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Comprehensive agronomy as a pre-condition for seed and food sovereignty: implications of SRI principles for strategic policy issues

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ABSTRACT

For many years, starting from the 1950/60s, agricultural research and the development recommendations based on it, have focused on mostly technocratic approaches in combination with introducing new, fertilizer-responsive, crop cultivars emanating from centralised (national and international) crop breeding programs. This has constituted the basis of the "Green Revolution" and the modern industrialised forms of agriculture. In that context the agronomy discipline is reduced to a support program that handles primarily such aspects that fit into the technocratic frame like mineral fertiliser use and chemical crop protection treatments against weeds, diseases and pests. The more recent event of the "gene revolution" and introduction of GMO cultivars on a wide scale appears to have reinforced this trend. Thus agronomy has been limited to aspects prescribed by the central powers of government and industry whereby "comprehensive agronomic knowledge" is essentially marginalised.

Starting in the late 1990s the "system of rice intensification (SRI)" –largely a grassroots development—has progressively and increasingly been providing fundamental challenges to the chemical-technological approach. The often spectacular results of SRI in many rice growing areas of the world support the notion that grain yields (not only for rice) can be raised substantially through relatively simple agronomic practices suitable for any type of farmer; simultaneously expenditures on external inputs (seeds and chemicals) are drastically reduced. As such SRI has exposed serious gaps in the mainstream agricultural research agendas, it also - through its greatly reduced seed rates (1/5th to 1/10th of conventionally recommended rates)- has direct ramifications for issues like seed- and food sovereignty as the present paper will elaborate.

1 Introduction

Comprehensive agronomy is a fascinating discipline as it serves to bring together diverse biological and technical insights in agriculture with socio-economic, cultural and policy considerations. In other words it contrasts the *theories* of agricultural sciences with the *practices* of farmers. Unfortunately, agronomy is rarely taught in this comprehensive way at universities. Usually it is reduced to a form of *hard* agronomy that deals with crop- and soil related issues (e.g. planting / seeding dates, plant densities, as well as the testing of crop varieties, mineral fertilizer rates and crop protection chemicals) that can be considered as routine exercises that are of little academic interest / prestige. Moreover, in most Western countries technocratic government policies are in place that are aimed at a central control over local agriculture. Such controls are implemented through technical protocols that have further reduced the incentives for independent initiatives by local farmers. Simultaneously, adequate funding to explore and exploit the creative potentials of these farming actors is not forthcoming either. Thus, technocratic protocols with their force of law (!) have filled the experimental horizons of both farmers and scientists. The officially sanctioned 'hard' agronomy therefore has shrunk to a dull exercise that generally doesn't merit publishing in the peer-reviewed literature. However, comprehensive agronomy is supposed to be focused on real-life soils, plants and animals that are actively managed by farmers. Individual scientists therefore can only gain a broad agronomic know-how through their own initiative over the years, in different jobs and in different countries and by mastering some essential social skills.

One of my first positions (1974-'76) has been as a post-doctoral with the CIMMYT (the international centre for maize and wheat improvement in Mexico) in their maize program after graduating as a soil scientist. Early on the program director told me: "*all agronomy* is location-specific, therefore an international research centre has little to contribute, what we can, however, is developing improved germplasm to serve national breeding programs; so for a career with CIMMYT better refocus your professional interests - - - -".

The above comment has greatly influenced my subsequent career. I instead joined ICRISAT's outreach program in Burkina Faso as "agronomist for cropping systems" and started to work on proving that agronomy was fundamentally important in viewing agriculture / farming in a broad perspective as mentioned in the opening sentence above. In that effort I came to realise that the "modern farming" and "Green Revolution" perspectives to which I had been exposed both in Wageningen and at CIMMYT were serious handicaps, because these had instilled some profound and even misleading biases. Initially, and partly unconsciously, these biases seriously influence ones professional approaches and subsequently ones views about such subjects as how to feed the world, how to battle climate change and ultimately the issue of food sovereignty. After-all, to achieve the latter one will first have to produce adequate quantities of food through farm systems that are both resilient and sustainable in the long term (i.e. without jeopardising the future production capacity by degrading / polluting the natural resource base and/or by reducing bio-diversity).

The "Green Revolution / intensification" paradigm has essentially constituted the basis of post Second World War university curricula, as well as research and development efforts throughout the world. As such it has also become the basis of the modern, large-scale industrial type of agriculture that is currently and widely presented as THE answer to feeding a growing world population of 9 billion people.

This paper questions to what extent the present mainstream intensification paradigm is indeed build on a solid version of *hard* agronomy or on "quick sand". Could it be that the paradigm serves commercial and political interests rather than those of the farmers and of the general public?

2 The broad relevance of the system of rice intensification (SRI) for food sovereignty

By the time I left ICRISAT (Burkina Faso) in 1982, I realised that the Green Revolution intensification approach based on improved varieties, high plant densities and increased levels of inputs (mineral fertilizers and crop protection chemicals) was inappropriate for the communities of poor farmers, and under the conditions of a variable and unreliable rainfall distribution as well as a great diversity in land types / soil qualities. Thus, standardised technological packages as promoted routinely by extension services (think of the Training and Visit --T&V—system that during the 1980s and 90s was widely promoted all over Asia and Africa by the World Bank) are unlikely to be efficient, because location-specific conditions are essentially ignored, leading to inappropriate, often wasteful and ineffective measures and recommendations to farmers.

It was, however, not until 1998 when first confronted with SRI, and increasingly in subsequent years, that the profound ramifications of SRI for agriculture in general started to dawn on me. However, most of the debates about appropriate farming systems for the future are based on *stereotyped* and *framed / model concepts* : large scale, modern industrial types of farming are presented as the logical evolution for agriculture and as essential to feeding a growing world population. By comparison biological, organic or ago-ecological approaches are often assumed as suitable mostly for small to intermediate scale farming. The latter supposedly cover the entire range from subsistence peasants, to part-time commercial farmers (van der Ploeg, 2013). Such comparisons and debates are essentially highly misleading, being conducted mostly on political / emotional grounds, rather than being based on solid scientific information (see below).

2.1 Some agronomic fundamentals

A key feature of agriculture is the interaction between "Genotypes" and "Environment" (G x E). As a result a multitude of landraces developed across the world and for all major crops, each showing specific, often subtle, adaptations to local environmental conditions. Such adaptations go way beyond the relatively simple distinction between photo-sensitive (many traditional, local varieties) and photo non-sensitive ones (most modern varieties). Obviously, local farmers were instrumental in developing, selecting and regenerating their own seeds. It is also well recognised that some farmers are more experienced and clever in this selection process than others (van der Ploeg, 2003). The implication is that in agriculture / farming we are always having to deal with very complex sets of interactions of the type G x E x M (the M standing for "man" or "management").

What are the practical and scientific implications of this interaction? To answer that question we have to recognise that the appearance of any *genotype* when grown in the field (be it by a farmer or a scientist), will differ considerably depending on the "E" and "M" factors. In other words in the field any one genotype will appear as different *"phenotypes"*, that even might function physiologically rather differently (Thakur et al., 2013). It follows that how to assess the superiority of one genotype over another (be it an improved open pollinated variety, or a hybrid, or a GMO) is an extremely complex task as the outcome of such comparison is determined (and can be influenced!) by numerous factors, including the so-called non-experimental (and human) factors. Moreover, many of these factors are interdependent which further complicates assessments. This applies even more so for comparisons between different (*cropping*) "*systems*", when the number of factors affecting the outcome becomes so large that these can no longer be accommodated by the conventional field experimental designs and/or surveys. Moreover, we have to face up to the presence of additional factors that we are still unaware of (the unknown, unknowns) or where we still lack adequate knowledge (e.g. soil microbiology and its interactions with roots thereby affecting plant development / plant nutrition; or the role of epigenetics in the inheritance of non-genetic, adaptive, plant characteristics).

Earlier articles (Stoop and Hart, 2005; Stoop et al., 2009) have elaborated how research and development might handle these complexities.

2.2 The intensification paradigm

Common plant features of most cereal crops landraces, both in the temperate and tropical zones, are their photo-sensitivity (i.e. flowering is triggered in response to day length / temperature), besides a relatively tall stature and abundant vegetative development often through a tillering process. Vegetative development will be enhanced the earlier in the season the crop is seeded and/or transplanted. When these crops (wheat, barley, rice, but also sorghum, maize and millet among others: see Uphoff, 2012) are seeded early and at high plant densities (number of plants/sq. meter), the vegetative development will become so abundant that the crop will "lodge". The latter is further enhanced by mineral fertilizer applications, nitrogen in particular. Hence it was concluded that raising grain production would only be possible if new, short-statured (photo-non-sensitive,) varieties were bred that would not lodge when fertilized and planted densely. This strategy of "improved variety, increased plant density, increased use of mineral fertilizers and plant protection chemicals" has become the mainstream intensification paradigm of modern agriculture popularly known as the *Green Revolution*.

A rather limited number of agronomic aspects have become integral parts of this intensification paradigm and as such are conducted as routine tests or are employed as standardised practices in field experiments and demonstration plots. This refers in particular to the following subjects:

a) Variety testing: obviously crop varieties are a major component of any farming system; farmers will value varieties not only for grain yield, but also for a wide range of secondary characteristics, such as grain quality / taste / cooking; forage quality, tolerance to pests, diseases, lodging, etc. .

   As a result of the spectacular progress made in genetics (mapping of e.g. the rice genome, the identification of specific genes and the use of markers to speed up the selection process, etc.), it appears that agricultural scientists have lost sight of the fact that the actual performance of any new material in the field will be highly variable as the "E" and "M" factors (see section 2.1.) will still give rise to different phenotypes. This feature complicates the proper testing of any new material (including GMO's), making it costly and time-consuming. Moreover, comparisons between newly developed materials and a control (of known performance and often a local material) are readily biased because the cultural practices (planting time; seeding density, plant population, mineral fertilizer use, weeding, etc.) are all standardised and this often in favour of the new material. This means that the control variety tends to be planted too late, at plant populations and mineral fertilizer applications that are too high for it to express its real potential.

b) Seeding date: the prevailing farming systems in the world tend to be rainfed so that the actual date of seeding normally is aligned with the start of the rains; for temperate regions and irrigated agriculture temperature will also be an important factor. In all regions a delay in the date of seeding will automatically lead to a shorter growth season which generally leads to a reduction in the total vegetative mass produced. As the start of the rains varies from year-to-year breeding programs have developed photo-non-sensitive materials that have a short growth cycle so that planting can be delayed, while still offering attractive yields. Once again, the G x E x M interaction plays out in complex ways that are highly location- and farmer specific with the overall trend that yields are reduced and risks are increased when planting / seeding operations are delayed for whatever reason.

c) Seeding density / plant populations : under the influence of the "intensification paradigm" and the related crop modelling approaches it has become a *sine qua non* to grow most crops (in particular the cereals) using relatively high seed rates and consequently high plant populations (as high as 100 to more than 300 rice or wheat plants per square meter). Once again, this practice has a huge effect on the plants' phenotype (both above and below ground) due to intra-crop competition and therefore on the efficiency of its physiological performance (see section 2.3.).

d) Mineral fertilizer requirements / need for plant protection chemicals: a common justification for the use of high plant populations under the intensification paradigm is that otherwise the high potential yields resulting from the "improved variety and mineral fertilizer" combination will not materialise. The same argument is used to justify the routine applications of plant protection chemicals.

Under the mainstream intensification paradigm all of the above practices have largely become routines that are implemented as standardised operations. Yet, it is this set of practices in particular that is currently being challenged by the results obtained under the "system of rice / crop intensification".

2.3. The "hard" agronomy of SRI

For those not yet familiar with SRI a brief background is presented in Box 1. The system is not unique, as individual farmers (even in The Netherlands for wheat) have been practicing similar versions for ages as also reported in some of the early colonial literature (see Thiyagarajan and Gujja. 2009).

Initially the spectacular yield increases reported for the SRI set of practices was attributed to "synergies" between the individual practices. Likewise, SRI was progressively characterised / framed as an agro-ecological and/or organic approach. Neither of these characterisations is fully correct; rather it illustrates a fundamental lack of understanding about the agronomic issues involved.

Already at an early stage of testing it was concluded that essentially all rice varieties (land races, improved varieties, hybrids, etc.) would respond positively to the combination of SRI cultural practices (Stoop, et al., 2002). Obviously, there are varietal differences that tend to be related to the plants' tillering ability and its maturity cycle: the intermediate and long duration materials responding more prominently (Thakur et al., 2009; Stoop, 2011).

In subsequent years numerous field comparisons in many countries have been made between SRI and conventional / *best-bet* rice systems, admittedly with variable results. This is understandable given the complexities involved as each system is composed of several different practices that are interdependent, but also interact with various non-experimental factors: the "E" and "M" factors mentioned in section 2.1. Therefore, the results of such tests become rather tricky to interpret and can be manipulated by choosing certain field conditions (see Stoop et al 2009). Even so spectacular yield increases were reported in a large number of cases and even a world record rice yield was claimed for a smallholder farmer in Bihar (India) in 2012 as widely reported in the press.

The question to pose now is: "what might have been the most critical factors / practices that contributed to such high yields?" This is not such an easy issue as in all of the experiments the different factors / cultural practices are confounded. Many of such tests were conducted all over India through the "All-India Rice Program" by the Directorate of Rice Research (DRR) partly in collaboration with ICRISAT and have been reported by Kumar, et al. (2012) and Gopalakrishnan, et al. (2013). It is illustrative for the confounding problem that the authors of these papers did not signal that the generally superior SRI yields were achieved in spite of a plant population of just 16 to 25 plants/m2 . This is way below the officially recommended densities for conventional systems that employ 150 plants/m2 or more (see Table 1). Kumar (pers. comm.) even mentions a yield of 9-10 tons/ha for a plant population as low as 12 plants/m2. In another recent article Thakur, et al. (2013) report a greatly increased nitrogen-use-efficiency for SRI with 25 plants/m2; the highest grain yield of 6 ton/ha being obtained with 90 kg N/ha, while for the conventional irrigated system with 150 plants/m2 the highest yield was 4 ton achieved with 120 kg N/ha. A similar result was reported from China by Zhao et al. (2009): SRI yielding 7 ton grain/ha with 80 kg N/ha while the fully irrigated conventional rice yielded 5 ton/ha.

As reported by Thakur et al. (in prep.) the plant density effect (recorded under rainfed as well as irrigated conditions) is complemented by an additional beneficial effect due to a controlled (alternate wet-and-dry) irrigation regime through which an aerobic soil condition can be maintained. As illustrated by the data in table 1 the rice crop responded remarkably to these two factors and particularly so because of the expansion in root systems and root activity under SRI conditions. The conclusion therefore is obvious: greatly reduced plant populations (in comparison with those formally recommended by extension services both in the North and in the South!) are instrumental in developing extensive root systems. These in turn will permit an increased efficiency in both the uptake of soil nutrients as well as moisture. Consequently, optimum crop growth is achieved at far lower soil nutrient contents than those established for conventional high density plantings, when due to inter-plant competition each individual plant has to perform with a seriously stunted root system. Large savings on the use of mineral fertilizers (see results by Thakur et al. and Zhao et al. mentioned above) then become a logical outcome. The result is an increased overall physiological efficiency of the plant (and crop) as reflected by both increased grain yield and straw production. Perhaps even more important for a farmer: the crop becomes more resilient and more tolerant to drought spells as well as to lodging and various diseases and pests. It should be obvious, however, that for seriously degraded / polluted soils in which the organic matter content and soil micro-biological activity are greatly reduced such processes may not occur to the same extent.

The ramifications of these findings are potentially profound as discussed in the final section of this paper.

3 Discussion: relevance of SRI in a wider perspective of seed and food sovereignty

A major objective of this paper has been to illustrate both the complexities and pitfalls in what is often considered just *simple* agronomy. In the absence of adequate (university) training and field experience in this discipline, misinterpretation of experimental and survey data is likely to be widespread (Stoop et al., 2009). Moreover, it has to be admitted that our knowledge about the biological and organic processes involved, still is greatly inadequate and incomplete. The bottom-line is that varietal and systems superiorities are extremely difficult to measure and to establish objectively. Stone (2012) has elaborated this issue convincingly for Bt cotton in India by showing that the superior yields reported in the peer-reviewed literature tend to be seriously biased[1]. S*ample selection* and/or *cultivation intensity* --the two elements most critical in assessing crop performance in a given location-- were generally not taken into account. To present the outcome of such studies in the peer-reviewed scientific literature as "truths" (e.g. McDonald et al., 2006; Seufert et al., 2012) only serves to fan debates that are driven implicitly by political and commercial motives. As the SRI debate has shown this will be compounded when the research results go against the present mainstream paradigm and/or against vested interests (see debate in IRRI's Rice Today 2004 between Uphoff and Sinclair; also Sinclair and Cassman, 2004).

Where do the brief presentations about SRI in section 2.3 and Box 1 lead us? It certainly raises some intriguing questions. Firstly, "why do farmers traditionally greatly *over-seed* their fields?" Secondly, "how is it possible that farmers, all over the world, have been advised (officially) to use seed rates that are way above (5 to 10 times!) those that would result in the highest yields?" And this when greatly reduced seed rates and therefore reduced plant densities would also permit large reductions in mineral fertilizer applications for nitrogen in particular and presumably also in the use of plant protection chemicals - - - -?

Even more disturbingly, very similar questions apply to the testing and introduction of new crop varieties including GMO's. Once again the field testing will follow standardised methodologies and practices developed for experimental stations and for on-farm multi-location testing. Moreover, the outcomes will obviously be reported in internal documents, but will *not* be considered attractive for publication in peer reviewed journals. As such the methodologies, results and their interpretation remain effectively hidden from public scrutiny. The recent article by Heinemann et al. (2013) which compares the cereal production statistics between the USA (mostly GMO-based) with those for Europe (no GMO's) sets this in perspective with the conclusion that the European grain yields have remained superior to those obtained elsewhere in the world. Then, where are the true advantages and benefits of GMO's , apart from those flowing to the multinational agro-industrial complex?

This paper has attempted to show just some of the numerous ways in which agronomic testing of new varieties (in particular GMO's which represent large commercial interests), but also of new production/cropping systems can be manipulated. This becomes all the more alarming when the means for an objective and neutral assessment of the claimed superior products and technologies from private sector seed companies, as well as by public-private coalitions, is in essence obstructed and/or side-tracked. As elaborated by Kloppenburg (2013) such neutral assessments have been made impossible through the US patenting laws. This provides the multi-national seed industries a strict control over all uses of these seeds (by farmers as well as by scientists). With the global seed market valued at US$ 35 billion (Kloppenburg, 2013), an uncomfortable totalitarian situation has been created that is counter to the principles of a democratic society (see also Stiglitz, 2013). It is therefore not unrealistic to conclude that the global agro-industrial complex with its huge financial interests in seeds and chemicals indeed provides a major threat to sustainable

[1] Yield increases attributed to Bt cotton in India have frequently been expressed on a percentage basis. This readily leads to impressive values of up to 80% when the initial yields are low (around 400 kg/ha). By contrast cotton yields in Southern Mali in the pre-GMO times were commonly in the order of 800 to 1200 kg/ha and considerably more for the best farmers.

agriculture and thus food security and –sovereignty.

Competent and independent agricultural research institutions, including universities and for instance the CGIAR Centres, ideally would have to balance and rectify the situation. However, in their search for funding these institutions increasingly call upon public-private collaborations to implement ambitious and comprehensive projects dealing with global issues, like poverty alleviation, climate change, sustainability as well as food security and food sovereignty. In that process the debates among administrators, policymakers, private sector representatives and research / academic stakeholders, unfortunately, are becoming increasingly remote from grassroots farming realities. When for instance in the recent "Africa Rice Congress" it is stated by the representative of the Gates Foundation that *"plant breeding is also the most effective path for agricultural adaptation to climate change - - - "* (Atlin, 2013) one wonders how realistic such aim is. How could anybody breed for problems that are not predictable *how, when* and *where* these may play out and that for natural phenomena as different as floods, droughts and/or storms - - - -?

The above statement by Atlin represents a more general and on-going trend. Namely, to present and frame extremely complex issues for which current knowledge is incomplete at best, through simplified statements that suggest crisis and great urgency, as well as the availability of potential –yet untested-- solutions (Bernessia and Barbiero, 2012). The ongoing promotion of GMO's by the multi-national, agro-industrial complex for instance for Bt cotton in India is a striking example (Stone, 2007; 2011). Yet the actual outcome of these solutions is uncertain if not entirely unpredictable even for the medium term, especially for agricultural systems that are continuously evolving.

The latter is set in perspective by the recent analysis by Mutsaers and Kleene (2013) who have been comparing the past ideas and views (from the 1970 and 80s) of a group of international agricultural experts about the future developments of African agriculture with what has actual happened on that continent. The conclusion is obvious: while many changes did take place in agriculture over that period, it rarely was along the lines and with the impacts anticipated by the experts. African agriculture would have been served better when at the time the experts would have focused on the actual and current problems and constraints. This would have entailed a focus on the actual systems of farming and their rational viewed against the prevailing local agro-ecological and socio-economic conditions, instead of trying to parachute alien, inadequately tested techniques (including all kinds of new varieties). The popularity of the SRI principles with many smallholder farmers throughout Asia and increasingly also in Africa is a point in case.

From the preceding presentation ONE major agronomic measure –among the SRI principles-- stands out: drastically reducing seed rates[2] and thus plant populations, so that more robust and resilient phenotypes can develop that will stand up effectively against the unpredictable hazards and risks of climate change. Additional benefits would be considerable reductions in the use of irrigation water, as well as in the expenditures on agricultural chemicals. Obviously, such drastic reductions (in the order of 1/5th to 1/10th of currently recommended rates for seeds) will not be welcomed by the seed and chemicals industry. However, many millions of farmers (small as well as large) all over the world would stand to benefit. In that respect, the serious opposition that SRI has been facing ever since it reached wider recognition sheds a dim light over the true motives of those responsible for sparking this debate: it was certainly not driven by agronomic professionalism. More likely short term opportunism (to secure research funding) and commercialism were the driving forces, rather than sincere concerns about poverty, malnutrition, pollution and land degradation.

4 Conclusions

The preceding analyses raise several major issues of concern, as well as some conclusions that merit to be

[2] a good *seed quality* being an obvious pre-condition.

highlighted.

a) Agriculture in general has to cope with *diversity, variability* and *uncertainty* as concerns the natural environment (soils, climate and weather), as well as in societal / human aspects of culture, socio-economics, policies, apart from management and organisation, and this ranging from the individual / micro to national and international / macro levels. There are huge trade-offs in terms of production efficiency when this is handled at local scales instead of through standardised / blue print approaches. Government agencies and the private sector, for obvious reasons, will find it unattractive to cope with this constraint.

b) Increasingly we are facing serious experience / knowledge gaps between the *sciences / theories* of agriculture and the field realities and practices of *farming*. A narrow technical focus and increased disciplinary specialisations of university education programs will have contributed to such gaps, yet with profound ramifications.

c) Notably, the introduction of new crop varieties (be it local landraces, open pollinated ones, hybrids or GMO's) in spite of the high expectations created by the "bio-tech / gene revolution" specialists is far less easy and straightforward than presented by private sector industries, development agencies and - - - - many scientists.

d) When external and independent controls of (multinational) seed producers about the quality and effectiveness of their GMO's are made impossible through legal tools (US patenting laws), there is every reason to become suspicious. Could it be possible that --given the financial stakes involved-- the potential of GMO's to raise agricultural production in the future are greatly exaggerated?

e) Taking the preceding elements into account one must conclude that the potential scope for frauds (both scientific and economic at national and international scales) is enormous.

f) By comparison the experiences with SRI over the past decade point to very simple agronomic measures (suitable for any type of farmer) and most likely of immediate benefits. Thereby it would contribute to an increased production while realising large savings on expenditures for external inputs, such as seeds and agricultural chemicals. Moreover, a far more resilient crop (that will stand up against the diverse risks associated with climate change) can be grown than would be possible by following standardised *green revolution* recommendations.

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Table 1: The effects of plant population (plants/m2) on root development (per hill and per m2) and subsequent grain yield (t/ha) for a conventional rainfed rice system as compared with three SRI fields under different irrigation regimes. Experiments were conducted in Odisha, India. The different letters denote significant (*P* < 0.05) difference between treatments by DMRT .

Rice systems	Hills/m2	Plants/m2	Root dry weight (g) per hill	Root dry weight (g) per m2	Rice grain yield (t/ha)
Conventional rainfed rice	50	150	4.1 d	206 d	2.9 d
Rainfed SRI rice	25	25	7.5 c	187 c	4.4 c
Rainfed SRI rice with suppl. irrigation from groundwater	25	25	10.2 b	254 b	5.7 b
Rainfed SRI rice with suppl. irrigation from stored run-off water	25	25	12.3 a	308 a	6.2 a

Courtesy of Dr. A.K. Thakur

Box 1: A brief background to SRI

Father Henri de Laulanie SJ, who was a practical field agronomist and good observer, probably used information about rice cultivation dating back to the colonial period and earlier experiences from the far East (Thiyagarajan and Gujja, 2009). During the 1980s he started experimenting with rice at his agricultural school near Antsirabe in Madagascar, where local farmers were facing shortages in rice seeds, irrigation water and mineral fertilisers following a decision by the Malgache Government to eliminate subsidies. In his efforts to cope with the situation de Laulanie experimented with the farmers to develop adjusted cultural practices. The result was a system based on transplanting single, widely-spaced, very young seedlings, reduced irrigation rates (alternate wet-and-dry practices), frequent weeding with a rotary hoe and liberal use of organic fertilisers (compost). This combination of practices resulted in extraordinary grain yields (increases of up to 100% and more), as well as large savings on external inputs (90% for seeds; 30 to 40% for irrigation water). For further details see the SRI website : www.ciifad.cornell.edu/sri , or http://srinewsandviews.blogspot.com/

During the mid 1990's Professor Norman Uphoff of Cornell University saw this rice system while visiting Madagascar and started further experimentation in collaboration with the University of Antananarivo. Having convinced himself about the potential, he drew wider international attention to it notably in the major rice producing countries of Asia (China, India, Indonesia, Vietnam, Cambodia). These efforts were met with disbelief, if not indignation, by the established rice research institutes like IRRI, WARDA/Africa Rice, CIRAD and major agricultural universities that characterised it as "voodoo science", based on "UFO's" (unconfirmed field observations). However, through his tireless efforts and with support from NGO's and some key professionals, farmers in many countries have adopted SRI (in various forms) successfully, in spite of the heated debates and conflicting messages from rice scientists, development workers and private sector.

Food Sovereignty: A Critical Dialogue

INTERNATIONAL COLLOQUIUM
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FOOD SOVEREIGNTY: A CRITICAL DIALOGUE INTERNATIONAL COLLOQUIUM PAPER SERIES

A fundamentally contested concept, food sovereignty has – as a political project and campaign, an alternative, a social movement, and an analytical framework – barged into global agrarian discourse over the last two decades. Since then, it has inspired and mobilized diverse publics: workers, scholars and public intellectuals, farmers and peasant movements, NGOs and human rights activists in the North and global South. The term has become a challenging subject for social science research, and has been interpreted and reinterpreted in a variety of ways by various groups and individuals. Indeed, it is a concept that is broadly defined as the right of peoples to democratically control or determine the shape of their food system, and to produce sufficient and healthy food in culturally appropriate and ecologically sustainable ways in and near their territory. As such it spans issues such as food politics, agroecology, land reform, biofuels, genetically modified organisms (GMOs), urban gardening, the patenting of life forms, labor migration, the feeding of volatile cities, ecological sustainability, and subsistence rights.

Sponsored by the Program in Agrarian Studies at Yale University and the Journal of Peasant Studies, and co-organized by Food First, Initiatives in Critical Agrarian Studies (ICAS) and the International Institute of Social Studies (ISS) in The Hague, as well as the Amsterdam-based Transnational Institute (TNI), the conference "Food Sovereignty: A Critical Dialogue" was held at Yale University on September 14-15, 2013. The event brought together leading scholars and political activists who are advocates of and sympathetic to the idea of food sovereignty, as well as those who are skeptical to the concept of food sovereignty to foster a critical and productive dialogue on the issue. The purpose of the meeting was to examine what food sovereignty might mean, how it might be variously construed, and what policies (e.g. of land use, commodity policy, and food subsidies) it implies. Moreover, such a dialogue aims at exploring whether the subject of food sovereignty has an "intellectual future" in critical agrarian studies and, if so, on what terms.

The Yale conference was a huge success. It was decided by the organizers, joined by the Land Deal Politics Initiative (LDPI), to hold a European version of the Yale conference on 24 January 2014 at the ISS in The Hague, The Netherlands.

ABOUT THE AUTHOR

Willem A. Stoop was trained as an agronomist/soil scientist; graduated from Wageningen in 1969 and holds a PhD from the University of Hawaii (1974). Next he had an international career mostly with the international agricultural research centres (CIMMYT; ICRISAT; ISNAR and WARDA/Africa Rice, as well as KIT). Since 1998 when he was serving as interim director of research at WARDA, and has become increasingly involved in rice and particularly SRI (System of rice intensification) on which he has published at several occasions. In recent years this has brought him into contact with Jan Douwe van der Ploeg and Josef Visser. Looking at the closing par. of Visser's mail you might consider him as an "agronomist that escaped from the cage" . Presently, he is involved in advising three Indian PhD candidates doing their research on socio-economic aspects of SRI in India and preparing their theses in Wageningen. In addition he supports several more senior Indian scientists who are studying fundamental plant physiological aspects of SRI.