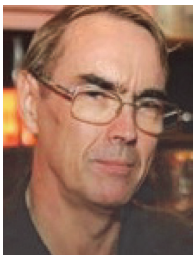
The Ninth Hugh Bunting Memorial Lecture delivered at Reading University on 9 June 2014

Can voluntary sustainability standards incentivise smallholder adoption? - The case of rice



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Introduction

Thirty-one years after completing my studies, I am delighted to return to Reading University, to which I shall always be indebted for inspiring me in my own career. The Memorial Lectures are a fitting tribute to Professor Hugh Bunting's passion for confronting the difficult issues of our time in a candid, no-nonsense style. A man of vision, an astute critic of contemporary development, and above all, a humanitarian, he will perhaps be remembered most for his diverse and lasting contributions to tropical agricultural research, which have inspired generations of students and development professionals around the world.

In keeping with the forward-looking theme of the memorial lectures, I have chosen a topic I believe Prof Bunting would surely have approved. This paper aims to highlight the urgency of the need to drive sustainability in the global rice sector: addressing how we meet our future food needs while at the same time mitigating environmental and other impacts associated with rice cultivation.

The 2008 food commodity price spike highlighted the fragility of the balance between food supply, global security, energy and environment, giving impetus to the quest for a truly sustainable global food system. Over the past decade, growing consumer consciousness, activism and concerns over supply chain continuity spawned a plethora of voluntary sustainability standards (VSS). Variously established and regulated by individual companies, Public Private Partnerships (PPPs), 'Round tables' or multi-stakeholder consortia, VSS aim to reduce costs, improve supply chain integrity or support corporate marketing and brand awareness. As a progressively more pervasive and transformative feature of the global economy, VSS are themselves not without controversy, but nevertheless offer supply chain actors trustworthy mechanisms that add value and enhance accountability. VSS schemes today certify over 10 percent of global production of key global commodities (Potts *et al*, 2010). It is therefore extraordinary to learn that, regardless of the strong role of VSS in other agri-food commodities, and despite the central role of rice in national and global food security, market-based initiatives targeting rice value chains have received relatively little attention.

This paper highlights the strategic contribution of rice to global food security, followed by a discussion of key sustainability challenges and specific issues in implementing VSS in rice. The question of incentivising adoption of proven technologies by resource-poor smallholders is then considered, and the paper concludes with an introduction to a global initiative – the **Sustainable Rice Platform** – that aims to address these intractable challenges in a coherent and practical way.

Rice - its strategic importance

Rice occupies 160 million hectares of land, much of it cultivated by 144 million smallholders with, on average, less than one hectare of land, and minimal market surplus. It is the daily staple for more than 3.5 billion people, many classed as food-insecure. With over 90 percent of the world's rice produced and consumed in Asia (Dawe *et al*, 2010), it is also the staple food for the 70 percent of the world's poor living in the region; over 1 billion depend upon rice for their livelihoods.

Global rice consumption is projected to increase from 450 million tons in 2011 to 650 million tons by 2050 (Rejesus *et al*, 2012). However, with little or no new land available for area expansion and the recent slowdown in yield growth to less than 0.8 percent pa, projected global supply in 2050 is unlikely to meet this 44 percent growth in demand (Pardey, 2011). Climate change impacts are expected to further widen this gap (Li & Wassmann, 2011).

Intensification of production on existing cropland thus seems to offer the only solution. Pisante *et al*, (2010) estimate that, in developing countries, as much as 80 percent of future crop production increases will need to be delivered through intensification of cropping systems. What, therefore, would be the sustainability implications of such intensification?

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Sustainability concerns in rice

Whilst flooded paddy rice production is considered an essentially sustainable system that maintains long-term soil fertility and continuous high productivity (Dobermann *et al*, 2004), rice systems present a number of sustainability concerns, generally categorised as follows:

- Resource use efficiency
- Greenhouse gas emissions
- Impacts on ecosystem services
- Soil impacts
- Disease impacts
- Climate change impacts.

There is particular concern over resource use efficiency (especially for water and fertilisers) and greenhouse gas emissions from rice paddies. The risk is increasing: with irrigated rice accounting for 34-43 percent of the world's irrigation water, by 2025, 15-20 million ha of irrigated rice is expected to suffer some degree of water scarcity (Bouman *et al*, 2007). The world's rice fields receive some 15 percent (or 24.3 million tons) of global fertiliser use. Health and environmental impacts of excessive fertiliser use in intensive systems are compounded by low use efficiencies; and poor application timing can result in only 20-40 percent or less of applied nitrogen fertiliser captured by the crop (Islam *et al*, 2007). Finally, flooded rice is an important source of greenhouse gas (GHG) emissions: using the Intergovernmental Panel on Climate Change (IPCC) Guidelines for National GHG Inventories and country-specific data, Yan *et al* (2009) calculated global methane emissions of 25.6 Tg/year from rice systems, or 9-11 percent of total non-CO_2 agricultural emissions.

Technologies and adoption

Fortunately, management practices offer potential for enhancing resource use efficiency while also mitigating GHG emissions, for example through adapted water management (such as alternate wetting and drying (AWD), mid-season drainage, and aerobic rice), residue management and appropriate selection and timing of fertiliser applications (Yan *et al*, 2009; Wassmann *et al*, 2010). The International Rice Research Institute (IRRI) has undertaken extensive research into a range of platform technologies in a range of rice systems. The following is a non-exhaustive list (IRRI, 2012):

- Safe alternate wetting and drying;
- Multi-stress tolerant varieties (salinity, drought, flooding) for climate-smart agriculture;
- Site-specific nutrient management tools to improve N and P efficiency;
- Sustainable intensification of rice cropping systems;
- Improved irrigation efficiency;
- Biofortification;
- Digital decision tools for extension workers and farmers; and
- Low-cost post-harvest technologies to reduce food losses.

Other emerging approaches such as the System for Rice Intensification (SRI), a low water, labour intensive, organic method using younger seedlings singly spaced and typically hand weeded with special tools, are also showing promise. However, driving wide-scale adoption of such technologies among millions of resource-poor, risk-averse smallholders presents immense extension challenges. Direct economic benefits for farmers may not always be apparent or compelling, so behavioural change needs to be incentivised either through market mechanisms or policy interventions. However, in general, both markets and policy frameworks have historically failed to internalise environmental costs and other impacts as a means of aligning interests in order to stimulate farmer uptake of sustainable best practice.

Challenges for VSS in the rice sector

Most VSS regimes harness market factors to drive transformation processes, creating financial or other incentives for producers to adopt 'best-practice' regimes that satisfy the norms of remote (mostly Western) destination markets. Such regimes are typically based upon certification, traceability and chain of custody, and product labels (Kessler *et al*, 2013). VSS have emerged for a range of commodities, including oil palm, sugar cane, coffee, tea, cocoa, soybean, fruit and vegetables, seafood, cotton, textiles, livestock and timber. VSS regimes have one thing in common: demand for 'sustainable produce' is driven almost exclusively by rich Northern countries, creating opportunities for value addition through price premiums and secured access to high-value markets. This 'demand pull' can help expand markets, increase value-addition and enhance livelihoods. The origin of this demand is therefore a fundamental driver of VSS regimes.

However, for rice, such demand pull hardly exists, and destination markets do not in general serve as a demand driver for sustainable market transformation. Only 5-7 percent of global production enters global trade, much of it via South-South bulk trade; less than 2 percent is destined for high-value markets. Alternative incentive mechanisms are therefore needed to stimulate adoption whilst avoiding the marginalisation of small farmers through creation of insurmountable compliance burdens. At the same time, the system also needs to create new value (eg financial or reputational) for buyers in destination markets.

Facing such formidable challenges, what can we do to enhance productivity and resource use efficiency not only at the farm level, but for all rice value chain actors, whilst at the same time protecting our environment?

The Sustainable Rice Platform

The Sustainable Rice Platform (SRP) was co-convened by the United Nations Environment Programme (UNEP) and IRRI, and was launched in December 2011 as a multi-stakeholder partnership with governments, the private sector, research institutes and non-profit organisations. SRP promotes resource use efficiency and sustainability, both on-farm and throughout value chains, through an alliance that links research, production, policy making, trade and consumption.

SRP pursues voluntary market transformation initiatives by developing sustainable production standards, incentive mechanisms and outreach mechanisms. SRP's three overall objectives are as follows:

- Develop a context-dependent modular standard for sustainable rice production and processing (including decision-making tools and quantitative sustainability impact indicators).
- Leverage supply chain mechanisms and public policy development to develop and promote outreach models that foster large-scale adoption of sustainable best practices.
- Establish a global knowledge hub to promote sustainability in the rice sector, with broad participation from value chain actors, public and private sectors, as well as research and non-profit organisations.

Incentivising uptake of sustainable best practice

In order to drive large-scale adoption of technological innovations, incentives and outreach strategies are needed to convince farmers of their direct economic benefits. SRP's working groups focus on development and testing of sustainability guidelines, standards and outreach models, including decision-making tools and quantitative sustainability impact indicators. Looking beyond certification and verification for premium-based segregated supply chains, SRP is currently working with its members to explore innovative alternative mechanisms, including the following:

- New business models for smallholder farmers, eg the 'small farmer-large field' system in Vietnam.
- Variants on the 'Book & Claim' principle to promote adoption of sustainable best practice.
- Payments for Ecosystem Services (PES), including performance standards and metrics.

The 'Book & Claim' model offers buyers an assurance that a certain percentage of the product has been produced sustainably (see Box 1). This assurance takes the form of a credit or guarantee of origin which can be traded independently from the physical rice supply chain. Other options may include linkages with existing Good Agricultural Practices (GAP) schemes, integration of sustainable standards in policies and public extension services, and creation of new incentives via PES schemes.

By 2016, the SRP aims to establish a robust system of standards and incentive mechanisms to facilitate broad-scale uptake, particularly by smallholders. By taking an innovative and integrated approach, SRP hopes to help minimise the environmental and ecological footprint of rice, whilst strengthening South-South cooperation on standards, stimulating supply stability, and enhancing value-addition along the value chain.

Conclusions

In our increasingly crowded, volatile and fragile world, rice represents a crucial driver of global food security. With mounting competition for finite resources and multiple risks threatening stability of global supplies, it is indeed alarming that sustainability concerns in the rice sector have been so neglected by the stakeholder community. With proven technologies available today to enhance resource use efficiency, close yield gaps, alleviate poverty and mitigate climate impacts, the international development community needs to prioritise the sector as part of its response to the requirements of the UN's proposed Sustainable Development Goals. I am sure that Hugh Bunting would concur that only a broad-based, scaled-up global response involving public and private partners can hope to drive the required transformations in global rice value chains if we are to secure a truly sustainable food system for our future.

BOX 1: Comparing market-based incentive mechanisms

	Segregation Model	Book & Claim Model
Market focus	• Markets that demand segregated / labelled sustainable rice (low volume) • Rice from certified farms sold as certified sustainable rice at premium price	• Bulk/mainstream markets with limited consumer demand for sustainable rice (high volume) • No price distortion
Drivers	• Supply chain actors	• Supply chain actors • Companies external to supply chain can also support sustainable production
Advantages	• Direct link with supply chain, traceable impact • 3rd party certification offers higher level of assurance	• Decoupled from physical supply chain • No supply chain alteration is required • Low transaction costs • Easier to scale than other models • Flexibility to grow into physical traceability with more assurance
Challenges	• Requires physical changes to supply chain organisation (Segregation); • High transaction costs • Substantial changes to market needed for large scale adoption • Need sufficient leverage to operate	• Food safety not addressed • Need to create a new market for credits • Verification • Ensuring farmers share benefits

Source: UTZ Certified; IRRI (2012)

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