Fixing both the symptoms and the causes of degradation: The need for an integrated approach to economic development and restoration

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How does one achieve the United Nations' Millennium Development Goals (MDGs) (UN, 2000) in arid ecosystems, which are often also economically deprived? The MDGs provide very little guidance on addressing this question and one must seek elsewhere for guidance. One such source is Reynolds et al. (2007), who provide meaningful insights, and sound principles for managing human–environmental – or socio-ecological – systems in arid regions. They fall short, however, of linking their work to any economic model, restoration, or the MDG's. There is therefore a vacuum between the work of Reynolds et al. (2007) and the MDG's. In this essay, I hope to make a contribution towards addressing this vacuum by presenting a systemic ecological economic approach to economic development that acknowledges the fact that arid ecosystems deserve special and deliberate action in order to achieve the MDGs. Applying this economic development approach should reduce pressure on natural capital and enhance ecosystem functioning. Capacity-building is an essential part of the approach.

Some of the best-documented causes for environmental degradation are rangeland grazing and the harvesting of fuelwood at rates faster than what primary production can replace – i.e. degradation is ecological symptoms caused by economic needs and pressures ([Ayyad, 2003], [Duraiappahn, 1998], [Geerken and Ilaiwi, 2004], [Mahiri and Howorth, 2001], [Wessels et al., 2004] and [Wezel and Bender, 2004]). If the cause of environmental degradation is economic by nature, the solutions proposed should be as well. A restoration programme that only treats the symptoms, but that is not embedded within a larger economic development programme that offers hope of affecting the cause, is unlikely to succeed. This is not to say that restoration should not take place, on the contrary rather. The restoration of natural capital (RNC) (Aronson et al., 2007) is essential and increasingly important in our current state of ecological overshoot (Blignaut and Aronson, 2008). RNC, however, is highly unlikely to be sufficient in and of itself to combat degradation in a lasting manner if it only treats symptoms. While natural capital provides a flow of ecosystem goods and services essential to life ([Costanza et al., 1997], [Daily, 1997], [De Groot et al., 2002] and [MA, 2005]), the restoration thereof is any activity that integrates investment in and replenishment of natural capital stocks to improve the flow of ecosystem goods and services, while enhancing all aspects of human wellbeing (Aronson et al., 2007). Despite restoration's intended objective(s), people's perceptions concerning its purpose also play a role in determining the success of restoration over the long-term. For example, during a site visit to a woodland restoration project (described in Blignaut and Van Aarde, 2007) it became evident that the villagers viewed the restoration programme as a means to reinstate their future source of firewood, despite a deliberate and ongoing capacity-building programme which included community participation to inform and sensitise local people

about the value and contribution of ecosystem restoration to their own livelihoods and wellbeing. The villagers regarded the restoration programme only in terms of its contribution to the supply of a basic need – energy – regardless of any conservation or biodiversity objective that might exist. How does one manage such a situation? If the restoration project or programme, in a context such as this, is framed independently from and in isolation to economic development issues, then it does not have much chance of success. It is by twinning the restoration effort with the achievement of a suite of economic development imperatives that the chance of restoration success increases.

How does one achieve such twinning of economic development and restoration objectives? Before answering this question, let us briefly consider the main thrust of the answer offered by mainstream economic development literature, most of which concerns itself only with economic growth, the development of human-made ("built" or "manufactured") infrastructure, and trade ([Stiglitz et al., 2006] and [Szirmai, 2005]). The next step, conventionally, is for the economist to seek the optimal conditions under which growth, infrastructure development and trade can prosper. Underdevelopment is characterised as lacking these three key ingredients.

While the individual merits and justification of growth, infrastructure development and trade cannot be denied, the broad-brushed application of the reasoning evoked just above, irrespective of context, can and should be challenged. Should one construct a development strategy around these components in rural and arid environments, the development programme is doomed to failure. A few reasons for this are as follows:

• Any growth programme is likely to be resource-intensive which will exacerbate the problem of degradation and not respect the inherent supply constraints;

• It does not recognise natural capital as the ultimate form of infrastructure that provides goods and services essential to the survival of people, let alone the deep-seated cultural and even spiritual link that there might be between people and their natural environment;

• It fails to recognise that a deprived community is deprived because it does not have the basic conditions, ability or means to trade equitably; and

• It does not recognise the primary need and even quest for food, water and energy security before considering any alternative form of trade or activity. Yet, for any development programme to be successful, these three pillars – food, water and energy security – have to be present since they form the mainstay of the individual's quest for survival under adverse conditions.

Since degradation and the need for restoration is born out of a basic economic need (harvesting of fuelwood and overgrazing), the way to make restoration work is to manage these drivers of degradation in a way that will contribute to restoration success and economic development. The drivers have to be turned around to become an integral part of the solution rather than the problem. Arguably the easiest way to twin

restoration and the stated economic development imperatives, is to view restoration as neither a conservation nor biodiversity initiative in the first place, but rather as an indispensable element of a broader economic development strategy. This is not such a far-fetched idea. As noted already, natural capital should be considered no different than that of any other form of capital from which we receive a stream of benefits or flows that contribute to improved human wellbeing. The difference is that nature's services have been fulfilling this life-support function from the beginning of time for free, which, economically, signals an infinite supply. With the demands of an increased population, higher per capita expectations, and the much increased flow of goods, services and raw materials around the world, natural capital has indeed become the limiting factor in short supply. It is now the bottleneck hampering economic development, as eloquently articulated by Herman Daly:

More and more, the complementary factor in short supply (the limiting factor to development) is remaining natural capital, not manmade capital as it used to be. For example, populations of fish, not fishing boats, limit fish catch worldwide. Economic logic says to invest in the limiting factor. That logic has not changed, but the identity of the limiting factor has.

Herman Daly (personal communication) cited in Aronson et al., 2006.

One way to inject the required value into an ecological restoration programme is by the development of markets for ecosystem goods and services (Turpie et al., 2008). In this way the economic rent of natural capital that provides a range of services is returned to the landowners/users who are responsible for managing the land. Ecological restoration and the development of markets for such services are, however, not in themselves sufficient to stimulate economic development, especially in arid areas.

A systemic ecological economic approach to economic development (see Fig. 1) ascribes a supporting role to functioning ecosystems brought about by applying appropriate adaptive management principles and the restoration of natural capital, where needed, and prudent use of land, water and other natural resources. Food, water and energy security – the basic development imperatives – are not in conflict with restoration or good land use. Sustainable sources of energy, such as biogas produced from cattle, chicken or goat manures, or through biomass gasification using invasive alien woody material, can be complementary to prudent land and resource use. The bio-slurry produced in the process of generating the biogas, is a high value-added input to a food production programme and it could replace expensive chemical fertilisers. In the same vein, a rainwater-harvesting programme – especially important in arid and semiarid areas – in conjunction with a food production programme, would contribute to both soil stability and erosion control, if planned and implemented properly. The construction of both a biogas digester and a rainwater-harvesting tank requires the same materials, skills and equipment and could be installed simultaneously. Likewise, the offal from chicken production can be used as input to the production of bio-diesel while the manure serves as input, with any source of grey water, to energy production. All the residuals from the food production can be used, in turn, in the biogas digesters to

increase the input, which will increase the energy production and the production of bio-slurry. Occasionally, it might be necessary to “farm” with energy in the form of a woodlot, using fast-growing trees and shrubs that may comprise exotic species, but these must not be invasive or toxic to livestock or humans. Rainwater-harvesting systems are quite suitable for the irrigation of such woodlots, depending on topography and soil types. Such woodlots contribute to a net gain in land productivity at the landscape-scale through reduced pressure on other uncultivated sources of fuelwood. Communities should benefit from capacity-building and training programmes aimed at developing and applying integrated and systems-oriented thinking. It is evident from the non-application thereof until now, that it will not occur without external help, assistance and guidance. This implies that external aid or governmental development programmes should be focussed not only on growing projects, but also on capacity-building of people working in, or in contact with the projects. An essential element would be guidance as to the management of the desired human population size.

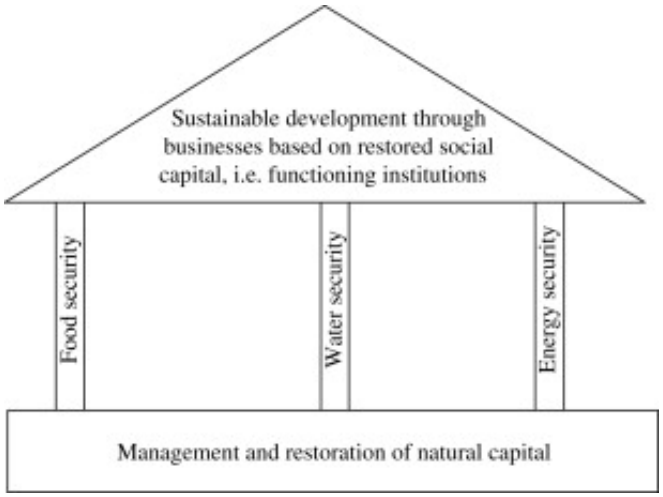

Fig. 1. A systemic ecological economic approach to economic development.

The pinnacle of such an integrated restoration/economic development programme would be the establishment of businesses and trade based on restored or intact social capital, i.e. functioning relationships – which includes functioning institutions and good governance, as shown in Fig. 1. Trade therefore does not take place outside of functioning institutions, good governance and village/community participation. Such social capital then becomes an integral part of the solution and the success of the trade. Trade is thereby contextualised and not just an artefact of outside thinking.

As referred to in the beginning, such an integrated ecological economic approach to development can contribute much to the achievements of the MDGs and in the following ways:

• MDG 1 – End of poverty: It can contribute by reducing the resource poverty of people and injecting new forms of cash, or help them avoid payments through markets for ecosystem services, energy, and food moving into communities;

• MDG 2 – Universal education: It offers learning opportunities in new ways to manage resources and the environment while enhancing the use of appropriate technologies;

• MDG 3 – Gender equity: It will contribute to gender equality since this approach is likely to reduce the task of wood and water collection, which, in Africa and many other regions, is generally assigned to women and children;

• MDGs 4, 5 and 6 – Health: Such an integrated system will also contribute significantly to improved sanitation and health since, in most cases, in most rural areas, the livestock is housed near the homestead. This leads to the stockpiling of manure that acts as a breeding ground for a range of pathogens. Also, the biogas is a much cleaner burning and more efficient source of energy than wood. Thus, its use is likely to reduce respiratory diseases;

• MDG 7 – Environmental stability: It goes without saying that a more integrated approach to environmental management and restoration will contribute much towards this objective, and also reduce the release of methane into the atmosphere by using biogas domestically; and

• MDG 8 – Global partnership: Functioning institutions and mutually beneficial trade would be key outcomes of such an integrated programme.

In conclusion, as praiseworthy and essential as restoration projects and programmes are, if they are conducted in isolation from any development strategy that removes or defuses the causes and drivers of degradation, restoration will remain merely a ‘band aid’ approach to symptoms and will not be a lasting cure. Here, I have sketched the outline of what an integrated ecological economic development programme that acknowledges the fact that arid ecosystems deserve special and deliberate action in order to achieve all eight of the Millennium Development Goals referred to above. While various permutations are possible within specific contexts, in rural arid areas it is likely to always include as a minimum a food, water and an energy component. This, however, cannot be seen in isolation from the need to develop various markets based on well-functioning institutions that will foster mutually beneficial trade. This note is a call to natural and social scientists alike, and scientists, community developers and policy-makers in general, to work together towards making restoration and natural capital work for people and, simultaneously, to galvanize people to work for restoration and natural capital maintenance under the umbrella of economic development.

Acknowledgements

The comments provided by Sue Milton-Dean, James Aronson, and two anonymous reviewers on earlier versions are hereby gratefully acknowledged.

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