

OUTLINING THE SUSTAINABILITY INDEX FOR AGRICULTURAL SYSTEMS AND APPLYING THE INDEX FOR PURPOSES OF PRODUCTION TO END HUNGER

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ABSTRACT

This paper attempts to firstly delineate the generalized environmental sustainability index for agricultural systems. The agricultural index for sustainability is a complex phenomenon but requires a rudimentary understanding in respect of definition and applicability with respect to understanding the global problem of alleviating hunger. Some of the models used are quantitative in nature to evaluate performance of the index in respect of the environmental perspective, comprising both on - and off – site environmental effects associated with agricultural systems used to evaluate agricultural performance in order to alleviate and deal with the challenges that hunger presents. It is often used in dealing with inherent soil productivity and groundwater availability; and the potential to degrade the surrounding environment. Results of the agricultural index for agricultural systems in various studies show that ESI is capable of demonstrating clear differences among crop management systems with respect to sustainability. It is not the idea of this paper to delve into these issues in any detail but to underscore the point of their importance in as far as they are used to determine the challenges of dealing with the food and hunger equation. The paper will therefore deal with the idea or rather concept of sustainable production to end hunger. The aim here is not the maximum conceivable production of food but rather sustainable and environmentally supported agriculture in terms of crop production. This will certainly be enough to feed a large population the world over. It is against this background that the paper will discuss the sustainability index for agricultural systems and the possibilities to deal with the challenges of global hunger. In other words defeating hunger remains a priority and argues how this should happen. It also posits that the position of women must be improved because they play a key role in food production, but earn less and have fewer rights. Reducing the proportion of undernourished people by half until 2015 was one of the Millennium Development Goals that the international community set in 2000. This will not be reached. Another aspect or challenge that urgently needs to be addressed is the question of food waste. The paper is not all encompassing and does not pretend to capture all the aspects that permeate these vexing but crucial issues.

Key Words: Sustainable, Agricultural Systems, Hunger, Environment, Millennium Goals, Alleviating, Index, Undernourished, Crucial

INTRODUCTION

Sands and Podmore (2000:1) indicate that of all human activities, it is perhaps agriculture that alters the global environment to the greatest extent (CAST, 1994). The paradigm for agricultural development worldwide has taken some remarkable turns over the past two centuries. *It must therefore be appreciated that the threat of soil degradation, modern, industrialized agriculture is especially hard on the environment (Stein, 1992). Water depletion and degradation, threats to human health, genetic diversity, and habitat alteration are all part of the litany of environmental ills associated with modern agriculture and Sands and Podmore (2000: 30) state that “the current struggle, pitting “conventional’ and “alternative’ agriculture paradigms, in both research and practice, comes in the wake of unparalleled, yet bittersweet harvests of the Green Revolution era it is thus obvious and necessary that today’s agricultural scientific communities face the challenge of developing new paradigms for agriculture which embodies the concept of sustainability. Although sustainability has become one of the forefront issues faced by agriculture, ‘sustainable agriculture’ continues to remain an ill – defined concept. The concept therefore has to be reshaped and redefined. Pragmatic definitions of sustainability, however, have been evolving at a much slower pace over the past decade.*

DEFINITION OF ENVIRONMENTAL SUSTAINABILITY

Environmental degradation and its relationship with agricultural systems appear to be at the heart of much of the interest in agricultural sustainability (Brklacich et al, (1991). The operative definition of environmental sustainability is based on a dual framework embodying both on - and off – site environmental effects of an agricultural system. An important distinction between productivity and production must be made. The inherent capacity to support production has to do with the intrinsic properties of the resources, that is their quality and quantity and, not simply maintenance of productivity in the conventional sense. . We can then posit an operative definition of environmental sustainability as “an agricultural system which is considered to be environmentally sustainable if certain inherent qualities of soil and water resources are maintained.” Sands and Podmore, 2000: 31). This will thus allow for the comparison of the performance of agricultural systems.

It is important to note that ESI embodies a set of assumptions with respect to its application. The ESI was developed as a tool to gauge environmental sustainability based on physical, biological, and chemical processes that characterize agricultural systems.” The ESI employs a modeling approach to enable relative comparisons of sustainability among a group of agricultural systems over long time frames and is thus, of little use for an individual crop management system.” (Sands and Podmore, 2000: 40). It embodies only the environmental aspects of sustainability and thus represents only part of the complete sustainability picture. Nevertheless the concept may justify further development, especially if it could be integrated with the social and economic aspects of sustainability.

OCCUPATIONAL SAFETY AND HEALTH METRICS

Sustainability Metrics is used by external stakeholders to compare Occupational Safety Health (OSH) performance across organizations whilst Performance Metrics is used internally as leading indicators of continuous OSH performance improvement. Environmental stewardship and occupational safety share a considerable overlap. Both are key sustainability issues, yet the green movement has outstripped workplace safety. Even companies with broad and aggressive environmental commitments are neglecting a core component of sustainability – worker health and safety (Lang Reports). The paper has only looked at the above issues in a cursory manner in order to situate the subject matter, from a perspective that indices and metrics must be

understood for purposes of dealing with sustainability but more importantly in dealing with the issue of hunger.

SUSTAINABLE PRODUCTION IS NEEDED FOR PURPOSES OF ENDING WORLD HUNGER

The issues discussed hereunder are basically summarized from the work of Schutter, Flasbarth and Herren (2013: 21). Reducing the proportion of undernourished people by half until 2015 was one of the Millennium Development Goals that the international community's set in 2000. It will not be reached: At least 870 million people worldwide and, one child in five, still go hungry; this in a world where we already produce enough food today to feed nine billion people in 2050. Further progress towards reaching this goal can be made in the remaining months, but we must ask ourselves what comes afterwards. The debate on the so-called Sustainable Development Goals (SDGs), to be reached by 2030, has already begun. On Wednesday, Sep. 25, heads of states and governments met in New York. Defeating hunger remains a priority. This is not simply a matter of providing everyone with enough food; crucial for the future of all human beings is how this should happen. Food security and nutrition for all through sustainable agriculture and food systems" must be set as one of the fundamental goals of global development. It is therefore imperative for agricultural policy to change course, as requested in 2008 by IAASTD, the International Assessment of Agricultural Knowledge, Science and Technology for Development. The same message was reiterated in the Rio+20 Declaration "The Future We Want".

WHAT CONSTITUTES SUSTAINABLE AGRICULTURE?

Widely spread forms of industrial, conventional agriculture are not sustainable. With high-yielding varieties and a heavy reliance on fertilisers, water, pesticides, and energy, it has delivered impressive yield increases, but only by exhausting its own production base in the long run. It not only depends on high levels of inputs, but also leaves behind degraded soils, polluted water, and depleted biodiversity. According to the often-cited IAASTD report, 1.9 billion hectares of land are already affected by degradation due to unsustainable use. This comes at an annual cost of around 40 billion dollars and negatively affects the livelihood of 1.5 billion people worldwide.

Industrial, conventional and certain forms of traditional agriculture are also major contributors to climate change. Meanwhile, the rural populations in developing countries remain mired in poverty. This form of food production must be replaced by sustainable forms of agriculture, which maintain and restore natural soil fertility, protect water sources and promote biodiversity. Sustainable agriculture has economic and social benefits while remaining within the natural boundaries of our planet.

The aim here is not the maximum conceivable yield but a sustainable and environmentally supportable yield. This is certainly enough to nourish the nine billion people who will inhabit the earth by mid-century. According to the "Green Economy Report" published in 2012 by the United Nations Environment Programme (UNEP), food availability per capita could be increased through sustainable production methods by 14 percent, creating millions of new jobs in rural regions in the process, and thus alleviating poverty. At the same time, agriculture could reduce its ecological footprint.

The main players here are small-scale farmers. Worldwide, 70 percent of food production comes from small farms, which collectively use 40 percent of the world's arable land. They would be able to nourish people in developing countries, but will have to be supported in this endeavour. They need guarantees regarding the ownership and rights of use for their land, better access to

education, information and markets, as well as fair prices for their products. Rural infrastructure and services are a key factor in this and must be promoted much more intensively by state and international authorities. Above all, the position of women must be improved. Women play a key role in food production, but earn less and have fewer rights. According to the U.N. Food and Agriculture Organisation (FAO), equal access to education and agricultural resources in Africa would boost harvests by 20 to 30 percent.

A significant challenge that needs to be urgently addressed is food waste. Worldwide, a third of what is produced goes to waste. Developed countries have a particular responsibility to act: they throw away 222 million tonnes of food every year, which is approximately the annual harvest of sub-Saharan Africa.

Finally, a fairer trading environment is critical. The rules of agricultural trade will have to be adapted to take into account the needs of small-scale farmers. At present, this is not the case. Developed countries need to reform their agricultural subsidies and trade policies. Government payments coupled to production, in addition to export subsidies, expose farmers in developing countries to unfair competition and can therefore impede their production. These subsidies must be converted to payments for ecosystem services and public goods.

Land grabbing, the acquisition of fertile land by financially strong investors over the interest of the local land users, must be stopped. Activities that exacerbate food price volatility, such as financial speculation on food commodity futures markets, must be reined in.

FOOD SECURITY AND NUTRITION FOR ALL THROUGH SUSTAINABLE AGRICULTURE AND FOOD SYSTEMS

According to these models, a sustainable development goal should comprise the following elements:

1. End malnutrition and hunger in all of their forms, so that all people enjoy the right to adequate food at all times.
2. Ensure that all smallholders and rural communities, in particular women and disadvantaged groups, enjoy a decent livelihood and income, and secure their right to access productive resources, such as land and water, everywhere.
3. Achieve the transformation to sustainable, diverse and resilient agriculture and food systems that conserve natural resources and ecosystems. The loss of fertile land is not acceptable. Instead, land degradation must be minimised and inevitable degradation compensated through regeneration and restoration measures.
4. Minimise post-harvest food losses and food waste.
5. Establish inclusive, transparent, and equitable legislative and other decision-making processes on food, nutrition, and agriculture at all levels.

CONCLUSION

This article attempted to briefly place on the table, the issues of understanding some aspects of generalized environmental sustainability index for agricultural systems with a view of improving its applicability to increase sustainable production, for purposes of ending worldwide hunger. It is a basic paper that attempted to place these important issues on the agenda of the development dynamics in relationship to the so – called “Third World” food crisis.

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