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The Sustainability of Organic Agriculture in Developing Countries: Lessons from China

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Abstract: Concern over food shortages in recent years has made questions over whether organic agriculture can provide the basis for sustainable agriculture in developing countries ever more urgent. In China, organic agriculture - almost completely abandoned as a result of Maoist grain monoculture and Green Revolution technologies by the 1970's - is making a comeback, with the Organic Food Development Centre, China's principal organic certifier, winning full accreditation from the International Federation of Organic Agricultural Movements in 2003 and organic food being produced in China in increasing amounts, albeit from a low base, for sale in both domestic and overseas markets. But organic conversion for China's overwhelmingly poor farmers, as for poor farmers everywhere, is extremely problematic. Not only are there risks of lower yields in the first few years, ignorance of organic techniques, problems of obtaining sufficient organic fertiliser, back-breaking weeding, problems of handling the bureaucratic requirements as well as the monetary costs of certification and finding markets, but owing to the very small size of Chinese farms, farmers need to undertake organic conversion cooperatively. Promoting the necessary conditions for organic agriculture is therefore not easy, particularly in poor, out-of-the-way rural areas. However, the decision by China's largest and most important state liquor company - Maotai - to source its ingredients, primarily sorghum and wheat, from organic sources has led to the largest concentration of organic farmers in China - in rural Guizhou, one of poorest parts of China - providing farmers with the necessary security to undertake organic conversion with enthusiasm. Our paper will present our research findings, based on visits to Maotai, Guizhou, in 2007 and 2009 and will point to possible lessons for other developing countries who wish to make organic conversion feasible and organic agriculture sustainable over time.

Keywords: Sustainable Agriculture, Organic Agriculture, China, Developing Countries

Introduction

IT IS IRONIC that, today, the term 'conventional' agriculture implies 'industrialised' agriculture based on huge scale, massive capital inputs and heavy use of chemicals for fertilisers, herbicides and pesticides. It is doubly ironic that this highly industrialised form of agriculture is presently practiced most extensively in developing countries while the expansion of organic agriculture in recent years has been most evident in the rich, developed world.

There are great hazards in presenting the statistics for organic food production not only because different countries produce data to different levels of efficiency but also because they count different forms of agriculture as 'organic' and thus comparisons between one country and another need to be interpreted with extreme caution. Nonetheless, all recent numbers suggest, as stated above, that organic agriculture is most commonly practised in

developed countries and least so in the developing world. According to the SOEL-FIBL statistics for 2006-7¹, the top nine countries in terms of the shares of organic land as a proportion of total agricultural land are all developed European countries, the top four being Liechtenstein (29%), Austria (13%), Switzerland (11.8%) and Italy (9%). Only heroic East Timor (6.9%) – a developing country – makes it into the top ten. Meanwhile, when we examine the share of organic land in total land across all developing countries, only 12 countries have a share above 1% and almost all of these are extremely small economies, to include East Timor (6.9%), Vanuatu (6.1%), Samoa (5.5%), Sao Tome and Prince (5.1%), the Solomon Islands (3.1%) and Niue (2%), while the numbers for the bigger developing countries, India (0.3%), Brazil (0.3%), Pakistan (0.1%) and Indonesia (0.1%) are exceedingly low. Even in China where, as will be discussed below, good progress has recently been made, the figures suggest that in 2008, with 1.9m hectares under cultivation, only 0.75% of total agricultural land is planted organically². At the same time, nine of the top ten countries currently enjoying the highest rates of growth of organic land are all European or North American (with the USA at number one).

That industrialised agriculture is most prevalent in poor countries while organic agriculture is increasingly practiced in the developed world, though counterintuitive, is not difficult to explain: *the rich, developed world can afford it*. Organic farmers in that rich world can afford to indulge their beliefs, their dreams, perhaps their lifestyles. And some of them can even prosper because consumers there can afford to pay the routinely (often substantially) higher prices charged for organic food over ‘conventionally’ produced food in their shops. The truth is that organic agriculture is expensive, conventional agriculture is cheap.

Or is it? In terms of current internal costs and benefits expressed at market prices, it certainly *is* the truth. Organic agriculture *is* costly, much more costly than conventional agriculture. It is extremely labour intensive. It involves not only frequent backbreaking planting, weeding and harvesting, but also the production and/or gathering and application of organic fertilisers, herbicides and pesticides to replace the easily obtained bags of chemicals imported into the countryside. Time needs to be spent by farmers on learning organic techniques forgotten by their forefathers and in honing those techniques to maximise yields using organic fertilisers which do not always immediately work –and almost never *immediately* work - sufficiently well to match yields from chemical fertilisers³. Organic agriculture involves using techniques which work with the grain of local conditions, to include the quality of soils and the local micro-climate while fertiliser bags containing mixtures of nitrogen,

¹ See Willer H, Youssefi-Menzler M. & Sorenson N, (2008) *The World of Organic Statistics and Emerging Trends 2008*, IFOAM, Bonn, Germany

² Figures provided by the Organic Food Development Centre, Nanjing, China 2009. Interestingly this number is less than the 2.3m hectares attributed to China by the SOEL-FIBL, illustrating the difficulties of comparing international statistics.

³ There have been a great many trials of organic agriculture across the world and the results are mixed. An article posted on the Easyearth Blog by the Organic Consumers Associations on January 30, 2009, for example, entitled *Can Organic Agriculture Feed the World* by the Organic Consumers Association argues that organic agriculture in developing countries suggest yields, particularly in developing countries, can *increase* yields, and quotes Pretty et al (2006) [“Resource Conserving Agriculture Increases Yields in Developing Countries”, *Environmental Science and Technology*, Vol.40(4), pp1114-1119], who argue that a review of 286 resource-conserving projects in 57 countries was found to have increased yields by an average of 79%. Nonetheless there is a broad consensus that yields from organic agriculture *per se*, across both the developed and developing worlds, are in the first instance lower, and sometimes much lower, than for conventional agriculture. This conforms to our own experience across China.

phosphorus and potassium are much more generalizable across farms: not quite ‘one size fits all’, but certainly less temperamental and less specific than organic fertilisers. Organic agriculture needs time, care and practice to make perfect.

And there are other problems which make organic agriculture more expensive in terms of its internal costs and benefits than its ‘conventional’ counterpart. There is a problem of validation. When a consumer buys an organic tomato in the market place, how can she know it has *really* been grown organically? She may wish to buy an organic tomato believing it to be environmentally more friendly, more natural and generally healthier than a conventionally produced tomato, but she won’t be able to judge how it has been produced purely by sight. The tomato may have come from a local farm where she knows the farmer and knows that organic techniques have been used. But the further away the market is from the farm, the more unlikely there will be a close relationship between farmer and consumer and the more likely that unknown intermediaries, who cannot be taken on trust, will be involved in the process. Thus validation of organic products necessitates some form of *certification*. This can be more or less formal, but in any event there needs to be some body, some institution to perform the certification process, and the more extensive the level of output and of marketisation, the more formal the process and the more overtly reputable the certifying body needs to be. But certification requires farmers to operate to exacting standards and to prove that they are doing so. Often barely literate farmers must keep detailed records to satisfy the certifiers and they must pay a fee for the privilege of doing so. Indeed, the whole business of certification can well become not only an expensive but an alienating state-of-affairs. No wonder poor farmers in developing countries are mostly deterred from producing organic food and continue to rely on the ‘cheap’ bags of chemicals conveniently distributed by the suppliers to the thresholds of their farms. A ‘new’ type of agriculture which may well be – *and probably will be* – more expensive, more time-consuming and more inefficient, particularly in the short run, than the type of agriculture currently practised, is hardly likely to be enthusiastically adopted. And in developing countries, it rarely is, without considerable encouragement and support.

So can organic agriculture ever be sustainable in developing countries over time?

Why Practice Organic Agriculture?

Farmers in developing countries who currently practise conventional agriculture were overwhelmingly persuaded to abandon their traditional organic practices in the 1970’s by the promise of the ‘Green Revolution’- a revolution of new strains, new technologies and new fertilisers which would banish hunger for ever. Needless to say the promotion of these new strains, technologies and fertilisers across the developing world led to money being earned by agro-chemical companies in the richer countries and while yields rose substantially and generalised hunger and malnourishment became a thing of the past in most parts of the poor world, it provided neither a general panacea for localised (or even regional) famines nor provided farmers with an ultimately sustainable alternative.

The latter has been the case because the continued application of chemical fertilisers is a self-defeating exercise in that chemical fertiliser use exhibits one of the most classic examples of the economist’s law of diminishing marginal returns. As chemical fertilisers are applied year in year out, it is necessary to apply increasingly large amounts just to *maintain* yields as the soil degrades. And it is not just the increasingly large amounts of chemicals needed

to be imported into the countryside which makes the process increasingly costly: when the *external* costs and benefits of conventional agriculture are added to the mix, then it becomes a rapidly more expensive - and damaging - option. Chemical fertilisers, herbicides and pesticides leave residues in the soil which can lead to eutrophication in lakes, rivers and other water sources as well damage to health of those who work on the land and consume from it⁴. Meanwhile, the increasing application of synthetic nitrogen fertiliser in agriculture has made nitrogen oxide the third most significant greenhouse gas (after carbon dioxide and methane) while its *production* (made as it is through ammonia production and demanding of energy) is a large and increasing significant greenhouse gas source in itself. Thus the use of (frequently) synthetic nitrogen in and the production of synthetic nitrogen for agriculture adds inexorably to global warming. It is estimated that, already, agriculture contributes up to 20% of greenhouse gases globally⁵ and further extension of conventional agriculture can only make the situation worse.

Thus, while 'conventional' agriculture may be cheap in terms of short run market prices, that is, in terms of the internal costs of farmers, it becomes a very costly state-of-affairs when the environmental and other externalities are taken into account. It is nowadays increasingly recognised that farmers in both developed and developing countries must play their part in greenhouse gas mitigation and the achievement of other environmental goods. Indeed, one illustration of the recognition of the need for a fundamental re-evaluation of the state of agriculture globally today was the decision by the United Nations Food and Agriculture Organisation (FAO) to hold its first international conference on "Organic Agriculture and Food Security" in Rome in 2007.

The International Federation of Organic Agricultural Movements

The International Federation of Organic Agricultural Movements (IFOAM), founded in 1972 by organic farmers in France, Austria and Germany (and immediately thereafter joined by organic farmers in England, Sweden, USA, South Africa, Canada and India) and with its headquarters presently in Germany, is the principal international organisation promoting organic agriculture around the world. It is also the principal standard bearer, enforcer and monitor of organic agriculture and trade in organic products, it being the critical *international* accreditor (through IOAS⁶, based in the USA) of individual organic certifying organisations (both private and public). While naturally insisting that organic agriculture means chemical-free agriculture, IFOAM argues that all organic agriculture should be based on four principles⁷ (1) health: "organic agriculture should sustain and enhance the health of the soil, plant, animal, human and planet as one and indivisible", (2) ecology: "organic agriculture should be based on living ecological systems and cycles, work with them, emulate them and sustain them" (3) fairness organic agriculture should build on relationships that ensure fairness with regard to the common environment and life opportunities" and (4) care: "organic agriculture

⁴ For a full discussion of literature on the harmful impacts of chemical fertilisers on soils and those who work on them in China see "A Market Road to Sustainable Agriculture" in Sanders R. (2006) *Development and Change*, pp.199-224

⁵ There are wildly varying estimates. But none puts it at less than 10%. According to Fahrenthold D. in *Washington Post* December 17, 2009, quoting Tom Vilsack, US Secretary for Agriculture, puts the global figure at 14%

⁶ The International Organic Accreditation Service Inc. based in North Dakota, USA

⁷ See IFOAMS' own website at <http://www.ifoam.com>

should be managed in a precautionary and responsible manner to protect the health and well-being of current and future generations and the environment⁷. Thus, organic agriculture is designed not only to promote health and well-being as well as environmental friendliness, but care, responsibility and fairness in terms of human relationships and life opportunities. For IFOAM, organic agriculture is an ambitious project.

Partly as a result of IFOAM's work over the last four decades, there has been a significant expansion in the production and consumption of organically produced goods world-wide, involving growing international trade. Throughout Europe, Japan and North America organic food has entered the mainstream to the extent that it is routinely sold in all main supermarkets where a majority of consumers claim to buy at least some organic products from time to time⁸. At the same time, the availability of organic products has expanded as farmers across the globe have engaged in organic conversion. But the recent expansion of both the supply of and demand for organic food, though positive, remains very limited and, as suggested earlier, remains almost exclusively confined to the developed world.

While the proponents for organic agricultural conversion in developing countries may stress possible advantages of doing so – the prospect of premium prices, greater self-reliance and autonomy, a stronger local economy, a greener local environment and the possibility of eco-tourism spin-offs⁹ - there remain big barriers in the way of persuading poor farmers to engage in organic conversion in developing countries¹⁰. Even if they are intellectually persuaded of the possibility of the environmental sustainability of organic farming, doubts over its economic sustainability – and the sustainability of their livelihoods – may well, and normally does, deter them from conversion to it.

The Case of China

In pre-Communist days (that is, before 1949 when Chairman Mao Zedong announced the birth of the Peoples Republic of China), traditional Chinese farming was organic farming and was highly respectful of the environment. As the American, FH King¹¹ noted on a tour of Southern China in 1926,

“enormous quantities of canal mud are applied to the field, sometimes at a rate of 70 or more tons per acre. So too, where there are no canals, both soil and subsoil are carried into the village and there they are, at the expense of great labour, composted with organic refuse, then dried and pulverized and finally carried back to the fields to be used as home-made fertilizers. Manure of all kinds, both animal and human is religiously saved and applied to the fields in a manner which secures an efficiency far above our own practices”

⁸ See Organic Market Report (2009), Soil Association, Bristol, UK. In its executive summary, it is suggested that 15% of the British consumers claim that over 40% of their food consumption is organic, while 33% claim it be between 20-30%

⁹ See David Crucifix (1998) *Organic Agriculture and Sustainable Rural Livelihoods in Developing Countries*, Soil Association, Bristol UK, executive summary, p.iv

¹⁰ Ibid, executive summary p.v

¹¹ See FH King, (1926) *Farmers of Forty Centuries*, Jonathon Cape, London , p.22

By the time of the death of Mao in 1976, this had all changed. Partly as a result of the exigencies of the Green Revolution and partly of Mao's predilection for grain monoculture, the import of chemicals into the countryside as fertilisers, pesticides and herbicides grew at a heroic rate. The application of (mostly synthetic nitrogen based) chemical fertiliser, negligible in 1952 was 8.8 tons in 1978.¹² But after Mao's death and with the advent of market-based reforms, this rate of growth accelerated, to 21.4 tons in 1988 and to 51.1m tons in 2007. And while grain harvests have risen to provide sufficient short-run food security in China, this has taken place as a result of accelerated application and at a cost of diminishing marginal returns. For while the grain harvest per ton of chemical fertiliser was 100.1 tons in 1965, by 1978 it had fallen to 33.5 tons and in 2007 it stood at a mere 9.82 tons. Thus the ratio of tons of chemical fertiliser application to tons of grain harvested, over 1:100 in the 1960s is now less than 1:10. As far back as 1991, Qu Geping, the then head of China's National Environmental Agency, sagely noted¹³,

“(problems associated with the increasing use of chemical fertilisers) not only hamper the further development of agriculture and the realisation of modernisation (but) also ... threaten the existence and development of the Chinese nation”

Today, almost two decades later, the threats are that much greater.

Organic Agriculture in China: Early Institutional Developments

Though China has experienced –indeed continues to experience – environmental problems of immense proportions, the Chinese government has, in the reform period over the last 30 years, been alive to their dangers. Indeed, the early realisation by Qu Geping and by China's NEPA of the need to change agricultural practices and limit the use of chemicals in the Chinese countryside, spurred China into a series of initiatives to that end. In the early 1980's the Chinese government promoted an initiative to popularise “Chinese Ecological Agriculture”¹⁴, involving farm processes designed to produce various forms of organic fertiliser (e.g. green manure, biomass, slurry) in a series of virtuous circles thereby reducing (though not eliminating) the need for chemical fertilisers while China's second initiative in this area, the promotion of Green Food - food produced with less chemicals than in conventional agriculture (similar to “Chinese Ecological Agriculture”) and marketed as such, with its own logo and brand image - began in the late 1980s.

Green Food is still sold in China today and its production has inevitably had some beneficial impact in reducing the rate of growth in the application of chemicals in rural China. But the possibility of its extension today is limited by the fact that, in all the significant *rich* markets available to Chinese farmers – domestic and ex-pat consumers in Beijing, Shanghai and

¹² All figures in this paragraph are produced in or derived by the author from *China Statistical Yearbooks* 1992 and 2008, China Statistical Press, Beijing

¹³ See Qu Geping, (1991) *The Review and Prospect of Eco-Farming Construction in China*, China Environmental Science Press, Beijing, p.14

¹⁴ A full account of Chinese Ecological Agriculture is included in Sanders R. (2000) *Prospects for Sustainable Development in the Chinese Countryside: the Political Economy of Chinese Ecological Agriculture*, Ashgate, Aldershot, UK

other big cities and international markets in Japan, Europe and North America – the demand is for fully organically produced food, not a sub-organic alternative.

Thus, the most significant institutional development in this regard took place in 1994 when the Organic Food Development Centre (OFDC) was established in Nanjing, as part of the then new State Environmental Protection Administration. OFDC had an immense job on its hands: to promote organic agriculture amongst farmers who had forgotten its existence and who faced not only the barriers to organic conversion common to all farmers in developing countries but additional barriers associated with the institutional setting of Chinese agriculture, namely the Household Responsibility System, which had replaced the communes established under Mao and involved farmers working exceedingly small plots of (semi-privatised) land individually and which militated against the communal, larger-scale farming necessary to produce organic products on a sufficient scale to be economically viable.

OFDC was charged with six principal tasks: to establish organic standards and promote them, to encourage the extension of organic agriculture, to train first the trainers and then the farmers in organic methods, to monitor developments in organic farming, develop the task of organic certification and to make and develop international links. Progress was sufficiently brisk in each of these areas that organic farming was established in some form or another in every Chinese province except Tibet by the turn of the millennium and OFDC was fully accredited by IFOAM as an international organic certifier in 2002. Today, China's share of land under organic cultivation as a percentage of the total land under cultivation is still low but, at 0.75%, is higher than any other major developing country outside South America.

Models of Organic Agricultural Extension in China

Every organic farm in China is, of course, different and consequently any attempt to categorise them necessarily involves some simplification and distortion. There will also be many outliers. Nonetheless, as a result of our researches in the Chinese countryside which has taken us to countless organic agricultural sites in a majority of Chinese provinces in the last ten years, We believe that it is possible to categorise them using a threefold typology: (i) organic agricultural market gardens near the big cities (ii) farmer cooperatives in villages established through the intervention of largely public sector change-agents to include OFDC itself, local research establishments, university agricultural department and county and provincial Environmental Protection Bureaux and (iii) farms involving large scale cooperative arrangements in and across villages promoted by, often very large, food processing companies in both the private *and public* sectors

(i) *Organic market gardens*. Over the last ten years or so, a resident middle class has developed sufficiently strongly amongst affluent Chinese and the ex-pat community which, with the big international hotels, provides a large and growing market for organic food in China's big cities, to include Beijing, Shanghai and Guangzhou, prepared to pay significantly higher prices for organically produced food than for conventionally produced food. Differentials in prices between the two can be 500%, sometimes more. To cater for this demand, organic market gardens have sprung up, having been established by entrepreneurs wishing to cash in on the lucrative market opportunities opened up. While this has led to an increase in both the production and consumption of organic products, with all the attendant benefits to the environment which that entails, in many cases these sites have been established on

land re-designated by city governments and leased or sold to entrepreneurs from other parts of China, to include Hong Kong and Taiwan, using poor, migrant labour from central and western China, housed temporarily and humbly without the normal social provision enjoyed by city residents¹⁵. Thus while, IFOAM's principles of "health" and "ecology" may be furthered by these farms, and should therefore be encouraged, there are question marks over the degree to which the principles of "fairness" and "care" are promoted. Certainly, it is a concern that farmers in this model are not engaged in practicing organic agriculture in their home villages and traditional communities. To the extent that migrant farmers may eventually return to those home villages, the sustainability of the development may be called into question.

(ii) *Village cooperatives*. The OFDC, in concert with many other official institutions, to include research establishments, universities and local environmental protection bureaux, have expended large amounts of resources to encourage individual farmers in new cooperative arrangements to engage in organic conversion in villages across China, those resources going primarily into training and education and other forms of institutional support in overcoming barriers to conversion. To the extent that this model allows farmers to remain planting their own land in their own communities, there are clear advantages to this over the previous model discussed above. There are many such examples across China and while some have been and remain successful –to include Liu Min Ying¹⁶, a small village in Beijing municipality, which had originally pioneered Chinese Ecological Agriculture in the early 1980s and which now produces a huge range of organic foods primarily for the Beijing market- others have been less successful. One such village is Shifu Si¹⁷ western Anhui province, where, in 2000, 33 farmers formed a cooperative and created an organic tea garden, becoming the first Organic Tea Growers Association in China. Though the association successfully applied for an official trademark for their tea in 2003 and though organic tea is still produced there through the perseverance and hard work of the leading villagers, barriers to *sustainable* development based upon it exist as a result of the small scale of the village itself coupled with its out-of-the-way location, leading to significant difficulties in marketing and selling the product in sufficient quantities to make the tea garden a commercially viable proposition. Today only nine farmers remain in the association.

(iii) *Multiple village cooperative farms promoted by food processing companies*. In many parts of China, companies wishing to process and sell organically produced goods –often for export- have initiated various kinds of cooperative arrangements with farmers in *many* local villages to supply them with organic produce at very favourable prices. One such example is the Tai'an Asia Food Company in Shandong Province¹⁸ which by 2000 had entered agreements with the collective leadership of five local villages who act as a go-between for the company and the farmers. Not only does the collective leadership in those villages have a contract with the Tai'an Co. to sell organic vegetables to it, but it also ensures each household has a suitable parcel of land in return for a contractual rent and an agreement to receive instructions on the standard management of organic plants and to supply vegetables to the cooperative which is responsible for their sale. In the early stages, the company provided

¹⁵ Such market gardens in the environs of Shanghai were visited by the authors in 2004 and 2005

¹⁶ Visited frequently by the authors 1992-2006

¹⁷ Visited frequently by the authors 2002-2008

¹⁸ Visited by the authors in 2002 and 2003

training to the newly organic farmers paying for an expert to be resident in the villages to ensure the correct practices were understood and adopted. Above all the company bore (and still bears) the risk of organic conversion by providing a guaranteed market at favourable prices, providing the necessary training and monitoring and paying for the certification.

Another more celebrated example of this model has resulted from the recent decision by the state-owned Maotai Company¹⁹ (which produces China's most famous brand of white spirit, distilled from sorghum) to source all its raw materials, primarily sorghum and wheat, from organic farms. This has produced the greatest wave of organic conversions in China in the last twenty years, involving "tens of thousands"²⁰ of farmers in "hundreds" of villages in western Guizhou Province, one of the poorest parts of the Chinese countryside. Through a marketing company established at the county level, Maotai Company guarantees farmers generous prices for their output, ensures adequate supplies of organic fertiliser at subsidised prices, ensures proper training of local farmers in organic techniques, provides direct grants to local schools and, above all, is responsible for the marketing of the products, bearing the risk of organic conversion which otherwise would be borne by the farmers. Though the decisions were made to source organic sorghum and wheat in the early 2000's, Maotai's entire needs are now met by organic farmers.

It is our view that this latter model of organic agricultural development has provided the basis for the greater part of the increase in land under organic cultivation experienced in China over the last fifteen years or so, and that, in *the present institutional arrangements within China today*, (and despite dangers inherent in the fact that the initiative for organic conversion comes from companies, not farmers), it promises the greatest potential for sustainability of organic agriculture in China in the near future.

Conclusion

It is clear from research based not only on our interviews with individual farmers but on an examination of global statistics that poor farmers in developing countries face particularly formidable obstacles to converting from conventional agriculture to organic agriculture. Whatever the merits of organic agriculture, there are huge risks entailed in the decision to begin practicing it and it is clear that most farmers, faced with a simple cost-benefit analysis based upon short-run market, *internal*, costs and prices, will shy away from doing so. It is therefore important to create an institutional setting which allows the *externalities* – the external costs and benefits - associated with organic conversion to be taken into account.

Thus policy designed to encourage organic conversion must first be based upon a profound recognition that conventional agriculture, when its total social costs are fully computed – to include both internal and *external* costs and costs both in the here-and-now and *in the future* – is an expensive form of agriculture and one which is becoming increasingly unsustainable both economically (as the bags of chemical fertilisers needed become ever more numerous) and environmentally (as each bag does ever more damage). The Chinese government recognised this early and began initiatives to change direction but the exigencies of food security and the high yields that chemical inputs promised meant that only very limited progress,

¹⁹ Visited by the authors in 2007 and 2009. Maotai is one of the most historically, culturally and economically significant state-owned enterprises in China. It is one of China's most famous 'red-chip' companies.

²⁰ Interview with Ms Cai Ying, Head of Raw Material Supply, Maotai Company, August 2007.

with various forms of sub-organic agriculture, was made as the application of chemical fertilisers increased alarmingly. By the early 1990's therefore, a new institution – the Organic Food Development Centre – was created to establish the necessary infrastructure to allow further opportunities for organic agricultural extension. Progress since then has been gradual but continuous.

That progress has been made because China has patiently built up the *institutions* favourable to organic agricultural extension. The 'institutions' include not merely appropriate government agencies and infrastructure – and the OFDC now operates directly under China's new Ministry of Environmental Protection, established in 2008 – but an educational and cultural environment in which ever larger numbers of Chinese, both consumers *and* producers in both the private and public sectors, are aware of the advantages to them *and to society* of organic food and are prepared to change their behaviour accordingly. Many of the actors involved are concerned, of course, to increase their own welfare – consumers want to eat healthier food, entrepreneurs and private food processing companies want to make more profits, farmers want higher and more secure returns for their products. But not all do so for purely self-interest. Maotai Company made the critical decision to source its raw materials from organic farmers because, according to Yuan Renguo, Chief Executive and Managing Director, he was persuaded that it was the "right thing to do"²¹. There was no immediate commercial advantage for Maotai, indeed, in the first instance, quite the opposite. But Maotai's decision is a crucial institutional development in the further extension of organic agriculture – not only has it directly created many more organic farmers, but it provides an example to other food processors in the public and private sectors, and puts the OFDC organic logo on every bottle of China's favourite white spirit.

To the extent the institutional setting in each developing country differs, China's increasingly successful model of organic agricultural extension may not be entirely appropriate for all others to follow. There will be a different path in each developing country²². But what is clear from China's example is that there is a need for the *active* development of institutions all pulling in the same direction to make organic agriculture sustainable over time. Given the difficulties for farmers of converting to organic agriculture, government policy, government agencies and institutes, environmental education, cultural development, public and private actors, even market forces are all part of the jigsaw and must play their part. Perhaps in some developing countries, an immediate leap from conventional to fully organic agriculture may be too great and that, as a first step, sub-organic forms of agriculture, with less dependence on chemical applications, needs to be tried. But institutional progress towards more ecological agriculture is absolutely necessary if the problems of chemical application are to be countered.

China's remarkable transition from plan to market over the last thirty years has been characterised as a process of "crossing the river by feeling the stones". The country's attempts at making organic agriculture sustainable can, we believe, be characterised in the same way. It is for each developing country to discover the particular 'institutional' stones necessary

²¹ Private Interview, 29 July 2009

²² See David Crucifix (1998) *Organic Agriculture and Sustainable Rural Livelihoods*, Soil Association, UK, which provides accounts of a range of different institutional barriers which organic farmers face in different developing countries

to allow it to cross the river successfully and ensure a sustainable future for its organic farmers.

About the Authors

Prof. Richard Sanders

Since 1993, when I was employed as an economics lecturer at Beijing Foreign Studies University, I have been researching environmentally friendly initiatives in the Chinese countryside. These initiatives include ecological agriculture, green food and organic agriculture. I gained my PhD. in 1998 with a thesis entitled “Prospects for Sustainable Development in the Chinese Countryside: the Political Economy of Chinese Ecological Agriculture.” Since then I have published widely in the areas of Chinese agricultural and rural development, environmental protection and property rights in China. I have made presentations in these areas at conferences in China, Japan, Australia, Berlin, Paris, Warsaw, Cambridge, London, Cambridge and Rome, the latter when I was invited by the UN Food and Agriculture Organisation (FAO) to talk to its first conference on Organic Agriculture and Food Security in May 2007. I continue to carry out fieldwork in the Chinese countryside in the field of organic agriculture as a Research Fellow of the Organic Food Development Centre in Nanjing, China. I was awarded the chair of Contemporary Chinese Studies at the University of Northampton in 2007.

Xingji Xiao

I have worked in the development of Chinese ecological and organic agriculture all my working life. I gained an MA in Soil Science in Canada in 1984, one of the first Chinese students to win a state scholarship to study abroad. I have been attached to the National Institute for Environmental Science since the late 1980s working in the area of ecological agricultural development in Nanjing. Soon after the initiation of the Organic Food Development Centre in 1993, I became its director and have remained in the post ever since. I have travelled extensively across the world as China’s representative in the promotion of organic agriculture and I have worked closely with other members of the International Organisation of Organic Agricultural Movements, my centre being a fully accredited member since 2003. I have travelled with Professor Richard Sanders on our field trips to Maotai, Guizhou, in 2007 and 2009.

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