Agro-Ecological Investment Management

AGRO-ECOLOGICAL RESILIENCE

A COMPARISON OF THE ECOLOGICAL AND CONVENTIONAL APPROACHES TO FARMING, AND THE IMPORTANCE OF RESILIENCE TO FINANCIAL RETURNS.

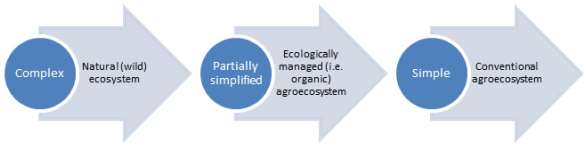
Resilience – "the propensity of a system to retain its organizational structure and productivity following a perturbation."[i] For an investor in agriculture, this is a vitally important issue, since a solid return stream will only come from resilient crop yields. This is especially pertinent in a world of increasingly erratic weather patterns. Therefore, the question of agroecosystem resilience is of the utmost importance to an investor in agriculture. This paper examines the different resilience characteristics of ecologically managed vs. conventionally managed farmland.

Conventional vs. Ecologically Managed

Conventionally (i.e. industrially/intensively) managed agro-ecosystems can be characterised by the ecological simplicity to which they have been reduced, compared to the wild ecosystems that would be present in human absence. Conventional farmers take a reductionist view, seeing the farm as a combination of a number of separate elements. It sets about systematically eliminating those elements it sees as threatening to the crop species.

Ecological (I.e. organic) farmers see the farm as a dynamic system which can only be separated down in conceptual terms. Thus, ecologically managed (i.e. organic) agro-ecosystems are far closer than conventionally managed systems to their wild counterparts – the latter which could be said to embody 100% ecological resilience for each location and situation.

There are many 'perturbations' that have the power to significantly disrupt yields on both types of farmland, thereby impacting financial returns. This paper examines three of the most important, and compares how the two approaches differ in their attempts to deal with them.



Pest outbreaks

Nature tends towards complexity. A wild ecosystem almost never consists of only a few species. Yet this is exactly the situation farmers require, since they are only interested in producing one or a few chosen species. But regardless of human needs, in any agro-ecosystem, nature is constantly trying to resume the natural complexity that would be present without human intervention.

The ecological approach to farming attempts to mimic the diversity and complexity of wild ecosystems, though structured so that special protection is afforded the crop species. Rather than employ chemical biocides, the ecological farmer maintains a sufficiently diverse and complex ecosystem so that no one species, i.e. pest, is ever able to proliferate – the situation found in wild ecosystems. As soon as pests increase, so do predators. From an investor's

point of view, this is good. Firstly, there is no cost associated with pest management – nature is leveraged to do the job for free. Secondly, there is no possibility of human or technological error, either in reaction time or biocide effectiveness. Nature makes no mistakes in this regard.

Conventional farming, however, takes the view that technology should be used to control natural processes. Synthetic biocide is its main weapon. From an agricultural investor's point of view, there are two major problems with this approach. Firstly, biocides are a cost. Secondly, biocides are clumsy and kill indiscriminately, destroying the integrity of the habitat associated with the farm, including natural pest predators. They also destroy the soil biota known to be essential for the long term health of the farmland.[ii]

Flood

If a complex, organic agro-ecosystem is flooded, much of the water will be absorbed by the myriad plants and animals in the system. The soil, being held in place by an extensive root system, will not be washed away. Roots will take up excess water, and water will also drain away through the soil, which has maintained its structure due to a healthy biotic system that has been allowed to flourish in the absence of biocide.[iii]

By contrast, a conventionally managed agro-ecosystem, with its non-complex structure, will have a trivial root system, and the soil will become loose and easily wash away, taking with it vital nutrients and minerals. The crop will therefore be threatened not only by excess water, but by a paucity of available nutrients. There is very little in the conventional farmer's arsenal that can cope with this. It should be no surprise, then, that the UN Special Rapporteur recently cited the greatest recent comprehensive analysis of recent scientific research on this subject, which found that ecological farming methods increased yields by 79% over 37 million hectares in 57 countries surveyed, many of them developing and flood-prone. [iv]

Drought

Plants and animals can be seen, from an ecological perspective, as dynamic water storage vessels. In a drought situation this function becomes vitally important. Complex ecosystems such as ecologically managed farmland will be best positioned to withstand dry periods, due to the availability of water stored in their above-ground biomass, and also in the soil and root systems. Further, due to the relative density of the agro-ecosystem with regards biomass, moisture will be maintained within the system and not lost to the wind and sun.

By contrast, conventionally managed agro-ecosystems are comparatively dry, with all biomass (except the crops) having been eliminated from the ecosystem (using a costly biocide regime). They are thus susceptible to drought. Further, any existing moisture is easily driven off by the exposed structure of the system, e.g. there is little vegetation cover to protect from wind. Thus for conventionally managed farms, drought can also often create famine.

The resilience of ecologically managed farmland has been comprehensively proven by the Farming Systems Trial of the Rodale Institute[v], a 30-year analysis of organic vs. conventional farming. It has found that, among other things, organic is both more profitable than conventional, and more resistant to drought.

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[i] Holling, C. S. 1973. *Resilience and Stability of Ecological Systems.* Annual Review of Ecology and Systematics 4 (1): 1–23.

[ii] Soil Biota and Biodiversity: the "Root" of Sustainable Agriculture, FAO. http://www.fao.org/AG/AGL/agll/soilbiod/docs/SB-brochure-sept.pdf

[iii] Ecological Farming: Drought Resistant Agriculture, Greenpeace, 2010. http://www.biosafety-info.net/file_dir/18493216064c58e899420b6.pdf

[iv] http://www.srfood.org/images/stories/pdf/officialreports/20110308_a-hrc-16-49_agroecology_en.pdf

[v] http://www.rodaleinstitute.org/fst30years