are missed. Second, some studies misuse interest rates, and miscalculate the true costs and benefits. For example, public benefits of a project could easily be overestimated. There could also be an issue of distribution costs and benefits.

This lack of information on the costs and benefits of forest landscape or ecosystem restoration projects may hinder further global public and private investment in restoration activities. What is required is a reliable and comprehensive database/tool on costs and benefits of ecosystem restoration projects that could further facilitate cost-benefit analysis of ecosystem restoration. Only when the costs and benefits are reasonably measured can we tell whether a project is worth investing in or not. Only then will we be able to scale up the financing for restoration. The cost-benefit analysis of ecosystem restoration could be labelled as the economics of ecosystem restoration (TEER).

Table 2: Data Review Results. *Source FAO.*

Costs			Benefits		
	NNumber of projects			Number of projects	
Presence of general information on costs			**Presence of quantitative information on benefits**		
Total cost of restoration	32	71%	Any quantitative information on benefits	18	40%
Restored area	23	51%	Quantitative benefits + Costs + Area	3	7%
Cost + Area	20	44%			
Presence of information on fixed costs			**Presence of qualitative information on benefits**		
Project design	0	0%	Access to water	5	12%
Consultations	0	0%	Gender benefits	8	17%
Overheads/Management costs	0	0%	Capacity building	14	31%
Cost/ha with description of the intervention	20	44%	Employment	0	0%

Put it in another way: one may wonder why there is not enough investment in restoration. My answer is partly because we do not even know the reliable costs and benefits of restoration. An investor who does not even know the costs and benefits of a project simply could not commit to invest. Thus, we need to come up with a reliable and comprehensive tool on costs and benefits of FLR, in order to scale up the financing for restoration.

The Theoretical Framework of TEER

The theoretical framework of TEER is simply cost-benefit analysis of investment projects. Let us take a watershed restoration project as an example (Figure 1). The total area of land needing to be restored in the watershed is W, and restoration will take four different interventions. Intervention 1 could restore X hectares and the cost of restoration is C1 per hectare. Intervention 2 could restore Y-X hectares at the cost of C2 per hectare. Applying all four interventions would restore the W hectares.

By connecting the intersections of quantity and cost for these four interventions, one could get a supply curve of restoration, which could provide an estimate of total cost (as well as the cost per treatment) of restoring the watershed.

The benefits associated with this watershed restoration could be classified as benefits from private goods, club goods, common goods, and public goods. All these benefits need to be estimated.

With realistic cost and benefit estimates one could calculate the return on investment by net present value, benefit-cost ratio and internal rate of return. Cost-benefit analysis also covers the distribution of benefits and costs. Sometimes, the benefits go beyond the restored watershed.

What is TEER?

TEER is an initiative that intends to build a reliable database on the costs and benefits of restoration in all major biomes and to conduct cost-benefit analysis for it. As a database, TEER is the very first step on our way to finding a reliable way to analyse costs and benefits of ecosystem restoration. This is fundamental work. Such a database can offer a reference point for the evaluation of a project or an intervention. Furthermore, it can serve as a basis for more complex economic analysis, such as supply curves for their scaling up in different regions and ecosystems.

In order to build TEER, as our first step, we plan to develop and test methodologies via a pilot study in the Sahel. The study will take 2-3 years and we will develop standardized templates to collect the cost and benefit data from each project. The data will be collected directly from the project and signed by the project manager, instead of being estimated by outside researchers. During this pilot study, we will continue to modify the template settings, methodologies as well as the data-collecting methods, in accordance with the actual situation.

In summary, lack of reliable cost-benefit analysis of ecosystem restoration is hindering investment in restoration activities. In order to scale up the financing and meet the needs of the Bonn Challenge, the FAO along with partners has designed the TEER. The central goal of TEER is to get the numbers—costs and benefits and their distribution—right. If we cannot get these numbers right, no finance will be willing to help us scale up restoration! We warmly welcome similar efforts to help ecosystem restoration in the Mediterranean region!

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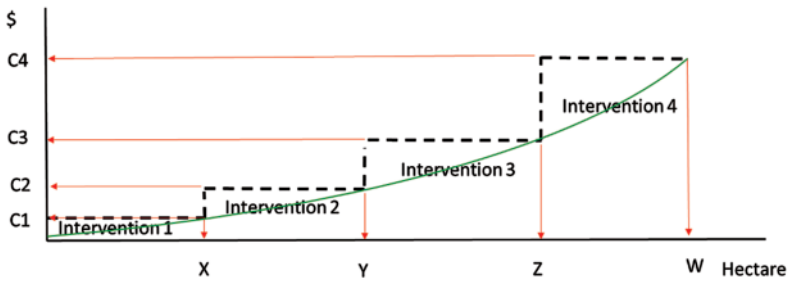

Fig. 1: Costs of Restoring a Watershed.

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