

2014 International Year of Family Farming: a boost to evergreen revolution

P. C. Kesavan* and M. S. Swaminathan

The evergreen revolution aims at achieving productivity in perpetuity without accompanying ecological and social harm. The smallholder family farms with pro-nature, pro-poor and pro-women orientation provide a boost to the evergreen revolution. Revitalization of family farming traditions with emphasis on the empowerment of women and youth will enhance small farm productivity and profitability on the one hand, and nutrition-sensitive agriculture on the other. Family farms enhance the rural livelihoods. Corporate farming displaces three to four jobs for every single job created. Monocropping largely practiced by the corporate farms is not conducive to develop strategies to provide agricultural remedies to nutritional maladies in different agro-ecological regions.

Keywords: Corporate and family farming, evergreen revolution, hunger-free world, nutrition-sensitive agriculture.

THE declaration of 2014 as the International Year of Family Farming (2014 IYFF) by the United Nations General Assembly at its 66th Session in 2011, would help reposition family farming at the centre of the agricultural, environmental and social policies in the national agendas for embarking on a path of sustainable development to meet the 'Zero Hunger Challenge'. The Zero Hunger Challenge Programme aims to achieve a hunger-free world by 2025. It was launched in 2012 by the U.N. Secretary-General, Ban Ki-Moon. This challenge needs to be taken up earnestly with responsibility and accountability, especially in the backdrop of the failure to achieve several major targets of the Millennium Development Goals (MDGs). It is most unlikely that the number of extremely poor and hungry people in the world would be halved by December 2015, as envisaged in the first target of the first of the eight goals of MDGs. In a recent Guest Editorial¹ one of us (M.S.S.) has emphasized that the 'agricentric international years' assume importance in generating the necessary political action and public interest in fostering an ever-green revolution in agriculture to achieve productivity increase in perpetuity without associated environmental or social harm. The Guest Editorial specifies some of the major initiatives (i.e. soil health monitoring and amelioration, water security, conservation of genetic resources) for urgent action. It also suggests that 2014 IYFF should be used for the revitalization of family farming traditions with particular emphasis on the empowerment of women and young people, who can help improve small farm productivity and profitability on the one hand, and nutrition-sensitive agriculture on the other.

P. C. Kesavan and M. S. Swaminathan are in the M.S. Swaminathan Research Foundation, Chennai 600 113, India.

*For correspondence. (e-mail: pkesavan@mssrf.res.in)

Family farming has several attributes of the evergreen revolution for sustainable agriculture, rural livelihoods and climate resilience. The resource-poor smallholder family farms, however, need technological and knowledge empowerment as well as policy support for credit, land rights to the women farmers and market linkages favouring 'production by masses' rather than 'mass production' (i.e. industrial/corporate farming).

The concept of 'evergreen revolution' was conceived and defined in the 1990s by M.S.S. as 'achieving productivity in perpetuity without accompanying ecological harm'. He also stated: 'what nations with small farms and resource-poor farmers need is the enhancement of productivity in perpetuity without associated ecological or social harm. The Green Revolution should become an evergreen revolution rooted in the principles of ecology, economics and gender and social equity'². Today, the 2014 IYFF is indeed catalytic to the evergreen revolution.

History of family farming

Homo sapiens and its brethren species *H. neanderthalensis* (who suddenly became extinct about 40,000 years ago) have been hunter-gatherers of food since they appeared on this planet between 400,000 and 500,000 years ago. Both hunting and gathering of food ought to have been a 'family' (men, women and their descendants) activity. It is only about 10,000 years ago that humans made the transition from hunting and gathering food to cultivation of edible cereals and domestication of pet and farm animals. Taking a generation time of 25 years, only the last 400 generations of a total of about 16,000–20,000 generations of *H. sapiens* have been cultivators. Thus, the

history of humans as hunter-gatherers is quite long. The beginning of a warming period, 'Holocene' that commenced about 11,000 years ago coincided with the transition from hunting-gathering of food to cultivation of crops. It is not that the warming period directly influenced this transition. The reason is that *H. sapiens* ought to have experienced 3–4 warming periods earlier since their appearance on Earth about 400,000–500,000 years ago. Cold periods of about 100,000 years each are intervened by warming periods of about 10,000 years each (100 kyr period cycle)³. Hence, it could be more due to evolution of the intellectual capacities as well as gaining experience that led to the transition. The global population about 10,000 years ago was just 4 million. Food at regular intervals and freedom from risk of sustaining serious injuries leading to disablement and even death during hunting and gathering have played a significant role in the accelerated human population growth, which is now over 7 billion. During the last two centuries, technological advances have been thwarting the Malthusian predictions. This may not, however, go on forever.

The history of cultivation and domestication that took place in different continents and countries at varying periods before the advent of the Christian era reveals one thing in common, i.e. farming activities were essentially a family affair and community-centric. The Harappa and Mohenjo-daro excavations have provided evidence of farming with techniques of plough cultivation and irrigation about 2450–2300 BC. Apparently, men ploughed, and women following behind them, put the seeds in the furrows. The granaries discovered at Harappa and Mohenjo-daro suggest that women managed the storage of grains, as they do even now. Most of the post-harvest processing was done by women. Even in the United States, family farming has been the preponderant system of crop and animal husbandry. In his recent book⁴, Hladik describes how food begins from the family farms and ends with a fork on the family dining table. The family farms could be very large, about 100–250 ha as in USA and Canada, or just about 1.0 ha or even less as in India and several other developing countries. Big family farms with fewer family members as in USA and Canada necessitate the use of massive farm machines and implements powered by fossil fuel. On the other hand, small and largely resource-poor farms depend mostly on the manual labour of the family members and landless labourers to carry out agricultural operations such as ploughing, sowing, weeding, harvesting, etc. The work in the farms is shared by men and women. In India and several other developing countries, women manage the farm animals, especially milking the cows, selling milk and its processed products (butter, ghee, etc.). Women also take care of the management of feed and water for the animals. They also collect dung and urine both for keeping the animal sheds clean and also using these for preparing manure; cow dung is also used as 'green energy' for cooking purposes.

Rural women play a major role in all these sustainable development activities.

Advantages of family farms

A point made by Hladik and several others is that family farms integrate social, ecological and economic dimensions of sustainable agriculture in contrast to industrial/corporate farming. The International Food Policy Research Institute in its 'IFPRI-2007 Discussion Paper 42' (ref. 5) has shown that small holdings are typically operated by members of poor households who use a great deal of manual labour, draught power of farm animals both from their own households and from their equally poor or poorer neighbours. These different valuable assets of small family farms have been summarized by one of us (M.S.S.) recently⁶: 'Smallholder agriculture is practiced by families (including one or more households) using only or mostly family labour, and from the work, they derive a large but variable share of their income, in kind or cash. In fact, smallholding is the foundation of food security in many countries and it is important in the socioeconomic and ecological landscape in all countries. With urbanization, integration and globalization, this sector is undergoing great changes.' This last sentence is the crux of the concerns for analyses and appropriate action during 2014 IYFF.

Corporate farming vis-à-vis family farming

The corporate farms invariably practice monocropping with intensification of inputs that are largely chemically derived. The goal is to use improved, high-yielding varieties of crops and exploit their high yield potential by applying huge amounts of inorganic chemical fertilizers, copious irrigation mostly using groundwater and energy from fossil fuel. They also drastically reduce the manpower on the farms. It promotes jobless economic growth. Data from the United States show that corporate farming only creates 9.44 jobs displacing 27.97 (ref. 7). This is also reflected in the fact that back in 1900, about 39% of the US population worked on farms, and today, only about 2% of all Americans are working on farms. USA has a population of just about 312 million and has an unemployment rate of about 9%. Judged against this background, the adverse impact on employment/livelihood by corporate farming in the Indian situation could be quite drastic, since hunger and malnourishment of millions of people in India, especially in the rural areas, is on account of famine of livelihoods. So, corporate farming would only increase the number of women and men without income-generating livelihoods. Without livelihoods, there will be a sharp rise in poverty-related hunger and malnourishment. A recent estimate by the Rangarajan panel puts the number of poor people in India at 363 million

(i.e. about 30% of the country's population), although this figure is disputed. Even if the number of poor people is put at about 250 million, it is still the highest for any country in the world. Corporate farming will increase and not reduce the number of poor people. And poverty is the root cause of hunger and malnourishment. Thus, corporate farming largely fails on both the ecological and social dimensions of sustainable development.

The monocropping system adopted by corporate farms cannot provide agricultural remedies for maladies caused by nutritional deficiencies. Once the nature of nutritional deficiencies is identified, appropriate vegetable, fruit or any other edible plant species can be included in the cropping system of the family farms, so that these are also included in the daily consumption. Along with cereals, oilseeds and pulses, several horticultural plants such as sweet potato, bread fruit, various berries, and citrus species which are rich in micronutrients and vitamins could be cultivated in the family farms. There are plant species specifically noted for high levels of iron, iodine, zinc and vitamin A. Such naturally biofortified plant species which are not the major concern of industrial farming would enhance the economic and health benefits of family farms. A family farm with such a diverse plant source of carbohydrates, fats, proteins as well as micronutrients is wholesome both in the macro- and micronutritional needs of the family members and other consumers.

From the time of preparing the land, sowing, raising the crops, and post-harvest processing until the food is put on the dining table, the labour involved is shared between women and men of the families. Manual labour supplemented with draught power provided by farm animals greatly reduces the need for fossil fuels.

Weeding is mostly done by women members of the family. Landless women from the neighbourhood may also join to earn livelihoods. Family farms which raise landraces and indigenous varieties of diverse crop species are more resilient to the extreme hydro-meteorological events (floods, droughts, cyclones, etc.), which are increasing both in frequency of occurrence and destructive potential because of climate change.

Another major ecological as well as socio-economic benefit associated with family farming comes from the inclusion of farm animals for milk, eggs, meat and draught. Women take up much of the work such as managing feeds for the animals, milking the cows, collecting urine and dung for making manure and/or 'green' fuels for cooking. The dried cow dung is used as fuel for cooking. In a more advanced system, 'cooking gas' is produced from cow dung. All these different aspects of work associated with family farming have pro-nature, pro-poor, pro-women, pro-livelihood and pro-renewable energy dimensions. The crops-plus-animals-based agro-systems are still prevalent, although threats to these highly sustainable family farming systems are increasing in scale and intensity.

Cropping systems in the family farms are not monotonously uniform. In fact, these vary widely depending upon the local cultural, culinary and curative needs. For example, the different varieties of rice grown in smallholder farms in Kerala, Odisha and the North East are cultivated for specific needs and occasions as follows:

- (i) 'Kala jeera' rice – in Odisha and the North East (Imphal) to prepare a sweet dish ('kheer') on certain festive occasions.
- (ii) Medicinal rice – in Kerala for curative purposes; for example, 'Navara' rice for concocting medicinal preparations to cure arthritis, joint pains, etc.
- (iii) 'Basmati' and other scented rice, as well as long grain rice are used for making specific dishes with meat or vegetables. In fact, the specificity is so high that one variety cannot substitute another to serve a particular purpose. For example, 'basmati' rice is most suitable to make 'pulav' or 'biryani' and not 'curd rice'. Corporate farms are hardly designed to cater to the various culinary, cultural and curative needs.

While agriculture in any form is not entirely benign to the environment, family farming is certainly in greater harmony with the natural ecosystems. The family farms include cultivation of nitrogen-fixing leguminous crops. Crop rotations and multiple-cropping systems help in managing pests below an 'economic injury level'. Conservation of biodiversity rules out eradication of species, including pests. With vegetable and fruit crops alongside cereals, pulses, oilseeds and fodder, the beneficial organisms in the soil (e.g. earthworms, nitrogen-fixing bacteria, etc.) and above the soil (e.g. pollinator insects, predators, parasites) flourish. Thus family farming is indeed a kind of farming with landscape/nature. Since no toxic residues of chemical pesticides are left in the soil, plant parts and water bodies, the health risk (e.g. cancer) to the family farmers and the neighbours is exceedingly low. The soil health in several smallholder farms could be poor for want of resources such as biofertilizers, manures, etc. but is not degraded beyond repair as it happens with intensification of agriculture with chemical inputs and fossil fuel-based energy.

Threats

Family farms have both national as well as global threats and challenges. The first is the myth that productivity increase (kg/ha) in crops cannot be achieved in smallholder farms. The basic question here is whether smallholder family farms can substantially increase the yields. In the past decade, significant progress towards sustainable agroecosystems has taken place mainly in the developing countries. Pretty⁸ has discussed in detail the effects of

sustainable agriculture on yields. A very large study comprised the analysis of 286 projects in 57 countries. It was found the mean relative yield increase was 79% across a wide variety of systems and crop types. Further, the smallholder farms can practice eco-friendly intensification with 'green' inputs (biofertilizers, biopesticides) and largely renewable energy (cow dung gas, wind and solar). This is called 'sustainable intensification'. The process of achieving the yield gains may, however, be slower than in the case of 'chemistry-based intensification of agriculture', but the former is not 'exploitative'; 'sustainable intensification' (including green agriculture) is acceptable within the purview of evergreen revolution.

Although the smallholder family farms are inherently eco-friendly and socially equitable, they still need the benefits of continuously advancing new technologies as well as market and policy support in order to enable them to slash mass poverty, and to promote food and nutrition security by farm-based progress. Thousands of resource-poor small farms require soil health care. Without proper soil health monitoring and necessary ameliorative steps, soil health to support crop growth remains poor. Often, the resource-poor small farmers are misled by the fertilizer dealers to apply those fertilizers which they want to sell, and not what the soil is hungry for. Hence, one of us (M.S.S.) has suggested setting up in every block of the country a Soil Health Monitoring and Amelioration Centre. It can also help farmers in the effective utilization of nutrient-based subsidies. Young agricultural graduates could be employed in such centres, including the agribusiness centres and agri-clinics for farm animals.

The smallholder family farmers also require technological support for community-centric rainwater harvesting, conservation and efficient use. The smallholder farms would greatly benefit from proactive support in the conservation of precious genetic resources, for achieving sustainable food and nutrition security, especially in view of extensive environmental degradation and climate change. Particular attention is necessary to conserve animal genetic resources. Several cattle breeds have already been lost. Small family farms owning and conserving the endangered animal breeds should be given appropriate incentives and recognition.

The corporate farms have little space for women farmers. On the other hand, the family farms have traditionally placed a heavy share of workload and responsibility on the shoulders of the women members. Yet, these women do not have the right to land. The women-managed small family farms are handicapped for credit, technological support, etc. When the women operated/managed family farms fail, the result is the 'feminization' of poverty and undesirable social consequences. Hence, M.S.S. who was a Member of the Rajya Sabha introduced a Bill, 'The Women Farmers' Entitlements Bill, 2011' in the Rajya Sabha on 11 May 2012. Its purpose is to provide for the gender-specific needs of women

farmers, to protect their legitimate needs and entitlements, and to empower them with rights over agricultural land, water resources and other related rights and for other functions relating thereto and for matters connected therewith. There can be no families without women and no family farms either.

One of the major disadvantages of the smallholder farms is the lack of power of economy of scale. On the criterion that smallholder farms largely practice 'near organic' or 'green agriculture' (that uses very small proportion of chemical fertilizers and chemical pesticides) following the Integrated Nutrition Management and Integrated Pest Management respectively, it is expected that their produce should fetch higher prices than those produced in the factory farms. However, that is not the case. Among a few reasons, one is that the produce is not directly sold to the consumers, but to traders (middlemen), who buy from the small farmers at very low prices, and sell these with several-fold profit to the consumers. This problem could be greatly mitigated through the formation of cooperatives which pool the produce from individual family farms and manage the marketing aspects. The farmers should get fair prices. The milk cooperative set up by late Verghese Kurien is an example. Milk is purchased from thousands of rural women who have a few cows/buffaloes. They take the milk to the collection centres where they are also immediately paid the cost of milk. It results in pooling an ocean of milk on the one hand, and ensuring livelihood security for women on the other. The National Commission on Farmers in its report submitted in 2007 to the Ministry of Agriculture, Government of India, has recommended the promotion of commodity-based farmers' organizations like Small Cotton Farmers' Estates, Small Farmers' Horticulture Estates, Small Farmers Medicinal Plant Estates, etc. in order to combine the advantages of decentralized production and centralized services, post-harvest management, value-addition and marketing for leveraging institutional support and facilitating direct farmer-consumer linkage. Distress sale by small and marginal farmers at discounted prices for immediate cash is a serious problem which could be countered to some extent by liberalizing pledge loans against produce stored in godowns/farmer's own home.

The industrial farms growing potatoes and onions could have their own cold storage facilities and they can sell the produce at higher profits when demand is more and supply is less. The smallholder farms cannot afford to do so. They do not even have proper storage facilities. Therefore, the public (government) support to smallholder farms should be to provide cold storage facilities, improving the warehousing systems, facilitating loans against warehouse receipts, etc.

The advantage of cooperatives of smallholder family farms is that it can also open up avenues for undertaking ecological farming techniques like integrated pest

management and integrated natural resources management, group credit, group insurance, improved post-harvest technology, water harvesting and water sharing, and establishment of Village Knowledge Centres (VKCs) based on modern information and communication technologies. In the ultimate analysis, farmers (especially youth from family farms) will need opportunities for assured and remunerative marketing. That alone can sustain farmers' interest in farming, particularly family farming. The farmers' cooperatives, if designed with pro-small farmer and pro-women orientation, will help trigger a nationwide movement. The World Trade Organization should appreciate that smallholder family farms are important for the following reasons:

- These are inextricably linked to world food security.
- These preserve traditional food products while contributing to a balanced diet and safeguarding the world's agro-biodiversity and the sustainable use of natural resources.
- These also contribute to local economies, and rural livelihoods more substantially than industrial/corporate farms.

Family farms to meet the 'zero hunger challenge'

It is pointed out that meeting the Zero Hunger Challenge should include attention to hidden hunger, caused by the deficiency of micronutrients like iron, zinc, iodine, vitamin A and vitamin B12. M.S.S. also suggested that one of the future agri-centric international years could be designated as the 'International Year of Bio-fortification and Under-utilized Crops'. His list of naturally bio-fortified plants includes *Moringa*, sweet potato, breadfruit, and a wide variety of fruits and vegetables which can readily be cultivated in the smallholder family farms and even in the kitchen gardens. The family farms located in the rainfed regions are likely to come under greater stress due to erratic monsoons, especially due to intensifying climate change. Pulses rich in proteins and underutilized nutritious millets (e.g. pearl millet) fortunately do not require plenty of freshwater for irrigation. Pulses (grain legumes) provide protein to humans (especially the vegetarians) and fix biological nitrogen for the health of soils.

The corporate farming vis-à-vis family farming also needs to be considered from the point of their contribution to the ever-widening inter-generational inequity for resources. Among these, 'land' both in quantity and quality is becoming an alarmingly shrinking resource. Apart from displacing the resource-poor small and

marginal farmers from their land (their soul), and the intensification of cultivation practices (exploitative agriculture), corporate farming leads to degradation of soil, inadequate recharging of groundwater, loss of biodiversity, and poor mitigation and adaptation to climate change. All these will lead the succeeding generations to have progressively decreasing resources for their own development, in fact, survival.

In conclusion, family farming that has several principles and practices in common with the evergreen revolution should have all the technological, financial, policy and market support so that the food and nutrition security can be maintained in perpetuity. 'Zero hunger' cannot be achieved only with building buffer stocks in warehouses; it also requires livelihoods for getting access to food and micronutrients to eliminate 'hidden hunger'. That corporate farming in the current situation of India and several developing countries cannot ever match the family farms in achieving 'zero hunger', needs to be widely appreciated by the policy makers, politicians and lay enlightened citizens.

Family farming that has all the ingredients and farming principles of the evergreen revolution is the best option to achieve 'zero hunger' that includes the hidden hunger as well. It is to be noted that E. O. Wilson, Harvard biologist of rare distinction has lauded M.S.S.'s concept of evergreen revolution as the best option available to feed the burgeoning human population and at the same time conserve the rest of life in his book *The Future of Life*⁹.

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