BUILDING THE INVESTMENT CASE FOR BUSINESS-DRIVEN LANDSCAPE RESTORATION

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THE NEED FOR SUSTAINABLE BUSINESS MODELS FOR LANDSCAPE RESTORATION

"Although the economic case is clear, Finance & Investments for restoration activities falls well short of the need for several reasons." (Roots of Prosperity, WRI 2017)

The UN recently announced that 2021-2030 will be the Decade on Ecosystem Restoration. Science-based projections of what may happen in the coming decades as a result of the combined environmental impacts of climate change, biodiversity loss and land degradation need to be used to design effective responses in concert with key players from governments, local communities, policy and business.

To scale up landscape restoration we need to engage the private sector and business community in catalyzing sustainable land use and management. Commonland (www.commonland.com) is a not for profit impact organization based in The Netherlands that aims to advance this cause by promoting the acceleration of large-scale landscape restoration based on sustainable business models that render multiple returns on investment: return of inspiration and hope, and returns of social, natural and financial capital. To that end, Commonland convenes and orchestrates businesses, investors, governments, NGOs, and practitioners to break through silos, find a common language, and work, invest, and think holistically in restoring landscapes. The 4 returns – 3 zones – 20 years framework for ecosystem restoration guides Commonland and their network partners in realizing a transition towards a restoration economy (Fig 1). The Ecosystem Services Partnership (ESP) has a complementary mission as a worldwide network that aims to enhance the science, policy and practice of ecosystem services for conservation and sustainable development.

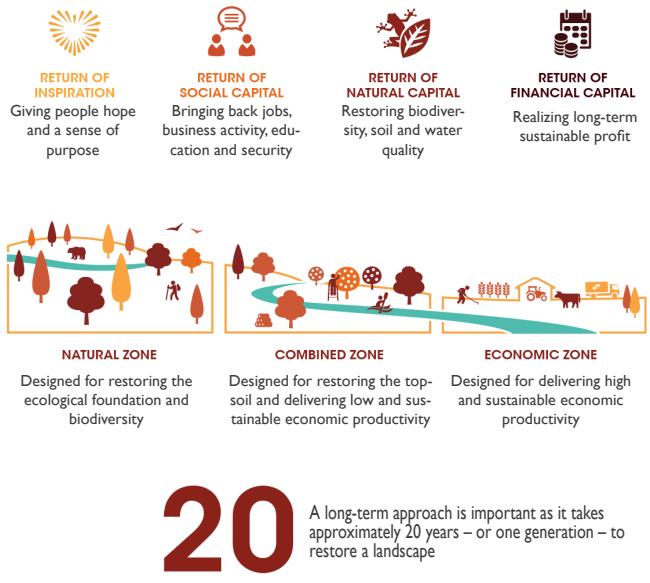

Fig 1. The Commonland restoration framework: 4 returns, 3 zones, 20 years.

THE VALUE OF RESTORING ECOSYSTEM FUNCTIONS AND SERVICES

One of the barriers to reach scale and attract funding for landscape restoration is that money spent on nature conservation, landscape restoration, and sustainable land management is still seen as a cost and not as an investment with a high return in benefits (de Groot et al. 2013, Crookes & Blignaut 2019). To demonstrate that investments in landscape restoration pay back through multiple returns, we developed a practical methodology to analyze, quantify, and where possible, monetize the benefits of large-scale landscape restoration: "*Guidelines for Integrated Assessment to value and capture the benefits of landscape restoration, nature conservation and sustainable ecosystem management*" (De Groot et al. 2019). The guidelines now consist of 9 steps, supported by annexes with specific information on how to implement each step. Both the guidelines and supporting materials are 'living documents' that will be further improved and updated in subsequent versions. The following case study, from a site in Spain that is transitioning to a multi-functional land use system, demonstrates several steps of this framework.

CASE: ALTIPLANO, SPAIN

The Altiplano region in Eastern Andalusia (app. 1M hectares [ha]) is one of the largest production areas in the world for rainfed organic almonds (Fig. 2). It contains 100,000 ha of superior quality almond groves, of which 45,000 ha are certified organic. However, like many other areas in the Mediterranean Basin, the region suffers from severe land degradation, desertification, rural abandonment, and unemployment. The area has become less attractive for younger generations and lacks support for entrepreneurs. People are leaving the area in search of a better living. Together with the local community, Commonland developed the 'Almendrehesa' concept:

an integrated production system combining almond and local trees, aromatic oils crops, active bee-hiving, and lamb farming, complemented by joint processing and marketing. This productive landscape decreases erosion, restores the water balance, enhances biodiversity, and beautifies the landscape. Altogether this improves the local economy while promoting local pride and inspiration.

The AlVelAl Association, named after the counties involved: Altiplano, Los Vélez and Alto Almanzora, promotes 'four returns restoration' initiatives and supports businesses and farms that implement the Almendrehesa concept. To achieve this transition requires investments, and to determine the costs and benefits of various restoration scenarios, we are using the above-mentioned guidelines to analyze and compare various land use and management options ranging from the economic to the natural zone. In this article we summarize and compare the results from farms implementing the Almendrehesa, multi-functional land use system ('combined zone') and conventional almond monoculture.

Fig 2. The AlVelAl landscape in the Altiplano region, Spain

Ecosystem Services

A central element in the assessment is the concept of ecosystem services: the direct and indirect contributions of ecosystems to human wellbeing, such as provisioning (of resources), regulating (useful ecological processes), habitat (to maintain biodiversity) and cultural (the non-material benefits). See www.TEEBweb.org and www.IPBES.net for two key organizations on ecosystem services assessment and column 1 in Table 1 for details on the classification used in our study.

For each land use type, the main ecosystem services are identified, along with their actual, and potential uses (including some examples of positive and negative externalities, both onsite and offsite): see Table 1.

Table 1. Ecosystem services provided by sustainable, multifunctional land use system. *Data is derived from several farms (interviews) and literature sources (using local/regional data), and averaged for a hypothetical farm of 1,000 ha. Management is based on Sustainable Land Management (SLM) practices, implying reduced tillage, organic production, etc.*

	Ha*	Service-provision per ha per year	Total per year for entire farm	Externalities (positive & negative)
PROVISIONING SERVICES				
Almonds (in shell)	350	680 kg	238,000 kg	
Cereals (three old varieties)	350	1,300 kg	455,000 kg	Maintenance of crop genetic diversity
Legumes	150	800 kg	120,000 kg	
Aromatics (Thyme & Lavender)	10	3,000 kg	30,000 kg	
Segurena Sheep (600) (manure +meat, milk, wool)		Only manure taken into account	6,000 kg	Fire control, less use of chemical fertilizer
REGULATING SERVICES				
Erosion prevention by SLM -> a) Reduced soil loss b) Maintenance of soil fertility	350	Reduced loss of: a) 0.4 ton top soil b) 11 kg nutrients	140 tons topsoil +3,850 kg of fertilizer saved	off-site effects not included yet
Water regulation by SLM (availability and quality)	350	Increased water availability by 3%	To be determined still	Less runoff, - less water downstream
C sequestration (ton C/ha/y)	350	3 tons C	1,050 tons C	climate change mitigation
Pollination (from honey bees and wild pollinators)	350	Increase crop-yield between 8- 27%	Included in almond yield	Also positive for other crops
HABITAT SERVICES (Biodiversity protection)		#rare/valuable species protected	Especially steppe birds	Habitat services is also positive for other species
CULTURAL & AMENITY				
Recreational opportunities		Opportunities for agri-tourism	500 visitors/ year	Off-site employment
Cultural heritage/identity		On-site job opportunities	To be determined	Less land abandonment
Education & science		Training courses Research facilitation	25 participants 3 projects	

* Almond and cereal production both occupy about 1/3 of this hypothetical farm (350 ha each); effects of SLM on regulating services are only calculated for the almond area.

For the conventional almond production system, data was used from several farms and re-calculated on a per/ha basis. The farms were all producing rainfed almonds, applying tillage 3x/year and using artificial fertilizer (average 150 kg/ha/y) and chemical pest control measures. Maximum harvest was 700 kg almonds/ha (in shell) per year.

Public and private costs and benefits

Once we have an idea of the actual and potential services provided by each land use type, and the associated externalities (positive and negative), we can analyze the monetary and economic effects, taking into account the public and private benefits and costs (including direct, indirect, and non-market values). Table 2 shows a summary of the private benefits and costs of almond monoculture (Mono) and a multi-functional use (MFU) farming system experimenting with the Almendrehesa concept. Please note that the table also assumes that in the multi-functional use approach only a portion will be planted in almonds (in this case 350 ha). As such, when the value is then spread across

Table 2. Private net benefits of almond monoculture (Mono) and multi-functional use (MFU) *(€/ha/y for a hypothetical farm of 1,000 ha)*

	Financial value[1]		Shadow price[2]		Subsidies[3]		TOTAL Private Net Benefits	
	Mono	MFU	Mono	MFU	Mono	MFU	MONO	MFU
TOTAL	**650**	**440**	**-205**	**71**	**190**	**150**	**635**	**661**
Provisioning	***650***	***390***			***190***	***100***	***840***	***490***
-Almonds[4]	650	255			190	75	840	330
-other	–	135			–	25		160
Regulating[5]			***-205***	***71***			***-205***	***71***
-soil & water			-130	45			-130	45
-C-sequestr.			-75	26			-75	26
Habitat prot.					***–***	***50***		***50***
-steppe birds					–	50	–	50
Cultural services	***–***	***50***					***–***	***50***
-recreation	–	10					–	10
-education/science	–	40					–	40

[1]Gross income minus labor and other costs.

[2] Shadow prices are the estimated price for something that is not normally priced or sold in the market - usually applied to externalities. Methods to determine shadow prices (or indirect market values) include (avoided) damage costs (ADC), (avoided) replacement costs (ARC) (to estimate the welfare effect of (prevented) soil erosion and water loss), and the benefits of carbon sequestration (here the price of Carbon Credits (CC) is used as a proxy, when actually paid this would be a financial value (benefit) for the land owner.

[3]Mono functional almond production is still heavily subsidized through the Common Agricultural Policy (CAP); Subsidies for MFU are lower from the CAP, but additional subsidies are provided for maintaining crop – old (cereals) and breed- (local sheep) diversity (25.000€/) and biodiversity conservation, esp. steppe-birds (50.000€/y).

[4]For Almond monoculture income from almonds only is 650€/ha/y: 1,050 € (700 kg x 1,5€) - 150€ (labor) – 250 € (other: fertilizer, pesticides, machinery, etc.); for MFU this is 255€/ha/y: 680 kg x 2,5€/kg (higher price for regenerative production) x 350 ha : 1,000 ha (only about 1/3 of the farm is used for almond production) – 280€ (labor) – 60€ (other costs: e.g. seeds, machinery).

[5]Regenerative multi-functional land use provides positive externalities in terms of erosion prevention (5 €/ha/y), improved water supply (40 €/ha/y) and carbon-sequestration (26€/ha/y). Conventional mono-culture only had negative externalities due to erosion, soil & water pollution, carbon-emission and other negative externalities)

the entire 1,000 ha farm, the return per ha for almonds, relative to the entire farm, is lower.

Public benefits consist of public revenues from income tax and Value Added Tax (VAT), which are higher for MFU (mainly due to higher employment) and positive externalities (e.g., erosion prevention, water regulation, and carbon-sequestration). Public costs consist of subsidies (i.e. Common Agricultural Policy [CAP] and targeted subsidies for maintaining crop genetic diversity and species protection) and negative externalities (mainly relevant for conventional almond production).

Total Economic Value

To determine the 'true' societal benefits or costs of landscape restoration, or any intervention in the landscape, we need to combine the private and public net-benefits into a so-called Total Economic Value (TEV) (Table 3).

The TEV only shows the annual net-benefits (or costs) of a given land use type. Since investments in restoration and most land use changes only generate their full potential over time, the TEV needs to be translated into a Net Present Value (NPV) (NPV accounts for the time value of money; the present value of future costs and benefits depends on the time horizon and the discount rate). The discount rate expresses the preference between the value of money today and in the future. Usually a time horizon of 20 years, and a discount rate of 5% is used. A high discount rate means we place less value on future costs and benefits. Since benefits from landscape restoration usually accrue for quite some time after investment, it is appropriate to use a low or even negative discount rate: restoration enhances the capacity of the land to provide services and benefits and thus increases the value of the land.

The NPV for the two land use types analysed in this article (for a 20-year time horizon and 5% discount rate) would be (rounded figures) **6,900 €/ha for Almond Monoculture** (ca 9,500 €/ha (financial value) – 2,600 €/ha (shadow price of negative externalities) and **7,900 €/ha for Multi-functional Land use** (ca 6,900 €/ha (financial value) + 1,000 €/ha (shadow price of positive externalities).

The NPV can be seen as the 'true value of the land' which, in this case, shows that converting ('restoring') conventional almond production into sustainable, multi-functional land use (Almendrehesa) increases the value of the land by 1,000 €/ha: 7,900 – 6,900. For a farm or landscape of 1,000 ha, this means that an investment of 1,000,000 euro would have paid itself back, in terms of land value increase, after 20 years at a 5% discount rate.
If we use 0%, the positive return on investment would already occur after 10 years; using a negative discount rate

Table 3. Total Economic Value: Summary of private and public (net) benefits *(values in €/ha/year)*

		Mono-culture	MFU	Detail
	TEV	**527**	**604**	
1	**Financial net benefits**	**732**	**533**	**(direct market values)**
	Private financial benefits	650	440	Gross revenues minus costs
	Private income from subsidies	190	150	CAP + biodiversity & crop diversity
	Public financial benefits	82	93	From income tax and VAT
	Public financial costs	-190	-150	CAP + biod. & crop diversity
2	**Shadow prices**	**-205**	**71**	**(indirect market values)**
	Private externalities (pos/neg)	-130	45	Avoided Replacement Cost (ARC) of erosion and water availability
	Public externalities (pos/neg)	-75	26	Avoided Damage Cost (ADC) is based on price of Carbon Credits

of 5% would have generated a net-profit already after 5 years, provided we acknowledge both private and public benefits. If only financial benefits (and costs) are taken into account, almond monoculture 'scores' higher than MFU in terms of private benefits but that comes at the expense of high public costs, which would only increase in the future, leading to a negative overall welfare effect.

WIDER SOCIO-ECONOMIC IMPLICATIONS

An important benefit of the ecosystem services-approach is that a systematic analysis of all services and values (public and private, financial and non-market) helps to identify positive and negative socio-economic implications beyond monetary values. In the context of the landscape restoration work in Spain, these include a) more employment: the MFU (Almendrehesa-system) provides 3x more employment than conventional monoculture; this not only leads to less land-abandonment (see next point) but also provides direct economic benefits in terms of income tax revenues and lower unemployment payments; b) the Almendrehesa system also helps to diversify farm income and make it more resilient to environmental (e.g., climate) and social changes; c) more employment and stability lead to improved social coherence, fewer social problems and less land-abandonment; and d) improvement of the social and environment conditions leads to better mental and physical health and lower health care costs. Calculating the value of these positive socio-economic effects further enhances the MFU.

CAPTURING THE VALUE: RETURN OF FINANCIAL AND SOCIAL CAPITAL AND BUSINESS OPPORTUNITIES

Once the monetary and socio-economic value (benefits – costs) of a given restoration project are clear, the next step is how to capture that value in concrete payment schemes to finance the restoration activities and combine these with business opportunities.

Two basic avenues exist: 1) Explore services which have potential for direct private cash flows, such as regenerative almond production, aromatics, lamb- & bee-keeping, recreation; these are already implemented in the Almendrehesa system and, as we have seen, already provide higher benefits than conventional almond monoculture. 2) A second option is to explore ways to internalize public externalities: a) public externalities can be turned into payments for public services (e.g., climate mitigation, erosion control, water supply), initially through subsidies and grants (e.g., from AlVeLal for farmers who join the Almendrehesa system); and b) negative externalities can be internalized through regulation and/or taxes. Based on the studies in this article, the 'true price' (or value) of the provision of any good or service can be calculated and internalized in the market-mechanism, leading to more fair competition in the market and opening up many business opportunities.

Some ideas for business cases are already being implemented successfully in the AlVelal region with the most important one being an increasing number of farmers that are joining the Almendrehesa system. The TUI Care Foundation invests in landscape restoration while

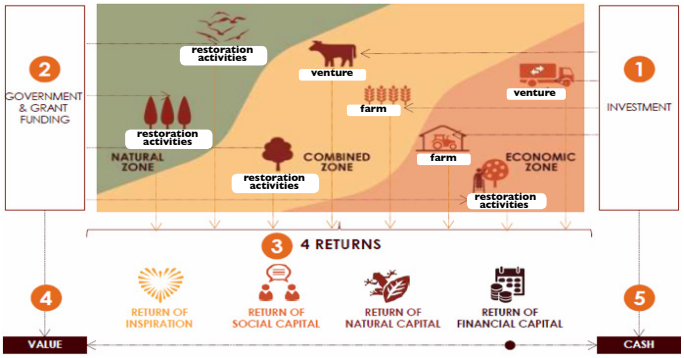

Fig 3. As illustrated here: by quantifying the 4 returns of landscape restoration (3), both private investment (1) and government funding (3) can be mobilized to turn value (4) into real cash (5).

developing agri-/eco-tourism. This looks very promising as well and will create new employment opportunities while improving environmental quality and enhancing social cohesion. Other examples for 4 returns on investment are given on https://alvelal.wixsite.com/website-6/copia-de-proyectos. The AlVelAl program clearly illustrates that investing in landscape restoration 'pays' in many ways!

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