

Ikerd, John

**Working Paper**

**Family farms of North America**

Working Paper, No. 152

**Provided in Cooperation with:**

International Policy Centre for Inclusive Growth (IPC-IG)

*Suggested Citation:* Ikerd, John (2016) : Family farms of North America, Working Paper, No. 152, International Policy Centre for Inclusive Growth (IPC-IG), Brasilia

This Version is available at:

<https://hdl.handle.net/10419/173807>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*



# WORKING PAPER

working paper **number 152**  
december, 2016

ISSN 1812-108x

Published by the Food and Agriculture Organization of the United Nations and the  
International Policy Centre for Inclusive Growth of the United Nations Development Programme

## Family farms of North America

John Ikerd, University of Missouri-Columbia



Food and Agriculture  
Organization of the  
United Nations



*Empowered lives.  
Resilient nations.*

International Policy Centre for Inclusive Growth (IPC-IG) Working Paper No. 152

**Family farms of North America**

By John Ikerd

This publication is part of a series of Working Papers produced in the context of the International Year of Family Farming, helping to inform regional discussions and debates about the phenomenon worldwide.

Published by the Food and Agriculture Organization of the United Nations and the United Nations Development Programme.

© FAO and UNDP, 2016

All rights reserved.

Developed in Brazil by the International Policy Centre for Inclusive Growth (IPC-IG)

*The International Policy Centre for Inclusive Growth is jointly supported by the United Nations Development Programme and the Government of Brazil.*

**International Policy Centre for Inclusive Growth (IPC-IG)**

United Nations Development Programme

SBS, Quadra 1, Bloco J, Ed. BNDES, 13º andar  
70076-900 Brasília, DF - Brazil  
Telephone: +55 61 2105 5000

[ipc@ipc-undp.org](mailto:ipc@ipc-undp.org) ■ [www.ipc-undp.org](http://www.ipc-undp.org)

The designations employed and the presentation of material in this information product do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations (FAO), or of the United Nations Development Programme (UNDP) concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. The mention of specific companies or products of manufacturers, whether or not these have been patented, does not imply that these have been endorsed or recommended by FAO, or UNDP in preference to others of a similar nature that are not mentioned. The views expressed in this information product are those of the author(s) and do not necessarily reflect the views or policies of FAO, or UNDP.

FAO and UNDP encourage the use, reproduction and dissemination of material in this information product. Except where otherwise indicated, material may be copied, downloaded and printed for private study, research and teaching purposes, or for use in non-commercial products or services, provided that appropriate acknowledgment of FAO and UNDP as the sources and copyright holders is given and that neither FAO nor UNDP endorsement of users' views, products or services is implied in any way.

All requests for translation and adaptation rights, and for resale and other commercial use rights should be made via [www.fao.org/contact-us/licence-request](http://www.fao.org/contact-us/licence-request) or addressed to [copyright@fao.org](mailto:copyright@fao.org).

FAO information products are available on the FAO website ([www.fao.org/publications](http://www.fao.org/publications)) and can be purchased through [publications-sales@fao.org](mailto:publications-sales@fao.org).

UNDP/IPC-IG publications are available online at [www.ipc-undp.org/publications](http://www.ipc-undp.org/publications) free of charge.

ISBN: 978-92-5-109474-7 (FAO)  
Print ISSN: 1812-108X

IPC-IG Working Papers are available online at [www.ipc-undp.org](http://www.ipc-undp.org) and subscriptions can be requested by email to [ipc@ipc-undp.org](mailto:ipc@ipc-undp.org).

# FAMILY FARMS OF NORTH AMERICA

John Ikerd<sup>1</sup>

## 1 FAMILY FARMS HELD IN HIGH ESTEEM

Historically, family farms held positions of respect and high esteem in the dominant cultures of North America and in much of the rest of the world. The first family farmers in North America were the indigenous peoples who had lived on the continent for centuries before the arrival of Europeans. Most depended primarily on hunting and gathering, but farming was common among many of the tribes of North America. These indigenous family farmers, like the early family farmers of Europe, usually included extended families. The families agreed on informal divisions of labour and divided the resulting production among kin groups within larger communities that farmed particular areas (Albritton 2012). An extended family might tend a specific land area, giving it some sense of ownership or rights; however, there was no real sense of private property. Most farming areas were considered 'common property' where all families could graze animals or farm cooperatively.

The indigenous farmers in what is now the United States (USA) and Canada were displaced by immigrants from Europe. Among the early European settlers, farmers held positions of distinction in their communities. The very survival of these early agrarian societies depended on the ability of farmers to produce enough food to meet the needs of all. Unlike Europe, there were no landlord classes with large estates or landholdings in the USA or Canada. The plantation agriculture of the US South prior to the 1860s Civil War was the exception rather than the rule. Family farming became rooted deeply in the cultures of both countries. The status of family farming in early Mexico was quite different. Indigenous Mexican farmers became unwilling workers, many virtual slaves, on large Spanish landholdings that were patterned after European feudal estates. Perhaps as a consequence, family farming in much of Mexico today still resembles the extended family, common property patterns of indigenous North America.

---

1. This paper was prepared by John Ikerd, Professor Emeritus of Agricultural and Applied Economics, University of Missouri-Columbia. Jennifer Sumner of the University of Toronto, Spencer Wood of Kansas State University and Lisa Griffith of the National Family Farm Coalition reviewed earlier drafts of the paper and suggested revisions. The author is grateful for their suggestions but accepts full responsibility for the content of the paper, including errors of omission or commission, as well as for all conclusions and recommendations included in the paper.

Thomas Jefferson, the third president of the USA, believed strongly that the 'yeoman farmer' best exemplified the kind of 'independence and virtue' that should be respected and supported by governments. He did not believe that financiers, bankers or industrialists could be trusted to be caretakers of democracy and, therefore, should not be encouraged. Adam Smith, an icon of capitalism and author of the classic *The Wealth of Nations*, influenced the early development of both the USA and Canada. He observed that farmers ranked among the highest social classes in China and India, and suggested it would be the same everywhere if the 'corporate spirit' did not prevent it. Smith never trusted businessmen to serve interests other than their own, and held a particular distrust of corporations.

Smith's reference to China was to the ancient philosophy of Confucius, which ranks farmers second only to academics or scholars in the Chinese social order. Following the farmer are the worker and, lastly, the businessman. Smith also suggested that "they who feed, clothe, and lodge the whole body of people, should have a share of the produce of their own labor as to themselves be tolerably well fed, clothed, and lodged" (Smith 1776). All of these respected historical figures placed those engaged in agriculture, who were family farmers, at or near the top of society and those concerned primarily with matters of economics and business at the lowest levels of society.

## 2 THE FAMILY FARM DEFINED

### 2.1 LACK OF CONSENSUS

Over the centuries, families obviously have continued to farm, but no generally accepted definition of the 'family farm' has emerged, in North America or elsewhere. Some of the commonly used statistical indicators of family farms were outlined in a 2014 report of the 'Dialogue of Family Farming in North America' (UPA and FAO 2014):

- source of the labour on the farm: whether provided by the family, paid employees or some combination of the two;
- source of capital: whether provided by the nuclear family, extended family or non-farm investors;
- primary decision-maker: whether independent operator, user of licensed technologies or contract producer of crops or livestock;
- land tenure status of the operator: whether resident owner-operator, multi-year share-leaser, multi-year cash leaser or renter from farm resident or non-resident landlord;
- legal ownership of the farms: whether single proprietorship, partnership, family corporation or publicly traded corporation; and
- primary destination of production; whether for family use, local or regional market, international niche market, domestic commodity market or international commodity market.

The likelihood of a farm being a true 'family farm' decreases along these statistical gradients: from family labour to paid employees, family capital to non-farm investments, independent operator to contract producer, land owner to cash renter, single proprietor to corporation, and producing for families and local markets to producing for international

markets. As relationships between the family and farm become less personal, the sense of interconnectedness of the family and farm decreases. The most commonly used criteria are probably the proportion of permanent labour provided by the farm family, the ability of the farmer to make day-to-day management decisions, and whether the farmer is a resident owner-operator or rents from a non-resident landlord. The family that provides the labour for a farm, makes the farm management decisions and owns and lives on the farm is more likely to feel a deep, personal sense of connectedness to the farm, which characterises true family farms. At some point along the continuums, the farm becomes a farm business rather than a family farm.

True family farmers have a strong 'sense of place'. Ultimately, the interconnectedness of the family with the farm is what makes a farm a 'family farm' and a family a 'farm family'. On a true family farm, the farm and the family are inseparable. The same farm with a different family would be a different farm, and the same family with a different farm would be a different family. The landscape, the local climate, the community—'the feel of the farm'—become engrained in the family culture. The family and the land are inseparable parts of the same whole; the family farm is an emergent property of that whole. The family farm and the farm family both have characteristics that emerge when the family connects with the farm and no longer exist if the family leaves the farm. That is why families cling to farms that have been in their families for decades. Some have even committed suicide when they were forced to leave their farms.

Family farmers also have a strong 'sense of family'. Family farms can be good places to raise children and to sustain family relationships—both within and among generations. Farm family members who work together obviously have an opportunity to spend more quality time together than do most other modern families. Working, child-rearing, recreation and family life all happen at the same time and place—on the farm. Children who contribute to the chores on family farms grow up knowing they are valuable and valued as productive participants in the work and life of the family. Feeling valued gives them a better chance of developing a healthy sense of self-esteem or self-worth. Family farms survive and thrive by creating and sustaining the kind of positive, caring personal relationships that are essential aspects of strong families.

Family farmers also have a strong 'sense of community'. The farm is a reflection of the social and ethical values of the farm family in the community, and the community often forms its opinions of the family in relation to their farm. If the farm is operated in ways that are either respectful or disrespectful of others in the community, the family is accordingly considered either responsible or irresponsible members of the community. Farm families often identify themselves, are identified by others and identify others in terms of networks of familial, social and economic relationships within communities. More than 50 years of social science research has validated that US communities characterised by small to mid-size family farms tend to be better places to live, both economically and socially, than are communities dominated by large farming enterprises (Stofferahn 2006).

Obviously, all family farms do not have all of the positive characteristics associated with sense of place, family and community. But they have the potential to do so. It is the positive 'potentials' of family farms, not their past or present reality, that make them important to the families who choose this way of life, to their communities, to the sustainability of agriculture and the future of humanity.

## 2.2 MULTIFUNCTIONALITY

With respect to the future, the most important descriptors of family farms relate to their multifunctionality, because multifunctionality is essential for sustainability. Sustainability may well be the defining question of the 21<sup>st</sup> century, and nowhere is sustainability more important than in agriculture. Sustainability is the ability to meet the needs of the present without diminishing opportunities for the future—paraphrasing the United Nation’s Brundtland Commission’s definition of ‘sustainable development’ (Brundtland 1987). A civilisation that cannot feed itself, in the present or future, obviously is not sustainable. A sustainable agriculture must be able to meet the needs of the present while maintaining the ecological and social integrity of the natural and human resources upon which its long-term productivity ultimately depends. Societies that cannot meet their needs through purely personal relationships must rely on impersonal economies that extend beyond their realm of personal relationships. Thus, a sustainable agriculture must be ecologically sound, socially responsible and economically viable: it must be multifunctional.

Farms are inherently multifunctional in that they have inherent economic, ecological and social consequences. Sustainable family farms are special in that they are *intentionally* multifunctional. They are managed to provide multiple benefits. Multifunctional family farms are not simply a means of economic livelihood for the family; they also are a social and ethical way of family life. They provide social and economic benefits to their communities and societies as well as to their families. They provide ecological benefits to communities, societies and humanity through ethical stewardship of the land, water, air and energy of the earth. Family-owned and -operated farms that are managed solely or predominately for the economic benefit of the family are managed as *mono-functional* family farms, even though they have inevitable multiple effects on communities and ecosystems. Such farms are not sustainable. The family farms idealised by Jefferson, Smith and others as being uniquely worthy of high esteem were *multifunctional* family farms.

## 3 EVOLUTION OF FAMILY FARMING IN NORTH AMERICA

### 3.1 ENCLOSURE OF THE COMMONS

The evolution of family farming in North America has been a continuation of trends begun in Europe in the 16<sup>th</sup> century. In his classic book, *The Great Transformation*, economist Karl Polanyi (1944; 1957) explains the historical consequences of ‘enclosing the commons’, or privatising farmland, as a means of ‘commodifying’ or giving economic value to land and labour. Prior to the enclosure movement, European families had free access to farmland. As in indigenous North America, extended families may have felt some sense of ‘use rights’ to the particular parcels of land they had tended over time, but there was no formal ownership of land as ‘private property’. Everyone had an equal right to use land in the commons to meet their basic needs for survival and sustenance. Uses of land for other purposes were determined by community consensus, not by markets.

Prior to the enclosures, market transactions had been limited primarily to international trade. The primary means of meeting basic physical or material needs were through subsistence farming and local gifting economies. Barter was generally limited to trade among people who did not have ongoing personal relationships. However, international markets had proven very effective

in increasing the aggregate wealth of nations, as suggested by Adam Smith and other early capitalists. Markets had allowed individual countries to capitalise on their economic 'comparative advantages'. Enclosing the commons would also allow individuals and villages to capitalise on their comparative economic advantages by responding to market incentives. This was consistent with prevailing economic thinking in Europe at the time and persists still today.

To allow markets to determine land use, farmland had to be privatised or commodified so that it could be bought and sold and thus reallocated among buyers and sellers to ensure its highest economic use. The use of various parcels of land could then be determined by market competition rather than community consensus. The commodification of land, or allowing markets to establish the value of land, essentially forced the commodification of labour as well. Those who lost access to land and the ability to grow their own food were forced to sell their labour to employers, not only to thrive economically but to survive physically. This fundamentally changed the nature of family farms, farming in general and, ultimately, the history of humanity.

People are inherently unequal in their ability to earn money in market economies. Each person has a different set of physical and mental capacities, aptitudes and opportunities, and initial endowments of financial and physical resources. However, all people have the same basic needs for food, clothing, shelter and other necessities of life. The enclosures of farmland left many people without the ability to earn enough money to buy food for their families. Nonetheless, enclosures of the commons spread across Europe. "The years between 1760 and 1820 [were] the years of wholesale enclosure in which, in village after village, common rights are lost" (Thompson 1991). For the first time, able-bodied workers were left poor and hungry in communities where their neighbours were wealthy and well fed. The enclosures in Europe, and the resulting poverty and hunger, were a significant factor in the mass migrations of Europeans who settled initially in the eastern regions of North America.

### 3.2 EUROPEAN MIGRATION

Farm families that migrated from Europe to the USA and Canada, with the backing of their governments, carried out their own form of enclosure by forcing the indigenous people off their land, privatising farmlands on the frontier, and eventually resettling the Native Americans on reservations (Albritton 2012). The farmland typically was divided into parcels that a single family could manage with the technologies of the times. These early European family farmers generally relied heavily on family labour. The land had not been farmed intensively, and thus the soils in most areas were still fertile and productive. Since these early family farmers produced food primarily for their own families and local communities, they had little incentive to increase productivity beyond the land's natural capacity.

The westward expansion of European settlements in North America was marked by major political events such as the Louisiana Purchase of 1803, which included much of what is now US territory west of the Mississippi River, and the US-Mexican War, which followed the annexation of Texas in 1845. The economic roots of industrial agriculture in the USA can be seen in the westward migration which followed, particularly during the 1860s. Prior to this time, farming was the predominant way of life in North America, and most farms were clearly family farms. In 1860, farm families made up close to 50 per cent of the US population, and farmers were nearly 60 per cent of the workforce (US Department of Agriculture 2014a). When President Abraham Lincoln established the US Department of Agriculture in 1862,



he called it the “people’s department”. Like Thomas Jefferson before him, he was reaffirming the ‘yeoman farmer’ as the foundation of a democratic society.

Farm sizes had begun to increase by the mid-1800s, as farms on the US and Canadian prairies began to mechanise and expand production to provide food for growing populations in the east. Improved storage and transportation also meant that the grain surpluses could be traded abroad. Trade was particularly important in Canada, as agriculture became part of its staples economy supplying the ‘mother country’, England. This expansion of production and trade was the germination of agricultural industrialisation, which is generally associated with the era after the Second World War. The industrialisation of agriculture probably ranks second in historical importance only to the initial domestication of plants and animals (Albritton 2012). The industrial revolution in agriculture eventually transformed millions of North American farms from multifunctional ways of life into mono-functional farm businesses.

### 3.3 FROM FAMILY FARMS TO FARM BUSINESSES

The US Homestead Act of 1862 opened new land for farming in the Great Plains, enclosing lands that had continued to be occupied by Native Americans until then. Homesteads were initially limited to 160 acres, which was considered enough to sustain a family. In the early 1900s, homesteads were expanded to 320 acres for dry land farming and to 640 acres for livestock production. The intent at the time was not necessarily to expand agricultural production but, instead, to expand control over the continent through occupation. However, much of the homesteaded land eventually fell into the hands of large landowners and land speculators. With completion of the transcontinental railroad in 1869, the midlands of the USA were opened for business, including agribusiness. Between 1870 and 1890, the number of farms in the USA grew by 80 per cent, to 4.5 million (US Department of Agriculture 2014b).

The Canadian government sold land on its western prairies for CAN10 per acre instead of offering it for homesteading. As in the USA, a quarter-section or 160 acres was considered the basic farm settlement unit (Faculty of Agriculture and Food Science, University of Manitoba 1994). The Canadian prairies failed to draw many land buyers until 1900, more than a decade after completion of the transcontinental railway in 1885. Overproduction of agricultural commodities coupled with the economic ‘Panic of 1893’ led to a collapse in export markets and widespread farm bankruptcies. The economic depression continued through the 1890s, halting the expansion of farming in the USA as well as Canada. By 1900, only 2 million more hectares on the Canadian prairies had been cleared and ploughed. Between 1881 and 1901, the number of Canadian farms only grew from 10,000 to just over 55,000.

The historic economic ‘high-water mark’ for US and Canadian agriculture came in the period between 1909 and 1918. Agricultural commodity prices were buoyed by strong export demand and the booming US and Canadian economies during the build-up to the First World War (ibid.). Prices of agricultural commodities rose to levels that have not since been equalled in terms of ‘parity’ or buying power of farm commodity sales. Between 1901 and 1921, 200,000 new farmers settled on the Canadian prairies, and by 1921, 16 million hectares of prairie lands were brought under cultivation. The number of US farms peaked at nearly 6.5 million in 1920 (US Department of Agriculture 2014c), and there were over 700,000 Canadian farms in 1921 (Statistics Canada 2009). The average farm size in the USA in 1920 was still only 140 acres. In Canada in 1921 it was somewhat larger at 198 acres.

Farmer cooperatives played a significant role in the evolution of farming in Canada and in the northern tier of states in the USA. Farmers in the Canadian prairies and the US Great Plains were dependent on corporate grain merchants and the railroads to get their grain to eastern markets. They were dependent also on bankers, implement manufacturers and local merchants to provide them with credit and other means of industrial production. To protect themselves against exploitation, they joined together in various cooperative organisations to gain bargaining power and provide their own services and means of production. New institutions, such as the United Farmers of Alberta, were “openly organized to protest the power of railroads, bankers, and grain merchants” (MacPherson 1979).

Grain growers were the first to make large-scale cooperatives work in North America. They were guided by the Rochdale principles of cooperation pioneered earlier in Europe, including democratic control, education and information, and concern for communities (Wikipedia 2014a). They addressed “both the economic and social problems that family farms faced” (MacPherson 2009). Cooperatives were not limited to grain but also included dairy, fisheries and a variety of other commodities. Service and bargaining cooperatives met the needs of farmers, and retail food cooperatives met needs of consumers. Over time, government programmes took over some of the functions of early cooperatives, and other cooperatives eventually evolved into mono-functional economic corporations. Nonetheless, cooperatives were a significant aspect of the evolution of family farming in North America and may have an even more important role to play in the future.

Continued mechanisation and persistently profitable prices led to surplus agricultural production at a time when the global economy was falling into the post-war economic recession of 1920–1921. This signalled the beginning of two decades of depressed agricultural commodity prices and farm incomes. The dustbowl of the Great Plains and the consequent western agricultural migration are parts of the sad legacy of this era. Farm numbers remained stable in both countries during the Great Depression of the 1930s. It took the wartime economy of the 1940s to return US and Canadian farmers to positions of economic respectability. However, farming in North America has never regained its lofty economic status of the early 1900s.

### 3.4 AGRICULTURAL CONSOLIDATION

Following the Second World War, millions of US and Canadian farms were destined to become farm businesses, and agriculture was soon on its way to becoming an industry. Wartime technologies developed to produce munitions, poison gas and tanks were soon adapted to produce chemical fertilisers, pesticides and farm equipment. During the 1950s and 1960s, capital and technology replaced labour and management, and farms were consolidated into larger and fewer farm businesses. By 1970, the number of farms in the USA had dropped by more than a half from its peak, leaving only 2.8 million farms (US Department of Agriculture 2014d). The surviving farms averaged 390 acres, nearly three times as large as in the 1920s. The number of Canadian farms peaked at 732,000 in 1941 but dropped by a half to 366,000 by 1971. Canadian farm size nearly doubled during this period from 237 acres to 463 acres (Statistics Canada 2009).

North American agriculture was ripe for the economic euphoria that arose from expanding export markets during the 1970s. On the advice of then US Secretary of Agriculture Earl Butz, farmers planted fencerow-to-fencerow and then tore out the fencerows, windbreaks

and anything else that stood in the way of industrial farming. North American farmers were going to provide food for the booming global economy, and there seemed to be no limit to continuing agricultural prosperity. However, the agricultural experts failed to anticipate the global economic recession of the 1980s, which dried up export markets and caused commodity prices to plunge. Farmers were caught with large debts at record-high interest rates, with prices too low to cover their financial commitments. North American agriculture was confronted with the 'farm financial crisis of the 1980s', as it is still called by those who remember the devastation of rural areas that occurred during that time.

Roughly a quarter of the remaining farms in the USA went out of business during that decade. Farm numbers fell to around 2 million and have since remained at that general level. The decline in farm numbers during the 1980s in Canada was less dramatic than in the USA, but Canadian farm numbers continued to decline to 205,000 in 2011. The average farm size in the USA is now 421 acres, and Canadian farms average 778 acres, with large farms and ranches on the Canadian prairies accounting for much of the difference.

The agricultural transformation has been even more profound than indicated by the drop in farm numbers and increase in farm size. The survivors were mostly in two groups: smaller family farms on which farming had remained a way of life, and larger specialised farm businesses that had prospered during the 1970s. Those who suffered most were on mid-sized, full-time family farms. The trend toward fewer traditional mid-sized family farms has continued in the USA and Canada, as some continue to transition into larger commercial farming operations and others are replaced by smaller part-time farms, including those producing for niche markets (Kirschenmann et al. 2004). Control of total agricultural production in both countries has become consolidated among a relatively small number of large, industrial farming operations.

### 3.5 FROM LAND REFORM TO RECONSOLIDATION—MEXICO

Farming in Mexico has followed a path quite different from the USA and Canada, but the tendency toward industrial consolidation has been much the same (Améndola, Castillo, and Martínez 2005). In 1876, Porfirio Díaz of Spain established a dictatorship in Mexico that lasted until 1911. He emphasised *modernisation* of the whole country, which included enclosing and privatising farmland. As in the USA and Canada, railroads were built to encourage expansion of agricultural production beyond the needs of local markets. Díaz established banks and promoted foreign investments to encourage industrialisation. His farm policies, similar to those of the USA and Canada, focused on increasing large, landed estates to the detriment of communal lands and small farms. These large estates (*haciendas*) were intended to minimise food costs in the domestic urban market and provide agricultural products for export.

The main beneficiaries of industrial agriculture in Mexico have been an agrarian oligarchy, the military elite, and foreign corporations that have invested in Mexican agriculture. The resulting social inequity, deprivation of access to farmland and the exploitation of peasants and workers has led to repeated rebellions and social struggles (ibid.). These conditions spawned the Mexican revolution of 1910, leading to a new Constitution in 1917. The new Constitution was established on the principles of national sovereignty with respect to natural resources, agrarian land reform, labour rights and education that is free, obligatory and secular. These principles were implemented primarily during the Cárdenas government. He redistributed some 18 million hectares of land between 1934 and 1940, twice as much as his predecessors combined.

By 1940 most of the country's arable land had been redistributed to peasant farmers, and approximately a third of all Mexicans had benefited from the agrarian reform programme.

The new Constitution established three different forms of land tenure in Mexico: private, public and social. Social property was further subdivided into communal land in southern Mexico and *ejido* lands elsewhere, which are held in common and farmed cooperatively or individually (Nations Encyclopedia 1996). The *ejido*, or communal land holdings, constitute the primary form of land tenure in Mexico. Private lands were worked by owners, sharecroppers and landless peasants; social lands were worked by *colonos* (settlers) or members of *ejidos*, known as *ejidatarios*. The Constitution held private ownership of land to be a privilege rather than an absolute right, and it allowed the State to expropriate lands that it judged not to serve a useful social purpose. Between 1924 and 1984, the government expropriated and redistributed more than 77 million hectares of large-estate land, amounting to more than a third of the national territory.

Agrarian reform obviously increased the proportion of Mexico's arable land held by *minifundistas* or smallholders. The share of total crop land held by large estates fell from 70 per cent in 1923 to 29 per cent by 1960, while that held by small farms of fewer than 5 hectares rose from 7 per cent in 1930 to more than 33 per cent by the 1980s. In an attempt to increase the economic efficiency and productivity of small farms, the Mexican government welcomed the international agencies that promoted the Green Revolution. They promoted the use of improved varieties, fertilisers, insecticides, herbicides, agricultural machinery and irrigation. After its apparent initial success, the Green Revolution lost favour in the 1970s, as Mexico's deficit commercial trade balance and the external debt increased by 400 per cent and 275 per cent, respectively, between 1971 and 1975.

Declining agricultural production and mounting food imports gave Mexican President Salinas, who was elected in 1988, political momentum to reform the land tenure system. In 1991, he announced a constitutional reform of the *ejido*, of which 58 per cent contained 5 hectares or less. A subsequent reform of land tenure rules in February 1992 gave Mexico's 3 million *ejidatarios* formal title to their land, enabling them to lease or sell their plots if a majority of members of their *ejido* agreed. No further land would be distributed, and joint ventures with private capital were legalised and encouraged. These reforms were intended to reverse the trend toward smaller farming units and to stimulate rural investment by allowing *ejidatarios* to use their holdings as collateral for raising capital. These actions set the stage for the North American Free Trade Agreement (NAFTA) of 1994 between Mexico, the USA and Canada.

The economic globalisation of North American agriculture which began in the 1980s culminated with NAFTA in 1994, which opened Mexican markets to unrestricted imports from the USA and Canada. Mexican markets were soon flooded with subsidised US corn. The result was a strong polarisation of economic opportunities and incomes between large industrial farming operations in northern Mexico and the largely subsistence family farmers elsewhere. Although the Mexican Constitution limited private holdings to 100 hectares, by the early 1990s Mexico had more than 40,000 farms of 101 hectares or larger and some 500 farms larger than 50,000 hectares. The earlier movement away from industrial agriculture in Mexico has clearly been reversed. As in the USA and Canada, family farms in Mexico are being consolidated into large farm businesses in an attempt to increase competitiveness in the global economy.

## 4 CHALLENGES TO FAMILY FARMS

### 4.1 ABANDONMENT BY GOVERNMENT FARM PROGRAMMES

North American farm families today face a number of major challenges. Some are continuing, while others are new. Perhaps the most important challenges in all three countries are government farm policies that increasingly support the industrialisation of farming in a quest for ever-greater economic efficiency. This has been a continuing challenge in the USA and Canada and has intensified in all three countries with the inclusion of Mexico in NAFTA in 1994. The increasing emphasis of farm policies on economic efficiency makes it even more difficult for multifunctional family farms to survive economically while maintaining their commitments to societal and ecological multifunctionality.

The only logical justification for government policies unique to agriculture and farming is to ensure food security. Trade policies are common to all sectors of economies. Food security in the USA has traditionally been defined as access to adequate quantities of wholesome foods to support healthy active lifestyles, although the terminology has changed over time. As people around the world have learned, or are learning, market economies simply will not ensure food security; thus virtually every nation has some form of farm policy. Markets only provide enough food for those who have enough money to buy enough food. Food security requires that everyone has enough food, regardless of whether they have enough money. Food security is a necessary condition for agricultural sustainability, but food security alone is not sufficient. Food security is about meeting the needs of all in the present, while agricultural sustainability extends the mandate for food security to those of future generations as well as those of the present.

The historic strategy for food security in the USA was to keep enough farm families on the land—farmers who were committed to caring for the land—to produce enough food for everyone in the nation. Government farm programmes in the USA were established during the Great Depression of the 1920s and 1930s, while the USA was still an agrarian nation. These early farm programmes were but one aspect of the so-called New Deal of the 1930s, instituted by President Franklin Roosevelt. The New Deal included a wide range of government programmes to address growing economic and social inequities. Government subsidies for farm families at that time provided badly needed income to people in rural areas, helping to preserve a way of life for farm families as well as provide both economic and food security for the nation.

### 4.2 INDUSTRIAL AGRICULTURAL POLICIES

The changes in American agriculture following the Second World War led to fundamental changes in US farm policies. Farms powered by horses and solar energy gave way to farms powered by tractors and fossil energy. Cheap nitrogen fertilisers and pesticides encouraged farmers to abandon crop rotations and diversified crop and livestock farming as the means of managing pests and maintaining soil fertility. Farms were being transformed into factories without roofs and fields, and feedlots into biological assembly lines.

The focus of US farm policy shifted from preserving family farms to promoting agricultural productivity, particularly during the 1960s and early 1970s. A more efficient agriculture would lead to lower food prices, making adequate quantities of wholesome and nutritious food affordable for everyone. The logical farm policies for achieving this objective were designed

to facilitate and promote the industrialisation of agriculture. The Land Grant University system in the USA, created by various Acts of Congress between 1862 and 1914, responded by shifting from its pre-war focus on empowering farm families with education and information to developing and promoting industrial agricultural technologies.

Many people associate industrialisation with the transition from an agrarian to a manufacturing economy. However, industrialisation is more accurately defined as a mental model or paradigm for organising and managing resources: land, labour and capital. The rural–urban migration of the 1900s was not the essence but simply a consequence of economic industrialisation. The fundamental strategies of industrial organisations are specialisation, standardisation and consolidation of control. Specialisation facilitates division of labour—allowing each person to do fewer things better. Specialised functions then must be standardised so that each contributes its part to a coherent whole. The standardised functions can then be simplified and routinised, allowing control to be consolidated into larger, more efficient production units. In competitive market economies, profits provide the motivation for industrialisation.

Specialisation in farming led to mechanisation and simplification of production processes, allowing farms to become larger and thereby achieve the ‘economies of scale’ associated with industrial production. Industrial farming allowed fewer specialised farmers to produce the nation’s food supply, thus freeing others to specialise in manufacturing the other activities associated with modern, industrial society. The transition from small family farms to large commercial farming enterprises was generally accepted as a logical consequence of government farm policy, even if not an explicit objective. Larger farms and fewer farms would make the nation both more food secure and economically secure. Farmers still made up more than a quarter of the US workforce during the 1960s, and a more efficient agriculture would free more ‘unneeded’ farmers to work in the factories and offices of the growing industrial economy.

Every major farm programme in the USA since the New Deal era, in one way or another, has facilitated, supported or promoted agricultural industrialisation—thereby promoting consolidation of agricultural production into fewer and larger economic production units. For example, price supports, deficiency payments, crop insurance and disaster payments all reduce the risks associated with specialising in producing one or a few basic commodities. Without such programmes, a diversity of crops and livestock enterprises would be essential to manage production and market risks, which would also help maintain the ecological health and natural productivity of the soil. Grades and standards facilitate standardisation and routinisation of production for mass markets. Subsidised credit, investment tax credits and accelerated depreciation of buildings and equipment encourage mechanisation and consolidation into larger production units. US farmers are told they should either ‘get big or get out’ of farming.

However, there is growing public scepticism regarding farm policies in the USA, fuelled by large government payments to larger farms and wealthy landowners. More than 60 per cent of US farmers receive no government subsidies, while the top 10 per cent of subsidy recipients receive 75 per cent of total payments (Environmental Working Group 2014). The recent shift in funding from direct payments to crop insurance subsidies will not change this situation. There seems to be no limit to the ability of those formulating US farm policy to find ways to continue promoting the mono-functional, industrial paradigm of agriculture.

### 4.3 GLOBALISATION OF AGRICULTURAL POLICIES

As US agricultural production continued to expand well beyond needs for domestic consumption, the focus of farm policy shifted from production for domestic consumption to producing for export markets. US agriculture would continue to ensure domestic food security by maintaining an agricultural trade surplus in global markets. US farm policy then became closely linked with US trade policy. The official US position on agricultural trade has been to push for 'free markets', through the General Agreement on Tariff and Trade (GATT), the World Trade Organization (WTO), NAFTA and other bilateral and regional trade agreements.

Over time, the US and Canadian agricultural economies have grown to become dominant players in a global industrial agro-food system. The USA is the world's leading agricultural exporter, and Canada ranks fifth among nations. Approximately 50 per cent of the farm value of Canadian agricultural production is exported, and exports account for about 30 per cent of US net farm income. While the USA is clearly the dominant player in the global food arena, Canadian agriculture has been and remains closely interconnected with US agriculture and with that of the larger global industrial agro-food system (Albritton 2012).

US farmers continue to be told that they have a moral obligation to expand production to help 'feed the world', and that growing global food demand will challenge their ability to do so in the future. However, the US biofuels mandate (US Environmental Protection Agency 2005) has caused many to seriously question the proclaimed commitment of US agriculture to providing food for the world's poor and hungry people. The mandate specifies percentages of US fuels to be derived from renewable sources by particular dates. Meeting the mandates has resulted in 40 per cent of the US corn crop in recent years being devoted to ethanol production (US Department of Agriculture, Economic Research Service 2014a). This has only served to accentuate the emphasis of farm policy on productivity and economic efficiency, magnifying its attendant negative impacts.

Farm policies in Canada are similar in many respects to those of the USA but are even more dominated by international trade considerations. The inclusion of agriculture in GATT was welcomed by Canada as well as the USA and the multinational agribusiness corporations (Wiebe 2012). Many other countries resisted leaving their food security vulnerable to global markets. Small farmers and peasants joined in protesting the anticipated impacts of GATT agreements for local food markets, rural livelihoods and cultures, and the environment (Via Campesina 1996). However, the forces of agricultural trade liberalisation prevailed, signalling a change in food and farming, not only in Canada and the USA but globally.

Canadian agriculture had been built around exports, but the GATT agreements paved the way for additional trade agreements in North America. Canadian agri-food exports quadrupled following the Canada–US Free Trade Agreement (CUSTA) in 1989, NAFTA in 1994 and the WTO Agreement on Agriculture (AoA) in 1995. As in the USA, these major trade agreements have been followed by numerous other Canadian bilateral and multilateral agreements that have erased virtually all barriers to agricultural trade.

Agricultural trade in Canada and elsewhere is largely limited to multinational agribusiness corporations, virtually eliminating direct farmer participation. Many international transactions take place 'within large multinational corporations', rather than 'among nations'. One exception to such transactions has been the Canadian Wheat Board (CWB), which is a western Canadian collective marketing agency. Canadian farmers were required by law to allow the

CWB to negotiate sales of wheat and barley on their behalf, which is seen as a threat to free trade in the global marketplace. Corporate pressures to establish neoliberal free-trade policies have recently forced the CWB to become a voluntary marketing organisation, freeing larger individual producers to negotiate their own sales (Wiebe 2012).

The only other sectors of Canadian agriculture left under protection from international competition are poultry, egg and dairy farms. These are the only sectors of the Canadian farm economy that have been consistently profitable. Supply management systems limit production to the needs of the domestic market, and farmers are assured of prices that will cover their production costs for the limited production. This price assurance is only possible with trade restrictions on imports of cheaper products from elsewhere. The remaining programmes are under threat from the proposed Trans-Pacific Partnership.

Supply management programmes have been critical in preserving the viability of thousands of small family farms in Canada. Similar supply management programmes also preserved thousands of family farms in the USA, until they were eliminated to facilitate international trade agreements long before NAFTA. The last supply management programmes to be phased out in the USA were for specialty crops: tobacco and peanuts. A loss of small family farms similar to that experienced in the USA can be expected as these programmes are eliminated in Canada. As in the USA, Canadian farm policies have focused on mono-functionality and economic efficiency to promote international trade rather than domestic food security. With few exceptions, Canadian food security and the economic well-being of Canadian farmers are being left to the vagaries of global markets.

#### 4.4 NORTH AMERICAN FREE TRADE AGREEMENT

NAFTA, the trilateral trade agreement of 1994 among the USA, Canada and Mexico, has had major negative impacts on family farmers in all three countries. However, the greatest negative impacts have likely been in Mexico, where the agreement accelerated agricultural industrialisation, particularly in the northern regions of the country. NAFTA clearly refocused Mexican farm policies on production of agricultural crops for export, rather than production for local and domestic consumption. Large industrial farms have been established in proximity to the US border to export labour-intensive crops, particularly fruits and vegetables, to the USA. Heavily subsidised imports from the USA, particularly corn, have depressed domestic prices and eliminated essential sources of cash income for Mexican farm families.

The effects of NAFTA on Mexican agriculture appear to be very similar to the negative impacts of the Green Revolution in India and Africa. As corn prices in Mexico plummeted by 66 per cent between 1993 and 2005, many farmers with significant debts lost their farms (Wise 2010). An estimated 1.1 million small farmers and 1.4 million other Mexicans who depended on the farm sector were left without work. This made land available for acquisition by foreign corporations that consolidated prime farmland into large plantations. While the price of corn paid to Mexican farmers fell by more than a half, the deregulated retail price of tortillas more than doubled (Henriques and Patel 2004). The proportion of Mexico's rural population earning less than the minimum cash income needed to purchase food grew by nearly 50 per cent in the agreement's first three years (World Bank 2004). Current agricultural policies in Mexico seem destined to continue the trend toward fewer farms, larger farms and increasing corporate control of agriculture.



The rhetoric of the Mexican farm policy is similar to the rhetoric of US and Canadian farm policy. They “seek to increase farm productivity by making use of the human capital and its natural resources in a sustainable way” (UPA and FAO 2014). The government provides technical assistance programmes that promote efficient water management, soil conservation and use of improved seeds and fertiliser. However, the stated goal is “to move from subsistence farming to consolidated agriculture that is more integrated with markets” (ibid.). This suggests that food security in Mexico will be left to the global market—primarily to trade with the USA and Canada. To ensure this transition, the Mexican government is stressing the adoption of new technologies and cooperative networking among small farms to achieve economies of scale. Based on the experiences of the USA, Canada and other so-called developed economies, current Mexican farm policies leave the future food security of Mexico to the vagaries of global markets and thus very much in doubt.

#### 4.5 ADVANCING AGE OF FAMILY FARMERS

Another major challenge to family farmers in North America is the advancing age of farmers. The average age of principal farm operators in 2006–2007 was 57.1 years in the USA, 53.3 years in Canada and 51.8 years in Mexico (SIAP 2010). Many of the older farmers in the USA and Canada were able to pay for their farmland in earlier times and likely have continued farming more as their chosen way of life rather than a meaningful source of farm income. Family farms such as these are not likely to be replaced with other family farms. The average age of farmers continues to climb in all three countries because fewer rural young people are staying on or returning to the farms where they were raised. Young people without farm backgrounds are beginning to operate small farms in the USA and Canada, many producing for local niche markets in rural and urban areas, but not enough to make up for those leaving conventional farms.

Advocates of industrial agriculture have shown little concern for the advancing age of farmers. Fewer young farmers are needed to replace aging farmers because as farms became larger the number of farmers needed naturally becomes smaller. Young people have not been choosing farming as their occupation because they have not been needed with declining farm numbers. However, the advancing age of farmers is an indication of the continuing decline in family farms. Many of the extended families of today’s aging farmers have long since left the family farm and have no intention of returning. When such farmers retire, sell their farms or die, their land will be farmed by large industrial farmers. Many of these industrial farmers will not live in close proximity to their new farmland and thus will feel no sense of personal connectedness to the land or to the community. If current trends continue, more farms are destined to become mono-functional farm businesses, rather than multifunctional family farms.

#### 4.6 LACK OF PUBLIC RESEARCH AND EDUCATION

Much of the knowledge and wisdom that will be needed to sustain multifunctional family farms resides in the hearts and minds of today’s aging farmers. Industrial agriculture continues to dominate public research and educational agendas, particularly the Land Grant Universities that traditionally supported family farming. As a result, many of the multifunctional family farmers have turned to learning from each other rather than from the so-called experts. Fortunately, mentorship and collaborative learning, while chosen by necessity, may actually turn out to be an essential aspect of sustainable farming in the future. Even if public research and educational institutions were to shift their priorities back to family farming, the wisdom

needed for multifunctional farming can only be gained through personal experience or passed on through personal relationships. Unfortunately, when today's aging farmers retire or die, their personal knowledge and wisdom will go with them.

Meanwhile, the public research and educational agenda continues to be dominated by the development of labour- and management-extensive or simplifying agricultural technologies, such as genetically modified organisms (GMOs), concentrated animal feeding operations (CAFOs) and GPS-guided precision agriculture systems. New and 'better' genetically engineered seeds, routine animal medication and sophisticated GPS technologies reduce the need for skilled labour and simplify farm management. On the other hand, farming practices that rely on selecting and saving seeds, protecting animal health and using basic machines and scale-appropriate technologies increase reliance on skilled labour and thoughtful, intelligent management. Farming in the future need not rely on the drudgery labour of farming in the past or be 'low-tech' to be multifunctional. It *will* require more *thinking workers* and *working thinkers*.

#### 4.7 LACK OF ACCESS TO LAND

Young people who do choose farming as their occupation face a major challenge in gaining access to land. Prices of farmland are at record high levels in the USA, as a consequence of expanding demand in global markets and domestic biofuel subsidies and mandates. The transfer of land from parent to child may be difficult due to high land values, particularly in cases of multiple siblings who expect to share an estate. Such farms are typically sold outside the family and the inheritance divided among the siblings. The highest bidders for the land are likely to be large farming operations with no personal sense of connectedness to any particular farm or community, other than perhaps their original 'home farm'.

The new farmers producing for niche markets, most of whom did not grow up on farms, face even greater challenges. Few are likely to have an inheritance to invest in farmland, and the younger would-be farmers are not likely to have significant savings to do so. In addition, it is far easier to obtain a commercial loan to finance a large corporate contract livestock operation than to finance a small organic farm. Government programmes for 'beginning farmers' are of primary benefit to new commodity producers, not new farmers who produce for local markets, despite recent efforts of the US Department of Agriculture to accommodate farmers producing for local markets. Given the current advanced age of owners of farmland in the USA, as much as 70 per cent of US farmland may change hands over the next two decades (Dean 2011). Non-farm investors already own about 30 per cent of all US farmland, and large private equity investors have become major competitors in land markets. Access to farmland for multifunctional family farmers is a challenge not likely to be met without significant changes in land tenure policies in the USA and Canada.

#### 4.8 RELUCTANCE TO COOPERATE

Today's smaller family farms that are producing for local niche markets will need to 'scale up' their operations, if they are to succeed in creating and supporting a sustainable food system in the future. If they are to scale up without losing their social and ecological integrity, they must learn to cooperate rather than compete—including forming and sustaining cooperative relationships with their customers. Their success will depend on their willingness and ability to sustain a meaningful sense of personal connectedness with others who share their social and ethical values, including their commitment to agricultural sustainability.

In meeting this challenge, literally thousands of farmer alliances, collaborations, networks and food hubs are being established across the USA and Canada (Ikerd 2011). It is critically important that these new food networks follow the organisational principles of earlier cooperative organisations if they are to maintain their multifunctionality and thus their sustainability. “A cooperative food system involves an interdependent web of *mutually beneficial* activities that include the production, processing, distribution, wholesaling, retailing, consumption, and disposal of food. It is based on a fundamental commitment to cooperation and democratic processes, while avoiding the winner-take-all competitive ethos that drives the dominant food system... It is interested in community economic development, social capital formation, just livelihoods, food security, and environmental care as much as profits. And like other food systems, cooperative food systems can occur at any scale: they can be part of a local food system and operate within a particular place; they can be part of a regional or national food system...; or they can be part of a worldwide system of cooperation, much like the fair-trade movement” (Sumner, McMurtry, and Renglich 2014).

The economic necessity for members of these new organisations or alliances to cooperate rather than compete will create significant challenges farmers, even for many of today’s multifunctional farmers. Farmers traditionally have prided themselves on their independence. Many simply have not thought it necessary to understand the science or art of social relationships, at least not beyond their close friends and family members. However, those who meet the challenges of cooperation, who master the art and science of social relationships, may well find it to be one of the most economically and personally rewarding aspects of family farming in the future.

#### 4.9 FAMILY FARMS AT A CROSSROADS

Whether deserved or not, family farmers still hold a position of respect and esteem among the people of North America. However, most North Americans do not realise the relentless pressures that family farmers have been under to abandon their historic role as caretakers of the earth and keepers of cultural values to survive economically. Many have failed economically, and the remaining family farmers are told they must manage their farms as a business, not a way of life, if they expect to survive. Family farmers today are being pressured to join the industrial business class and become managers of money, machinery and labourers, instead of traditional ‘farmers’. Their ‘fair share’ of benefits will be determined by global markets, not by their ability to “feed, clothe, and lodge the whole body of people”, as suggested by Adam Smith (1776).

Many of the surviving farmers have remained true to the principles of traditional family farming, but many others have not. As a result, any two farms that are owned and operated by families may have very different implications for the well-being of society and the future of humanity, as well as for the two farm families. Family farmers in North America are at a crossroads. Economic globalisation of the food system is reaching a point of crisis, meaning a time of decision for the future of family farmers. Farm families are being forced to choose between farming as a way of life and farming as a bottom-line business: the former at the highest esteem, and the latter at the lowest esteem within past cultures. A fundamental question is whether the characteristics of family farms associated with their position of high esteem in the past are still relevant today or, alternatively, whether economic efficiency should be the new measure of a family farm’s true worth.

## 5 DO FAMILY FARMS MATTER?

### 5.1 THE FAMILY FARM CONTROVERSY

Family farms obviously are important to farm families, but is their survival essential or even significant for society as a whole or the future of humanity? Farm families represent a very small percentage of the total population of the USA and Canada and a rapidly decreasing percentage of the population of Mexico. Family farms also account for a small and shrinking portion of the agricultural economy. As economies shift from agrarian to industrial, the economic importance of agriculture declines, and the economic significance of family farmers declines even faster. Those who focus on agricultural productivity or economic efficiency often view family farms as nostalgic relics of the past that will soon be replaced by more economically efficient farm businesses. Those who value traditional family farms are sometimes referred to as idealists who long for a return to some utopian vision of the past that never actually existed.

The controversies surrounding family farms versus industrial farms tend to centre on questions related to agricultural sustainability. The International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) *Global Report* (McIntyre et al. 2009) states: "Sustainable development is about meeting current needs without compromising the ability of future generations to meet their own needs. Within this context, sustainability is envisaged within three key dimensions: social, environmental and economic, all three of which have direct and indirect linkages to agriculture. It is indisputable that agriculture as a sector cannot meet this goal on its own. Agriculture, however, fulfills a series of additional goals besides food production. Last but by no means least, agriculture ensures the delivery of a range of ecosystem services. In view of a globally sustainable form of development, the importance of this role may increase and become central for human survival on this planet." Can family farms meet the needs of the present without diminishing opportunities for the future?

Humanity is even more dependent on farming today than in the times when hunting and gathering was the dominant food system. The sustainability of human life on Earth depends on the sustainability of agriculture. A sustainable agriculture must be economically viable, but economic *sustainability* cannot be ensured through productivity or economic *efficiency*. The sustainability of agriculture depends on the willingness and ability of farmers to sustain the long-run productivity of the natural and human resources on which agricultural productivity ultimately depends, as well as the economically efficient use of those resources.

Sustainable farms must be intentionally multifunctional: they must be managed for ecological, social and economic integrity. Will family farms remain multifunctional farms, or will they become mono-functional farm businesses? This is a decision that will not and cannot be made solely by farmers but also must be made by society through individual choices as consumers and collective choices among agricultural and trade policies. This is not a decision to be taken lightly. The future of humanity may well depend on the future of multifunctional family farmers.

### 5.2 MULTIFUNCTIONALITY OF FARMS AND FARMERS

Are operators of farms really farmers, or are they business-men or -women? What does it mean to be a farmer? Historically, a farmer has always been one who cultivates land, cares for livestock or otherwise operates a farm. The English word *farmer* has varied origins: from Middle English *fermer*, *fermour* (steward), partly from Old French *fermier* (husbandman), and from Medieval Latin *firmarius*

(one who rents land) (Wiktionary 2014a). The English word *farm* comes from Middle English *ferme*, *farme* (rent, revenue, produce, stewardship, meal, feast), from Old English *feorm*, *fearm*, *farm* (provisions, food, supplies, possessions, stores, feast, entertainment, haven), from Proto-Germanic *fermō* (means of living, subsistence) and from Proto-Indo-European *perk* (life, strength, force). It is related also to Old English words such as *feormian* (to provision, sustain) and *feorh* (life, spiri') and the Icelandic word *fjör* (life, vitality, vigour, animation) (Wiktionary 2014b).

These root meanings suggest that economics has always been an important aspect of farming and farms. Root meanings such as rent, revenue, subsistence and means of living suggest that farming has always been a means for families to make an economic living. Farming has also been about producing food for others, for communities and societies, which is often achieved through a farm economy. Root meanings such as provision, food supplies and purveyor also suggest that farming has always been seen as an essential part of the larger food economy.

However, farming has also been about providing sustenance for the mental and spiritual needs of farm families, communities and societies, as well as providing physical nourishment. Root meanings such as spirit, entertainment, feast and haven suggest that farms represent something more than physical and economic sustenance. Equally important, the roots of farms and farming strongly suggest a moral or ethical commitment to the long-term well-being of communities, societies and humanity. Root meanings such as stewardship, strength, firm, solid, security and sustain reflect a historical commitment of farmers to a *permanent* agriculture to ensure the durability of sustainable societies and the sustainability of humanity.

Throughout nearly all of human history, farms have been multifunctional, and most farmers have been committed to the basic ideology of sustainability: attempting to meet the needs of their families and societies without diminishing opportunities for those of future generations. Obviously, farmers have not always succeeded in their multifunctional mission. The fundamental question today is whether farmers of the future should abandon multifunctionality in the pursuit of mono-functional economic efficiency or should continue to embrace multifunctionality in their pursuit of agricultural sustainability.

Many farms of the past obviously were not sustainable, as former great civilisations rose with the increased productivity of their farms and fell when their farmers lost the ability to meet the needs of their societies because they had degraded their environment. Obviously, many early farmers in the USA and Canada were not stewards of the land. That said, many family farms today still retain a commitment to intentional multifunctional farming—to sustainability: balancing the need to make a living for the family with their need to be respectful members of their communities and responsible stewards of the land for the future of humanity. Family farmers today have the benefit of learning from past failures and the potential for a far greater understanding of how best to work with nature and society to ensure long-run sustainability. These lessons from the past can be acknowledged and addressed by today's family farmers, rather than discarded as useless relics of indigenous cultures.

### 5.3 INTENTIONAL MULTIFUNCTIONALITY

Multifunctionality has been a primary focus of work in the so-called developing countries of the world, but it is equally important to the future of industrial countries, including the USA and Canada. The IAASTD *Global Report* (McIntyre et al. 2009), reflecting a consensus of 400 scientists representing 58 different countries, confirmed that agriculture is inherently

multifunctional: "It provides food, feed, fiber, fuel and other goods. It also has a major influence on other essential ecosystem services such as water supply and carbon sequestration or release. Agriculture plays an important social role, providing employment and a way of life. Both agriculture and its products are a medium of cultural transmission and cultural practices worldwide. Agriculturally based communities provide a foundation for local economies and are an important means for countries to secure their territories." The key question is whether the multifunctionality of a specific approach to agriculture or system of farming is consistent with sustainability.

Presumably, no farmer would intentionally manage his or her farm in ways that needlessly degrade the natural ecosystems or diminish the quality of life in the communities in which the farm operates. Thus, intentional multifunctionality implies conscious, purposeful farm management decisions and actions that have positive, rather than negative, impacts on the natural ecosystems, communities and economies. Farms that are managed strictly as businesses are also multifunctional, since they have inevitable ecological, social and economic consequences. However, the ecological and social consequences of mono-functional farm businesses are almost certain to be negative. Family farms are unique because they have a logical motivation to be intentionally multifunctional, because the social and ecological consequences of their functionality are inseparable from the overall well-being of the farm families. Thus, the ecological and social consequences of multifunctional family farming could logically be expected to be quite different from the consequences of mono-functional farm businesses.

Prioritising economic efficiency invariably leads to the extraction and exploitation of the natural and human resources that ultimately must sustain long-run productivity—in agriculture as well as all other sectors of economies. Certainly, farm businesses can be managed in ways that limit their inevitable pollution of air, water and soil with chemical and biological contaminants. They can even substitute renewable for non-renewable inputs and resources. Operators of farm businesses can also consider the impacts of their management decisions on their land, their neighbours and the people who eat their food. Such strategies explicitly show respect for the inherent multifunctionality of farming and obviously can reduce its negative social and ecological impacts. However, farm businesses can minimise their negative impacts only to the extent that doing so does not compromise their economic bottom lines. Prioritising economic efficiency has unavoidably negative social and ecological consequences which threaten long-term economic sustainability.

#### 5.4 ECONOMIC MONO-FUNCTIONALITY

Economic value is individual, instrumental and impersonal (Ikerd 2012). Economic value accrues to individuals rather than to communities or societies as wholes. It is instrumental, in that an economic transaction is a means to an end, rather than something done because of its inherent worth. As a result, the economy places a premium on the present relative to the future. For example, it makes no economic sense to invest in anything if the returns are expected to accrue only after the investor is dead. Since life is inherently uncertain, investments with quicker returns are valued higher than comparable investments with longer-term payouts. That is why borrowers pay interest and lenders charge interest. There is an economic cost associated with delaying the potential gratification from an economic asset until sometime in the future. Furthermore, there are no *economic* incentives to be caretakers of the land or to care about communities if the benefits will accrue solely to someone else at some time in the future.

Economic value is impersonal, because if something cannot be bought, sold or traded from one person to another, it has no economic value. Social values are personal; the particular persons involved in a social relationship matter. Social values evolve into ethical values, as people learn they should show the same empathy, compassion and respect for everyone that they show for those they know personally: a personal ethic. Many family farmers also feel personal connections to their farms, which evolve into their personal 'land ethics'. Many people quite logically and rationally invest significant amounts of their time, energy and money in things they value socially and ethically, even when there is no *economic* incentive to do so.

Mono-functional farmers, on the other hand, will only make investments in society and nature if their investments are expected to yield economic benefits, which are short term in nature. They will make investments that are socially and ecologically responsible only if they are also profitable or economically valuable. Thus, mono-functional farm businesses will not make the multi-generational investments in society and nature that are essential for agricultural sustainability. Since all economic value ultimately is derived from nature by way of society, mono-functional farms are not even economically sustainable.

## 5.5 CONSEQUENCES OF CORPORATIZATION

The question of ownership and control is critical to determining the functionality and sustainability of a family farm. Another farm financial crisis like the 1980s is highly unlikely in the USA. Large, specialised farming operations have continued to grow even larger, but, most important, farms have become increasingly controlled by large, multinational agribusiness corporations. The corporations typically do not own these farms or feedlots but control their production process through various contractual arrangements. Contracts range from those specifying a selling price or use of a specific herbicide to controlling virtually every aspect of the production and marketing process. More than 95 per cent of poultry (National Chicken Council 2012) and 70 per cent of hogs (McBride and Key 2013) in the USA are produced under comprehensive corporate production contracts. More than 90 per cent of all soybeans, corn and cotton grown in the USA is produced using patented genetically engineered seeds requiring corporate licensing agreements (US Department of Agriculture, Economic Research Service 2014b). Corporate control of agriculture is widespread in the USA.

Various studies have indicated that maximum economic efficiencies of large-scale farming operations are reached at farm sizes far smaller than is claimed by advocates of industrial agriculture and were probably largely exhausted in the USA by the 1950s or 1960s (Duffy 2009). The logical motives of continued corporate consolidation are market power, which brings financial power and, ultimately, political power. Market power can be used to extract unnecessary profits from consumers, producers and nature. Contract growers can be pressured to minimise production costs through practices that degrade the land and natural environment and diminish the quality of life of people in rural communities. Corporate political influence can thwart government regulations that might otherwise protect natural and human resources from exploitation.

Unlike corporations, multifunctional family farmers are real people; they have purely *personal* connections to their farms and to others in their communities. They feel an *ethical* responsibility to care for their land and care about their neighbours and customers. Their social and ethical values can affect their decisions, even if they function through family corporations.

Corporations are not real people; they have no ethical or social values. Corporations function to serve the common interest of their shareholders. Family corporations can reflect the shared social and ethical values of the family, which they can prioritise over economic values.

The investors or shareholders in large, publicly traded corporations also have social and ethical values. However, with thousands or millions of investors from many different nationalities, religions and philosophies, investors in large multinational corporations are highly unlikely to share any common social or ethical values. The only common value shared by stockholders in such corporations is the desire to enhance the economic value of their investments, particularly for companies with blocks of shares owned by pension funds and mutual funds. High-speed electronic trading of corporate stock makes connections between transitory investors and corporate management even less personal and thus more economic.

Even so, the prevailing agricultural ideology seems to be that continued corporatisation and industrialisation of agriculture are the only logical means of providing enough food for a growing global population. Agricultural producers in North America are told they must continue increasing production for exports to countries that are unable to meet the food needs of their people. The basic logic or reasoning supporting this ideology is that the global population is destined to grow from the current 7 billion to at least 9 billion people by the middle of this century. More people obviously will require more food. And a corporately controlled, industrial agriculture is the only logical means of increasing global food production.

A basic flaw in this logic is that with greater scarcity and rising costs of fossil energy and the progression of global climate change, industrial agriculture inevitably will become less productive and less economically efficient over time and may not even survive the 21<sup>st</sup> century. Genetic engineering and precision farming are just the latest in a long line of technologies designed to 'prop up' a system of farming that is inherently incapable of agricultural sustainability. Nations that continue to depend on industrial agriculture for short-term food security or long-term agricultural sustainability face a future of growing dependence on a few large multinational food corporations that have no personal or ethical commitment or allegiance to any nation or the future of humanity.

## 5.6 FAILURE OF AGRICULTURAL INDUSTRIALIZATION

Faith in the future of industrial agriculture is apparently based on its record of increasing productivity over the past 50 to 60 years. Admittedly, yields of crops per acre or hectare of farmland in terms of production of meat, milk and eggs, per bushel or ton of feed have increased during this period. However, virtually all of these increases have been linked directly or indirectly to an increased reliance on previously abundant and inexpensive fossil energy. Cheap nitrogen fertilisers were readily available because of an abundance of natural gas. Climate-controlled buildings for livestock were economically feasible because of low-cost fuel for heating and ventilation. Fossil fuels provided energy not only for traction but also for the manufacturing of machinery. Deep-well irrigation likewise depends on low-cost energy to pump and distribute water. Most pesticides are also based on fossil energy. Industrial agriculture is inherently dependent on fossil energy.

In the USA, for example, approximately 10 calories of fossil energy are required for each calorie of food energy produced (Pimentel and Pimentel 1996). About two thirds of this total is associated with food processing, manufacturing, transportation, packaging and other processes



of the industrial food system. Even at the farm level, industrial agriculture requires about 3 calories of fossil energy per calorie of food produced. In addition, industrial agriculture is impractical, if not impossible, without an industrial system of food processing and distribution. The economic competitiveness of industrial agriculture depends on a fossil-energy-dependent food system.

Energy experts differ on their estimates of how much recoverable fossil energy is left to be extracted from the earth. Some experts claim that most economically recoverable fossil energy reserves will be depleted within 50 years, while others believe there is enough fossil energy for another 100 to 150 years. However, there is no disagreement that the remaining reserves of fossil energy will be more physically challenging, environmentally risky and economically costly to extract, as is evident with the 'fracking' process required to extract shale gas and deep-sea drilling for oil and natural gas. Beyond some point for each fossil energy source, production will peak; there will be less fossil energy available each year thereafter. Each time demand increases relative to supplies, prices of fossil energy will rise—and eventually will rise dramatically.

With increases in fossil energy demand of 2.5 per cent per year, which is typical of recent years, total fossil energy demand would double every 30 years. This means twice as much fossil energy would be needed by 2045, four times as much by 2075, and eight times as much by 2105. Renewable energy from wind, water, passive solar and photovoltaic cells must eventually replace fossil energy in agriculture as well as elsewhere in the economy. However, renewable energy must be captured, organised, concentrated and stored before it is suitable for a wide range of current energy uses. Thus, useful energy from renewable sources will likely be far less abundant and more expensive than the fossil energy of the past century that was used to develop and support an industrial agriculture.

In addition, industrial agriculture places similarly unsustainable demands on groundwater or aquifers used for irrigation, half of which has already been depleted by some estimates (Soule and Piper 1992; Kirschenmann 2010). Other estimates indicate that the Earth's mineable phosphorus reserves could be depleted in 50 to 100 years, with a peak occurring around 2030 (Cordell, Drangert, and White 2009). Industrial agriculture is also destroying the natural productivity of soils through erosion, salinisation and agrochemical contamination. Fertilisers and agricultural pesticides also are major contributors to pollution of groundwater, streams and estuaries. Industrial agriculture is a major contributor to global climate change, and the related weather instability will be a major challenge in sustaining productivity to provide global food security and agricultural sustainability (Wikipedia 2014b; 2014c). In summary, industrial agriculture depletes the natural resource base that supports its productivity and pollutes the natural environment that sustains the health of humanity. Industrial agriculture cannot possibly provide long-term food security or agricultural sustainability.

Contrary to popular belief, the inability of industrial agriculture to provide even short-term food security is readily apparent in the USA and Canada. In fact, a larger percentage of people in the USA are 'food insecure' today than during the 1960s, prior to the final phases of agricultural industrialisation. As indicated previously, food security means that everyone has enough wholesome and nutritious food to support healthy, active lifestyles. About one in six residents of the USA and one in eight Canadians are classified as 'food insecure'. The prevalence of hunger among children is higher, with about one in five US children and one in six Canadian children living in food-insecure homes (Coleman-Jensen, Gregory, and Singh 2014; CBC News 2013).

In industrial nations, many people can get enough food to satisfy their hunger only by buying cheap, industrial, calorie-rich food products that fail to meet their nutritional needs for healthy, active lifestyles. As a result, diet-related illnesses in the USA are rampant, including obesity and related diseases such as diabetes, hypertension, heart failure and various types of cancers. Obesity-related illnesses alone are projected to claim about one fifth of all spending on health care in the USA by 2020—erasing virtually all of the gains made in improving public health over the past several decades (Rand Corporation 2004). Total health care costs in the USA are almost double the total cost of food (Centers for Medicare & Medicaid Services 2014). As might be expected, diet-related illnesses are most prevalent in lower-income, food-insecure homes. Food security depends on food quality, not simply calories.

A growing body of scientific evidence links the industrialisation of agriculture to foods that are rich in calories and poor in essential nutrients, which have helped fuel the epidemic of obesity and other diet-related illnesses (Davis, Epp, and Riordan 2004; Smith 1993; Jarrell and Beverly 1981). The rising costs of diet-related health care have paralleled the industrialisation of agriculture. Industrial agriculture in North America has produced an abundance of cheap food, but it has failed to provide food security or sustain public health. Food security, as well as agricultural sustainability, will require a fundamental change in farming systems: a return to multifunctionality.

## 5.7 FAILURE OF THE GREEN REVOLUTION

Agricultural industrialisation has also failed to provide food security in the so-called developing nations. Development experts attribute the persistence of global hunger to increases in population made possible by increased food production during the Green Revolution. They argue that infant mortality has declined due to better nutrition. However, many of those living in developing nations have a very different view. Stacia and Kristof Nordin (2000), who have worked for decades with farmers in Malawi, point out the consequences of dependence on industrial agricultural technologies: “Many [farmers] have found themselves caught in a cycle of dependency that has actually left them worse off than before the Green Revolution took hold. People are finding that they are forced to sell off larger amounts of their yields in order to cover the cost of these growing expenditures. The selling of their crops has deprived many families of annual food reserves, nutritional requirements, and [potential] increased standards of living.”

In the words of Vandava Shiva (1991), a globally prominent and highly respected ecologist and Indian food activist: “The Green Revolution has been a failure. It has led to reduced genetic diversity, increased vulnerability to pests, soil erosion, water shortages, reduced soil fertility, micronutrient deficiencies, soil contamination, reduced availability of nutritious food crops for the local population, the displacement of vast numbers of small farmers from their land, rural impoverishment and increased tensions and conflicts. The beneficiaries have been the agrochemical industry, large petrochemical companies, manufacturers of agricultural machinery, dam builders and large landowners.”

Admittedly, the Green Revolution was a success from the perspective of economic efficiency or productivity. It turned multifunctional family farms into mono-functional farm businesses. However, the fact that previous food-importing countries become exporters of grain simply meant the new industrial producers were exporting their products to more profitable markets elsewhere, rather than providing food to the poor and hungry people at home. The potential reduction in food prices for those living in cities was often too small

to make any real difference in hunger. As the US and Canadian experiences have clearly demonstrated, cheap food is not the solution to hunger. In addition, lower production costs may be offset by increased profits of food processors and distributors, and the nutritional quality of food may be diminished. Even in cases where it may appear that industrial agriculture has succeeded, it is eventually destined to fail because of its lack of ecological and social sustainability.

But is there an alternative? If large, mono-functional farms cannot feed the world, can small, multifunctional farms provide global food security and agricultural sustainability? Contrary to a widely promoted belief, industrialising global agriculture—meaning replacing the remaining small, multifunctional, diversified farms with large, mono-functional, specialised farms—is *not* the only means of increasing global food production. Industrial agriculture advocates seem to ignore that small multifunctional farms already account for at least 70 per cent of global food production, according to the United Nations Environmental Programme (2010). Furthermore, industrial agriculture is more efficient than non-industrial agriculture only in terms of the number of people employed and the costs of labour and management. Industrial agriculture is not more efficient in terms of production per dollar invested, per calorie of fossil energy used or in terms of resource degradation and pollution per calorie of food produced. It is not even more efficient in terms of production per acre or hectare of land.

Miguel Altieri (2009) of the University of California elaborates on the productivity advantage for small farms. “A large farm may produce more corn per hectare than a small farm in which the corn is grown as part of a polyculture that also includes beans, squash, potatoes, and fodder. But, productivity in terms of harvestable products per unit area of polycultures developed by smallholders is higher than under a single crop with the *same level of management* [emphasis added]. Yield advantages can range from 20 percent to 60 percent, because polycultures reduce losses due to weeds (by occupying space that weeds might otherwise occupy), insects, and diseases (because of the presence of multiple species), and make more efficient use of the available resources of water, light, and nutrients” (Francis 1986).

Major comprehensive studies have documented the potential for increasing the productivity of intensively managed, small-scale farms by relying on diversified, organic, sustainable farming methods. For example, a 2008 United Nations study of farming methods in 24 African countries found that organic or near-organic farming resulted in yield increases of more than 100 per cent (UNEP-UNCTAD 2008). As Peter Rossett of the Institute for Food and Development Policy explains: “Here at the Institute, we’ve reviewed the data from every country for which it’s available, comparing the productivity of smaller farms versus larger farms. For every country for which data is available, smaller farms are anywhere from 200 to 1,000 percent more productive per unit area. When you grow one crop all by itself, you may get a lot of that one crop, but you’re not using the ecological space—the land and water—very efficiently. Large farmers generally have monocultures because they are easier to fully mechanize” (Multinational Monitor 2000).

A doubling of production on the small farms that currently provide food for 70 per cent of the global population would allow them to support a 70 per cent increase in the global population, even if there were no further increase in production from industrial farms—clearly enough to meet the expected basic global food needs of 2050 and beyond. Therefore, global food security does not depend on continued increases in productivity in industrial agricultural countries such as the USA and Canada. The challenge in these countries is to increase the sustainability of agriculture, rather than to increase agricultural yields or productivity.

Most of the research comparing conventional farming with more sustainable alternatives focuses on organic farming. Long-term studies in the USA have shown that well-managed organic farming systems—using organic practices common in the USA, Canada and northern Mexico—can produce yields comparable to conventional farming systems (Drinkwater, Wagoner, and Sarrantonio 1998; Rodale Institute 2012). A comprehensive review of numerous comparisons which was published in the journal *Nature* indicates that organic yields tend to be lower, at least under some conditions. Summarising a large number of studies, the authors found organic deficits averaging as high as 34 per cent under conditions least favourable for organic but only 13 per cent under the best organic management practices. Organic yields were actually higher in some situations, and deficits averaged as low as 5 per cent for some crops and growing conditions. The study concluded: “Under certain conditions—that is, with good management practices, particular crop types and growing conditions—organic systems can thus nearly match conventional yields, whereas under others it at present cannot” (Seufert, Ramankutty, and Foley 2012). But, as others have pointed out, yields are not the primary motivation for organic or sustainable agriculture (Wilde 2012).

Yields ‘comparable to’ current yields will be more than adequate to provide food security in the USA with an otherwise sustainable food system. Yield differences between conventional and organic farming were greatest for field crops, such as corn and soybeans, used primarily for livestock feed and biofuels. Simply reducing the proportion of animal products in North American diets and taking animals out of feedlots, returning them to their natural roles as foragers and scavengers, would free up a significant percentage of total tillable acres for food production. The primary challenge to family farmers in North America is sustainability, not productivity.

In addition, with multifunctional farming the need for fossil energy for food production would be greatly reduced, scarcity of water and other natural resources would be less restricting of food production, nature could accommodate the agricultural wastes, and soil productivity could be restored, while sequestering large quantities of greenhouse gases and mitigating global climate change in the process. All of these changes would move humanity closer to food security and agricultural sustainability.

## 5.8 SUSTAINABILITY DEPENDS ON INTENTIONAL MULTIFUNCTIONALITY

The IAASTD *Global Report* cited previously concluded that agricultural production systems must change radically to meet future demand. It called for governments to pay more attention to small-scale farmers and sustainable farming practices (McIntyre et al. 2009). These international food experts challenge the myth that industrial agriculture is more efficient in any sense other than in reducing agricultural employment and maximising economic returns for those who have the capital to invest in an industrial farming operation. Increasingly, food security experts are now calling for a shift in global agricultural development programmes to focus on supporting a multifunctional agriculture, capable of providing global food security while protecting the natural environment, preserving rural communities and honouring indigenous knowledge and cultures—meeting the needs of the present and future.

A strong and growing sustainable agriculture movement is already underway in the USA and Canada: with names including organic, ecological, biodynamic, holistic, permaculture, practical and innovative (Ikerd 2008). However, the sustainability of North American agriculture may ultimately depend on North American farmers being willing to learn agroecology,

permaculture and other approaches to sustainable farming that are more common to farming in other parts of the world. Mexican farmers may have a distinct advantage in this regard, because many have not abandoned the more sustainable farming and land tenure practices of earlier times. Supportive farm policies could help families preserve the multifunctionality of their farms. Farmers in the USA may have the greatest difficulty, because US agriculture is still dominated by the corporate industrial paradigm of agriculture. Farmers in Canada have a more recent history of supply management to meet their domestic food needs but also have the greatest economic dependence on agricultural exports.

The industrial model of food production seemed to make sense in an earlier world where people were relatively few, fossil energy was plentiful and inexpensive, natural resources were abundant, and nature seemed capable of assimilating and neutralising any amount of toxins and wastes. None of these conditions are true of the world of today. The challenge of the future will be to provide meaningful employment for more people, to transition from non-renewable to renewable resources and to reduce pollution to levels that can be assimilated or otherwise accommodated by nature.

The global food system of the future must balance the need for greater productivity and resource efficiency with the resilience to thrive under uncertain climatic conditions, and the capacity to renew and regenerate the soil, water, air, energy and other resources needed to sustain productivity. Rather than being mechanistic, specialised, standardised and centrally controlled, farms of the future must be organismic, holistic, diverse, multifunctional, decentralised farms that are 'ways of life', as well as means of making a living. Family farms have the potential to meet these criteria and have a natural advantage in fulfilling the multiple needs of their societies and of humanity in the future.

The sustainable food systems of the future are likely to be local community-based systems that are guided by collaboration and cooperation, rather than global corporate-based systems guided by competition and domination. The smaller, diversified, sustainable family farms of the future will provide greater economic opportunities for people in rural areas and cleaner, healthier rural environments—slowing and eventually reversing the rural–urban population migration of the past. People of the future, in all nations of the world, will have not only enough calories to meet their energy needs but also access to enough nutritious foods to meet their complete nutritional needs for healthy, active lifestyles. Healthier people and lower costs of health care will result in healthier economies and societies.

All of these benefits are possible with existing knowledge and technologies, and the positive possibilities for the future are even greater. Large, mono-functional industrial farms cannot provide global food security for either the present or the future, but multifunctional sustainable family farms could provide both. All it would take is a fundamental change in thinking and the courage to act in the face of corporate opposition. The future of multifunctional family farms is critical to global food security and agricultural sustainability.

## **6 DIVERSITY OF FAMILY-OPERATED FARMS**

### **6.1 OFFICIAL DEFINITIONS OF FAMILY FARMS**

The 2014 'Dialogue on Family Farms in North America' clearly demonstrated that family farms are very diverse or heterogeneous in nature (UPA and FAO 2014). Farming operations owned and controlled by families range from small urban market gardens to large multinational

corporations, such as Cargill. As indicated previously, there is no consensus regarding the definition of a 'family farm' for purposes of farm policy. The Economic Research Service of the US Department of Agriculture defines family farms as "those whose principal operator, and people related to the principal operator by blood or marriage, own most of the farm business" (MacDonald 2014). The principal operator is the person who is responsible for the on-site, day-to-day business decisions.

Under the Economic Research Service's definition, family farms represent 97.6 per cent of all US farms and are responsible for 85 per cent of US farm production. When consideration is given to whether the family provides most of the labour for the farm and to whether the farm used most of the labour of the family, the percentages of family farms drop to 87 per cent and 86 per cent, respectively, and the percentage of total production drops to 57 per cent and 47 per cent, respectively. These definitions provide very limited useful information regarding the important question of whether family-owned farms in the USA are multifunctional or mono-functional with respect to management.

Statistics Canada defines a family farm as "a farm where the farm family provides much of the capital and labour for the farm. In some cases there are seasonal employees. Many incorporated farms are still considered to be family farms" (Government of Saskatchewan 2014). Non-family corporations account for 2.4 per cent of all Canadian farms. The rest are presumably considered to be family farms. However non-family corporations own 10 per cent of farms with sales of over Can\$1 million in Canada, which account for just under a half of total gross farm receipts (Statistics Canada 2012). The 'farm policy definitions' of family farms in Canada and the USA appear to be quite similar in classifying virtually all farming operations as family farms and attributing the vast majority of agricultural production to them. Unfortunately, such definitions are of very limited benefit in addressing the challenges faced by multifunctional family farms.

Mexican statistics for family farms include those that produce foods to meet the needs of farm families and for sale in local markets, which would exclude virtually all corporate farms. A study conducted by the Ministry of Agriculture, Livestock, Rural Development, Fisheries and Nutrition (SAGARPA) identified three major groups of family farms: "*Subsistence family farms*: Food production for on-farm consumption characterized by inadequate productive resources and the need to supplement income with non-farm activities or government aid; *Family farms in transition*: Production for on-farm consumption and sale, with minor shortages of productive resources; additional sources of income are rarely needed; and *Consolidated family farms*: Sustainable production and sale in local markets, with no shortage of productive resources; other sources of income may sporadically be required" (FAO Regional Office for Latin America and the Caribbean 2013).

The study concluded that 81.3 per cent of Mexico's 5.4 million rural economic units could be considered family farms. According to the study, 39.6 per cent of rural economic units in Mexico have 'business production potential' beyond subsistence farming. The primary exception to family farming in Mexico appears to be farms operated by large US food corporations that rent land in northern Mexico to produce crops for export to the USA. None of the current agricultural statistics provide information of significant value in meeting the current challenges to family farms, domestic food security or the long-term sustainability of North American agriculture.

## 6.2 FAMILY FARM DEFINITIONS INCLUDE FARM BUSINESSES

In the USA and Canada, farms obviously have become fewer and larger as family farms have been transformed into agricultural businesses. This same trend is apparent in northern Mexico and is being supported by policies of the Mexican government. However, farm size alone does not distinguish between family farms and non-family farms. The existing definitions tend to give some consideration to the gradients between family and non-family farms mentioned previously. They include the nature of management, legal ownership and, in the case of Mexico, the destination of production. The source of labour is somewhat ambiguous in US and Canadian definitions. Current definitions fail to consider the source of investment capital or land tenure status, although the vast majority of Mexican family farmers rent rather than own their land.

Perhaps the most obvious and important omission from family farm statistics is the ultimate source of control of farming operations. The US and Canadian definitions both indicate that farm families must be the principal operators, meaning they make the day-to-day management decisions for family farms. However, the basic functionality of the farming operation, of whether it is multifunctional or mono-functional, may be determined far more by various contractual agreements than by the 'principal operators' who make day-to-day decisions. The terms of production contracts are typically determined by agribusiness corporations that have far more bargaining power than do even the largest of family farming operations. The terms of corporate contracts obviously reflect the economic interest of corporate investors, and thus give priority to the economic functions of the farming operation. Attention given to social and ecological functions are likely to be limited to minimum compliance with environmental regulations and avoiding potential nuisance law suits of neighbours who endure their negative ecological and social impacts.

The extent to which contracts shift control of the farming operation from the principal operator to the contracting corporation varies greatly, depending on the nature of the contract. A contracted price for a single shipment of grain or livestock represents little transfer of control from the farmer to corporate buyer. Comprehensive production contracts for livestock, such as those typical for large livestock feeding operations, transfer almost complete control of the production process from the principal operator to the contracting corporation. The corporation often specifies the design of production facilities, retains ownership of the feeder livestock, provides the feed, determines health management practices and specifies timing of production practices and marketing (Constance and Heffernan 1991). The length of the operator's commitment is essentially determined by the useful life of the production facilities, as financing of construction may be dependent on the contract.

A licensing agreement to grow a genetically modified, herbicide-resistant grain crop transfers control of production practices for the growing season. The licence to use the corporation's genetically modified seeds obliges the operator to use the corporation's herbicides and associated management practices and prohibits saving of seeds for replanting. Producers of fresh fruits and vegetables who become dependent on single corporate buyers are essentially controlled by those corporations, regardless of the length of their contracts. They have no logical alternative markets.

The limited government data available regarding the extent of contracting among family farms and the nature of contractual arrangements are not adequate to be of use in determining the degree of multifunctionality. In matters concerning food security, agricultural sustainability and the future of humanity, the functionality of farming operations is far more

important than whether a family owns and provides day-to-day management for a farming operation. Farms that are owned and operated by families are quite diverse, but the security and sustainability of food systems depends on the specific subset of family farms that are *intentionally* multifunctional rather than simply family owned and operated—sustainable farms managed for ecological, social and economic integrity rather than economic efficiency.

## 7 GOVERNMENT POLICIES FOR MULTIFUNCTIONAL FAMILY FARMS

### 7.1 FROM FOOD SECURITY TO AGRICULTURAL SUSTAINABILITY

Over the past several decades, government policies have focused on mono-functional economic efficiency. While such policies obviously were motivated by good intentions, the negative consequences of an economically mono-functional agriculture are now clearly evident in persistent pockets of food insecurity and the more general rise in diet-related illnesses in the USA and Canada. Other countries of the world have experienced similar consequences as they have industrialised their food systems and shifted from multifunctional family farms to mono-functional farm businesses. Mexico is beginning to experience similar consequences in the northern part of the country, as traditional family farms are replaced by corporate farms and people become reliant on food imports from the USA.

Food security, domestic and global, has been a logical motive for government policies specific to agriculture and farming in the past, even though such policies obviously failed to provide everyone with access to enough wholesome food to support healthy, active lifestyles. However, with growing concerns about ecological integrity and social equity, the agricultural public policy mandate must extend beyond food security to agricultural sustainability. Food security alone, while necessary, is insufficient to address the long-term challenges to the future of humanity. Agricultural sustainability is inherently a multifunctional concept with ecological, social and economic dimensions. Thus, farm policies that support and promote agricultural sustainability must support and promote intentional multifunctionality.

As an example of multifunctional farm policy, the concept of *food sovereignty* has been developed by La Via Campesina as an alternative to food security in formulating farm policy. Food sovereignty is defined as “the right of the world’s peoples to healthy and culturally appropriate food, produced in an ecological and sustainable way, and the right to define their own farming and food systems” (UPA and FAO 2014). Regardless of whether governments embrace the specific policy agenda of the food sovereignty, the concept provides a significant example of a multifunctional approach to farm policy. Its principles include:

- target food for people and not agribusiness and international markets;
- promote the work of everyone who produces food, and reject policies that seek to eliminate producers or threaten their communities;
- promote the development of local networks that link producers and consumers;
- promote decisions and local control of resources by resisting privatisation while emphasising sharing and sustainability;
- promote the development and transmission of local knowledge to future generations; and
- promote working together with nature to benefit biodiversity (ibid.).



A seventh and important principle was omitted from the FAO summary: “Smallholder farmers must have direct input into formulating agricultural policies at all levels. Everyone has the right to honest, accurate information and open and democratic decision-making... free from all forms of discrimination. Rural women, in particular, must be granted direct and active decision making on food and rural issues” (ibid.). Food sovereignty goes beyond food security to include ethical, social and ecological agendas for farm policy.

Regardless of the specific policy agenda chosen, agricultural sustainability will require fundamental changes in farm policies. The greatest obstacle to such changes in North America will be the economic and political power of multinational food corporations and large agribusinesses. Corporate agribusiness, large commodity associations and even some traditional family farm organisations have multimillion-dollar political campaign budgets that are dedicated to government maintaining programmes that subsidise industrial agriculture. They are equally dedicated to defeating policy initiatives that oppose or even question their agenda. They understand that even small government programmes that give token support to organic farming, sustainable agriculture and local niche markets are essential to create a public perception of political objectivity, but they are careful not to allow such perceptions to become reality.

## 7.2 FROM ECONOMIC EFFICIENCY TO MULTIFUNCTIONALITY

The longest journey begins with the first step, and the first towards redirecting farming towards multifunctional family farms may be to redefine family farms—at least for purposes of public policy. Past definitions or classifications of farms have focused on the economic dimension of farming, such as value of production, net farm income, ownership structure, source of labour, source of capital and land tenure. Such criteria apparently assume that the most important functions of farming, if not its sole function, are economic in nature. Different types of farms are defined simply as different types of farm businesses—as mono-functional rather than multifunctional.

Redefining family farms to reflect their multifunctionality will require the best thinking of the brightest minds and the commitment and persistence of a dedicated coalition of political activists. Accordingly, the Food and Agricultural Organization of the United Nations (FAO) has assembled a working group to develop a consensus definition of family farms appropriate for purposes of public policy. To be useful in developing farm policies that support food sovereignty, definitions or classifications of family farms must reflect differences in their *intentionality*. Family farms that are *managed* multifunctionally must be distinguishable from those *managed* mono-functionally.

While new definitions of multifunctional family farms may be useful in guiding future farm policies, the necessity for fundamental changes in North America is already abundantly clear. The necessary changes may seem radical to those involved in current farm policy debates; however, fundamental changes in North American farm policy must be made before it is too late to reverse the ecological and social degradation inherent in industrial agriculture. The future of humanity may well depend on transformational rather than incremental change.

### 7.3 PHASE OUT COMMODITY-BASED FARM POLICIES

Public policies currently subsidising industrial agriculture should be de-emphasised immediately and phased out over time. All government programmes that are linked to specific commodities, including corn, soybeans, wheat and rice, encourage specialisation of production for globally traded commodities and promote agricultural industrialisation. Subsidised crop insurance for specific commodities, which was emphasised in the latest US Farm Bill, is simply another means of subsidising agricultural industrialisation. Subsidised crop insurance, particularly insurance that insures both yields and prices, reduces the economic risks associated with specialising in one or two crops, such as corn and soybeans, and promotes large-scale industrial farming operations. All these programmes should be de-emphasised and eventually phased out. The only exception for crop-specific subsidies would be for production needed for domestic food security, which should be produced under production controls that prevent economic exploitation. Other government programmes that incentivise expansion of farm size, such as subsidised farm credit and investment tax credits, should also be phased out over time.

While such a change in US farm programmes may seem radical today, a similar planned phase-out was included in the 1995 US Farm Bill, the 'Freedom to Farm Act'. Elimination of crop-specific subsidies has also been an important aspect of ongoing 'free trade' negotiations. In addition, such a phase-out would not appreciably affect most US family farmers. As indicated previously, 75 per cent of all US government payments go to 10 per cent of farmers, who almost certainly manage mono-functional farms. These payments directly subsidise chemical-intensive, genetically modified, irrigated cropping operations and indirectly subsidise large-scale confinement animal feeding operations. More than 60 per cent of US farmers received no government payments and thus are not dependent on the continuation of commodity-based programmes (Environmental Working Group 2014).

Commodity-based programmes should be phased out over time to allow a transition period for the few multifunctional family farms that have become dependent on government payments for supplemental income. The incremental increase in government funds saved in the process of phasing out subsidies for mono-functional farms could be used to facilitate the development of replacement sources of income for multifunctional family farms. Over the longer term, competitiveness must be restored to agricultural markets to ensure that multifunctional family farms receive fair market prices or economic value for their products. Corporate dominance of markets is currently common to all sectors of the global economy and will require more comprehensive changes than those available through agricultural policies. However, there would still be a need for government farm policies. Even the most effective markets will not ensure either food security or agricultural sustainability.

Future government farm programmes should focus on developing and sustaining multifunctional family farms. Farm families need not be rewarded economically for everything they must do for the good of society or the future of humanity. For example, soil and water conservation incentives to farmers should be cost-sharing programmes. Farmers must be willing to share the ecological and social costs, along with consumers and taxpayers. Ultimately, food consumers in general, not just elite 'foodies', must be willing to share the ecological and social costs of sustainable farming. The economic costs will be bearable, and less than the ecological and social value of doing so. The purpose of farm programmes should be to allow taxpayers to do collectively, through government, those things that cannot be done individually. Farmers and consumers must bear some of the costs of agricultural sustainability individually, but they also must share other costs collectively, as taxpayers.

#### 7.4 INCENTIVISE FAMILIES, NOT FARMS

A comprehensive list of North American government policies needed to replace current industrial farm policies is clearly beyond the scope of this report, but not beyond the realm of possibility or practically. Some general proposals include basing subsidies on whole-farm income rather than production of specific commodities. The intent of such programmes would be to remove current incentives to specialise in specific subsidised crops or commodities. Subsidised whole-farm revenue insurance could be provided to reduce economic risks for multifunctional family farms, with lower premiums available to reflect lower risks of more diversified farming operations. Lower insurance costs for diversified farms would discourage specialisation and industrialisation.

All farm subsidies should be contingent on the implementation of sustainable farming practices. Farms that choose not to participate in government programmes to avoid this requirement should be regulated in the same as any other industrial operation, including environmental and worker safety regulations. The animals in such operations should be treated as workers, with appropriate standards for humane treatment. Mono-functional farms should not be able to *externalise* their social or ecological costs by imposing them on communities or societies.

Government payments should be linked to family size, not farm size—people, not production. Maximum payments could be adjusted to reflect the dependence of the family on farm income. The motivation for such limits would be to encourage more families to engage in agriculture, particularly in ways that create a sense of connectedness between the families and their farms. Farm programmes should be designed to sustain families through periods of economic adversity, rather than create dependencies on government payments. The payments could be linked to net farm income, increasing to levels necessary to support families during years of negative net farm income and decreasing to elimination as net farm income approaches median non-farm incomes for comparable non-farm families.

Government provision of basic health care, as is already available in Canada, should be made available to multifunctional farm families in the USA and Mexico to remove a major obstacle to full-time family farming. Multifunctional farmers should also be provided with workers' compensation during recovery from inevitable injuries and illnesses. 'Fringe benefits' for multifunctional farm families, provided through farm programmes, should be comparable to government and corporate fringe benefits provided to non-farm workers.

#### 7.5 REFORM USE OF FARMLAND FOR THE COMMON GOOD

History has proven that allowing markets to value and allocate the use of farmland will not provide domestic food security and most certainly will not ensure either food security or agricultural sustainability. Meeting these challenges will require comprehensive land reform policies. For example, specific parcels of naturally productive farmland could be identified and zoned for use to provide domestic food security and global agricultural sustainability. Enough land would need to be 'permanently zoned' for food production to meet the basic needs of all people, including current and future generations.

This approach would be very different from the current practice of buying 'development rights' and placing land in agricultural 'land trusts'. Any speculative 'development value' of land currently zoned for agriculture would be lost with comprehensive land reform. However,

society has no responsibility to ensure the success of the current *speculative* ownership of farmland. Owners of good farmland currently zoned for higher-valued economic uses could be compensated for 'down-zoning' to agriculture, funded by taxing away speculative gains in lands that are up-zoned to higher-valued uses. Profits from up-zoning are essentially grants from societies, as the owners of such land have done nothing productive to increase its value. Taxing away such profits would also remove any economic pressure to up-zone good farmland from agriculture to other uses. Prices of farmland would reflect the economic value of land in producing food, not prices inflated by land speculation.

Farmland not needed for domestic food security would also need to be farmed sustainably. This land could be farmed by larger commercial operations to produce food for export to food-deficient nations, giving them an economic incentive to increase the *sustainable* productivity of their land. Global markets would again be restricted to trade in domestic agricultural surpluses, not depended on to provide domestic food security.

The effect of land tenure policies that support agricultural sustainability would be to return most farmland to some sense of common property, or at least common rights, by ensuring the use of farmland for the common good. In places where farmland remains in common use, it should be retained in common use, with adequate incentives to ensure that it is managed multifunctionally for the common good of farm families and society. Government-owned farmland should be offered to multifunctional farmers at minimal or no cost to allow young families to get started in farming without large investments in land. Given the cultural history of the USA and Canada, it might be more acceptable to allow young farm families to 'homestead' public land. They would be given a reasonable period of time to turn it into a successful multifunctional farm to qualify for ownership of the land. They would need to be able to make an economic living while caring for the land and contributing to the food needs of their community.

## 7.6 REDIRECT PUBLIC RESEARCH AND EDUCATION

If publicly funded research and education is to fulfil its public mission by supporting domestic food security and agricultural sustainability, the existing ties between agribusiness corporations and public-funded research and educational institutions must be broken. The current justification for public-private partnerships in research and education is that public interests are best served through the marketplace. While this approach may have seemed reasonable at some time in the past, the evidence is now clear that the industrialisation of the food system has failed to provide either food security or long-term agricultural sustainability. The public research and educational agenda must be redirected towards agricultural sustainability through multifunctionality, rather than food security through mono-functional economic efficiency, by empowering farm families with information and technologies appropriate for sustainable farming.

Publicly funded research and education must give priority to on-farm research and with-farmer education. Farming in the future must be treated as a learned profession. In the words of Adam Smith (1776): "no endeavor requires a greater variety of knowledge and experience than does farming, other than possibly the fine arts or liberal professions." Multifunctional farmers need good basic liberal educations, but they also need a deep personal sense of connectedness with their farms and communities. Young farm families need to be provided

with personal tutors and mentors in the person of experienced farm families or aging farmers who have developed a close working relationship with their own farms and communities. Government mentorships and internships would ensure that interns or apprentices were not treated as a source of low-cost labour but as an opportunity to pass knowledge and wisdom from one generation to the next.

### 7.7 RESTORE FAMILY FARMS TO A POSITION OF HIGH ESTEEM

In summary, agricultural policies, in North America and elsewhere, must be realigned to move beyond a commitment to domestic food security to agricultural sustainability. Each family farmer should be encouraged to produce food on the farm to meet at least some of the basic needs of the family and, equally important, to maintain a sense of personal connectedness with the earth. Communities, rural and urban, should be encouraged to meet more of their food needs by supporting local farm families who farm multifunctionally, adjusting diets seasonally to take advantage of the resources of local foodsheds.

Each nation should strive for domestic food security, first through local food systems, with local deficiencies met through trade among communities that have developed long-term, trusting relationships. Unavoidable long-term food deficits within nations should be resolved through long-term international trade agreements that are based on trust rather than economic expediency. International markets for agricultural products should be relegated to trade that is not essential to agricultural sustainability but adds to the variety of diets and the pleasures of eating.

The sustainability of food production, for the long-term benefit of all of the world's people, can be and must be ensured by government policies that support a global network of local community-based food systems that support and are supported by multifunctional family farms. Only multifunctional farmers are endowed with the inherent potential to farm sustainably, and sustainable farms are essential to sustainable agriculture and sustainable food systems. Public policies thus must support a transition from mono- to multi-functionality. Family farms can and must return to their honoured, almost sacred, position in the cultures of North America and the rest of the world.

## REFERENCES

- Albritton, Robert. 2012. "Two Great Food Revolutions: The Domestication of Nature and the Transgression of Nature's Limits." In *Critical Perspectives in Food Studies*, edited by Mustafa Koc, Jennifer Sumner, and Anthony Winson. Oxford: Oxford University Press.
- Alteri, Miguel. 2009. "Agroecology, Small Farms, and Food Sovereignty." *Monthly Review* 61(3), July/August. <<http://monthlyreview.org/2009/07/01/agroecology-small-farms-and-food-sovereignty>>. Accessed 15 September 2014.
- Améndola, Ricardo, Epigmenio Castillo, and Pedro A. Martínez. 2005. "Country/Pastures Forage/Resource Profiles: Mexico." Food and Agriculture Organization of the United Nations website. <<http://www.fao.org/ag/AGP/AGPC/doc/Counprof/Mexico/Mexico.htm>>. Accessed 15 September 2014.
- Brundtland, Gro Harlem (ed.). 1987. *Our Common Future*. Oxford: Oxford University Press.
- CBC News. 2013. "One in eight Canadian families struggle to put food on tables." CBC News website. <<http://www.cbc.ca/news/canada/new-brunswick/1-in-8-canadian-families-struggle-to-put-food-on-table-study-says-1.1346620>>. Accessed 15 September 2014.
- Centers for Medicare & Medicaid Services. 2014. *NHE Fact Sheet*. Centers for Medicare & Medicaid Services website. <<https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/NHE-Fact-Sheet.html>>. Accessed 15 September 2014.
- Coleman-Jensen, Alisha, Christian Gregory, and Anita Singh. 2014. "Household Food Security in the U.S. in 2013." *Economic Research Report* No. 173. Washington, DC: US Department of Agriculture, Economic Research Service. <http://www.ers.usda.gov/media/1565415/err173.pdf>>. Accessed 15 September 2014.
- Constance, Douglas H., and William D. Heffernan. 1991. "The Global Poultry Agro/Food Complex." *International Journal of Sociology of Agriculture and Food* 1: 126–142
- Cordell, Dana, Jan-Olof Drangert, and Stuart White. 2009. "The story of phosphorus: Global food security and food for thought." *Global Environmental Change* 19(2): 292–305. <<http://www.sciencedirect.com/science/article/pii/S095937800800099X>>. Accessed 15 September 2014.
- Davis, Donald, Melvin Epp, and Hugh Riordan. 2004. "Changes in USDA Food Composition Data for 43 Garden Crops, 1950 to 1999." *Journal of American College of Nutrition* 23: 669–682.
- Dean, Kate. 2011. *Farmland Changing Hands: A Study of Innovative Land Transfer Strategies*. Seattle, WA: Washington Farm Link. <[http://www.cascadeharvest.org/files/u1/Farmland\\_Changing\\_Hands\\_0.pdf](http://www.cascadeharvest.org/files/u1/Farmland_Changing_Hands_0.pdf)>. Accessed 15 September 2014.
- Drinkwater, L.E., P. Wagoner, and M. Sarrantonio. 1998. "Legume-based cropping systems have reduced carbon and nitrogen losses." *Nature* 396: 262–265.
- Duffy, Michael. 2009. "Economies of Size in Production Agriculture." *Journal of Hunger Environmental Nutrition* 4(3–4): 375–392. <<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3489134/>>. Accessed 10 October 2014.

- Environmental Working Group. 2014. "EWG Farm Subsidy Database, United States Summary." Environmental Working Group website <<http://farm.ewg.org/region.php?fips=00000>>. Accessed 15 September 2014.
- Faculty of Agriculture and Food Science, University of Manitoba. 1994. *Sustainability of Canada's Agri-Food System; a Prairie Perspective*. Winnipeg, MB: International Institute of Sustainable Development: 20. <<http://www.iisd.org/pdf/agrifood.pdf>>. Accessed 15 September 2014.
- FAO Regional Office for Latin America and the Caribbean. 2013. "Family farming in Mexico." *Family Farming Newsletter*, April–June. <<http://www.fao.org/3/as188e.pdf>>. Accessed 15 September 2014.
- Francis, Chuck. 1986. *Multiple Cropping Systems*. New York: MacMillan.
- Government of Saskatchewan. 2014. "Think Ag: Definitions of Farm and Farmer." Henriques, Gisele, and Raj Patel. 2004. *NAFTA, Corn, and Mexico's Agricultural Trade Liberalization*. Silver City, NM: Interhemispheric Resource Center: 6. <<http://dspace.africaportal.org/jspui/bitstream/123456789/113/1/NAFTA%20Corn%20and%20Mexicos%20Agricultural%20Trade%20Liberalization.pdf?1>>. Accessed 15 September 2014.
- Ikerd, John E. 2008. *Crisis and Opportunity; Sustainability in American Agriculture*. Lincoln, NE: University of Nebraska Press.
- Ikerd, John E. 2011. "Local Food: Revolution and Reality." *Journal of Agricultural and Food Information* 12(1): 49–57.
- Ikerd, John E. 2012. *The Essentials of Economic Sustainability*. Bloomfield, CT: Kumarian Press: Chapter 1.
- Jarrell, W.M., and R.B. Beverly. 1981. "The Dilution Effect in Plant Nutrient Studies." *Advances in Agronomy* 34: 197–224.
- Kirschenmann, Frederick L. 2010. *Cultivating an Ecological Conscience*. Berkeley, CA: Counterpoint.
- Kirschenmann, Frederick L., Steve Stevenson, Fred Buttel, Tom Lyson, and Michael Duffy. 2004. "Why Worry About the Agriculture of the Middle?" *Leopold Center Pubs and Papers*. Paper 143. Ames, IA: Leopold Center for Sustainable Agriculture, Iowa State University. <[http://lib.dr.iastate.edu/cgi/viewcontent.cgi?article=1141&context=leopold\\_pubspapers](http://lib.dr.iastate.edu/cgi/viewcontent.cgi?article=1141&context=leopold_pubspapers)>. Accessed 15 September 2014.
- MacDonald, James. 2014. *Family Farming in the U.S.* Washington, DC: US Department of Agriculture, Economic Research Service. <[http://www.ers.usda.gov/amber-waves/2014-march/family-farming-in-the-united-states.aspx#.U\\_NzSvldV8E](http://www.ers.usda.gov/amber-waves/2014-march/family-farming-in-the-united-states.aspx#.U_NzSvldV8E)>. Accessed 15 September 2014.
- MacPherson, Ian. 1979. *Each for All: A History of the Co-operative Movement in English Canada, 1900–1945*. Toronto, ON: The Macmillan Company of Canada Limited: 12.
- MacPherson, Ian. 2009. *A Century of Co-operation*. Ottawa, ON: The Canadian Co-operative Association: 28.
- McBride, William D., and Nigel Key. 2013. "U.S. Hog Production From 1992 to 2009: Technology, Restructuring, and Productivity Growth." *Economic Research Report No. ERR-158*. Washington, DC: US Department of Agriculture, Economic Research Service. <<http://www.ers.usda.gov/publications/err-economic-research-report/err158.aspx#.U-jy9fldV8E>> Accessed September 15, 2014.

- McIntyre, Beverly D., Hans R. Herren, Judi Wakhungu, and Robert T. Watson (eds). 2009. *International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD): Global Report*. Washington, DC: Island Press: 15. <[http://www.weltagrabericht.de/reports/Global\\_Report/Global\\_content.html](http://www.weltagrabericht.de/reports/Global_Report/Global_content.html)>. Accessed 15 September 2014.
- Multinational Monitor. 2000. "The Case for Small Farms: An Interview with Peter Rosset." *Multinational Monitor* 21 (7–8), July/August. <<http://www.multinationalmonitor.org/mm2000/00july-aug/interview.html>>. Accessed 15 September 2014.
- National Chicken Council. 2012. "Vertical Integration." National Chicken Council website. <<http://www.nationalchickencouncil.org/industry-issues/vertical-integration/>>. Accessed 15 September 2014.
- Nations Encyclopedia. 1996. "Mexico – Agriculture." Nations Encyclopedia website. <<http://www.country-data.com/cgi-bin/query/r-8742.html>>. Accessed 15 September 2014.
- Nordin, Stacia, and Kristof Nordin. 2000. "Green Revolution Fails." Never Ending Food website. <<http://www.neverendingfood.org/articles/how-the-green-revolution-has-failed-to-feed-us/>>. Accessed 15 September 2014.
- Pimentel, David, and Marcia Pimentel. 1996. *Food, Energy, and Society*. Niwot, CO: University Press of Colorado.
- Polanyi, Karl. 1944, 1957. *The Great Transformation; The Political and Economic Origins of our Time*. Boston, MA: Beacon Press.
- Rand Corporation. 2004. "Cost of Treatment for Obesity-Related Medical Problems Growing Dramatically." Rand Corporation website. <<http://www.rand.org/news/press/2004/03/09.html>>. Accessed 15 September 2014.
- Rodale Institute. 2012. *The Farming Systems Trials: Celebrating 30 years*. Kutztown, PA: Rodale Institute. Accessed 15 September 2014. <<http://rodaleinstitute.org/assets/FSTbooklet.pdf>>.
- Seufert, Verena, Navin Ramankutty, and Jonathan A. Foley. 2012. "Comparing the yields of organic and conventional agriculture." *Nature* 485, 10 May: 229–232. <<http://www.nature.com/nature/journal/v485/n7397/abs/nature11069.html>>. Accessed 15 September 2014.
- Shiva, Vandana. 1991. "The Green Revolution in the Punjab." *The Ecologist* 21(2), March–April. <<http://livingheritage.org/green-revolution.htm>>. Accessed 15 September 2014.
- SIAP. 2010. *Average Age of Principal Farm Operators: Canada, United States and Mexico*. Mexico: Servicio de Información Agroalimentaria y Pesquera. <[http://webpage.siap.gob.mx/opt/mapas/Map\\_Edadpromedio\\_en.pdf](http://webpage.siap.gob.mx/opt/mapas/Map_Edadpromedio_en.pdf)>. Accessed 15 September 2014.
- Smith, Adam. 1776, 1991. *Wealth of Nations*. New York: Prometheus Books: 83.
- Smith, Bob. 1993. "Organic Foods vs Supermarket Foods: Element Levels." *Journal of Applied Nutrition* 45: 35–39.
- Soule, Judith S., and John K. Piper. 1992. *Farming in Nature's Image, An Ecological Approach to Agriculture*. Washington, DC: Island Press.
- Statistics Canada. 2009. "A statistical portrait of agriculture, Canada and provinces: census years 1921 to 2006." Statistics Canada website. <<http://www.statcan.gc.ca/pub/95-632-x/2007000/t/4185570-eng.htm>>. Accessed 15 September 2014.



- Statistics Canada. 2012. "2011 Census of Agriculture." Statistics Canada website. <<http://www.statcan.gc.ca/eng/ca2011/index>>. Accessed 15 September 2014.
- Stofferahn, Curtis. 2006. *Industrialized Farming and Its Relationship to Community Well-Being: an Update of the 2000 Report by Linda Lobao*. Bismarck, ND: Office of the Attorney General of North Dakota. <<http://www.und.edu/org/ndrural/Lobao%20&%20Stofferahn.pdf>> Accessed September 15, 2014.
- Sumner, Jennifer, J.J. McMurtry, and Hannah Renglich. 2014. "Leveraging the local: Cooperative food systems and the Local Organic Food Co-ops Network in Ontario, Canada." *Journal of Agriculture, Food Systems, and Community Development* 4(3): 49.
- Thompson, Edward. 1991. *The Making of the English Working Class*. New York: Penguin Press: 217.
- UNEP-UNCTAD. 2008. *Organic agriculture and food security in Africa*. New York and Geneva: UNEP-UNCTAD Capacity Building Task Force on Trade, Environment and Development. <[http://unctad.org/en/docs/ditcted200715\\_en.pdf](http://unctad.org/en/docs/ditcted200715_en.pdf)>. Accessed 15 September 2014.
- United Nations Environmental Programme. 2010. *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication*. Nairobi, Kenya: United Nations Environmental Programme. <<http://web.unep.org/greeneconomy/resources/green-economy-report>>. Accessed 15 September 2014.
- UPA and FAO. 2014. *Dialogue on Family Farming in North America. Event report*. Longueuil, QB: Union des producteurs agricoles and the Food and Agriculture Organization of the United Nations: 10.
- US Department of Agriculture. 2014a. "Growing a Nation: The Story of American Agriculture. Historical Timeline — 1860." Agriculture in the Classroom website. <<http://www.agclassroom.org/gan/timeline/1860.htm>>. Accessed 15 September 2014.
- US Department of Agriculture. 2014b. "Growing a Nation: The Story of American Agriculture. Historical Timeline — 1880." Agriculture in the Classroom website. <<http://www.agclassroom.org/gan/timeline/1880.htm>>. Accessed 15 September 2014.
- US Department of Agriculture. 2014c. "Growing a Nation: The Story of American Agriculture. Historical Timeline — 1920." Agriculture in the Classroom website. <<http://www.agclassroom.org/gan/timeline/1920.htm>>. Accessed 15 September 2014.
- US Department of Agriculture. 2014d. "Growing a Nation: The Story of American Agriculture. Historical Timeline — 1970." Agriculture in the Classroom website. <<http://www.agclassroom.org/gan/timeline/1970.htm>>. Accessed 15 September 2014.
- US Department of Agriculture, Economic Research Service. 2014. "Bioenergy: Findings." US Department of Agriculture, Economic Research Service website. <<http://www.ers.usda.gov/topics/farm-economy/bioenergy/findings.aspx#.VBXrWPldV8E>>. Accessed 15 September 2014.
- US Department of Agriculture, Economic Research Service. 2014b. "Adoption of Genetically Engineered Crops in the U.S." US Department of Agriculture, Economic Research Service website. Accessed 15 September 2014. <<http://www.ers.usda.gov/data-products/adoption-of-genetically-engineered-crops-in-the-us/recent-trends-in-ge-adoption.aspx#.U-jzjPldV8E>>.

US Environmental Protection Agency. 2005. "Renewable Fuel Standard Program." US Environmental Protection Agency website. <<http://www.epa.gov/otaq/fuels/renewablefuels/>>. Accessed 15 September 2014.

Via Campesina. 1996. *The Right to Produce and Access to Land*. Harare, Zimbabwe: Via Campesina. <<http://www.acordinternational.org/silo/files/decfoodsov1996.pdf>>. Accessed 15 September 2014.

Wiebe, Nettie. 2012. "Crisis in the Food System: the Farm Crisis." In *Critical Perspectives in Food Studies*, edited by Mustafa Koc, Jennifer Sumner, and Anthony Winson. Oxford: Oxford University Press.

Wikipedia. 2014a. "Rochdale Principles." Wikipedia website. <[http://en.wikipedia.org/wiki/Rochdale\\_Principles](http://en.wikipedia.org/wiki/Rochdale_Principles)>. Accessed 15 September 2014.

Wikipedia. 2014b. "Greenhouse gas." Wikipedia website. <[http://en.wikipedia.org/wiki/Greenhouse\\_gas](http://en.wikipedia.org/wiki/Greenhouse_gas)>. Accessed 15 September 2014.

Wikipedia. 2014c. "Climate Change and Agriculture." Wikipedia website. <[http://en.wikipedia.org/wiki/Climate\\_change\\_and\\_agriculture](http://en.wikipedia.org/wiki/Climate_change_and_agriculture)>. Accessed 15 September 2014.

Wiktionary. 2014a. "Farmer." Wiktionary website. <<http://en.wiktionary.org/wiki/farmer>>. Accessed 15 September 2014.

Wiktionary. 2014b. "Farm." Wiktionary website. <<http://en.wiktionary.org/wiki/farm>>. Accessed 15 September 2014.

Wilde, Parke. 2012. "Crop yields are only part of the organic vs. conventional farming debate." *Grist*, May. <<http://grist.org/organic-food/crop-yields-are-only-part-of-the-organic-vs-conventional-farming-debate/>>. Accessed 15 September 2014.

Wise, Timothy. 2010. "Agricultural Dumping Under NAFTA: Estimating the Costs of U.S. Agricultural Policies to Mexican Producers." *GDAE Working Paper* No. 09-08. Medford, MA: Global Development and Environment Institute. <<http://www.ase.tufts.edu/gdae/Pubs/rp/AgricDumpingWoodrowWilsonCenter.pdf>>. Accessed 15 September 2014.

World Bank. 2004. "Poverty in Mexico: An Assessment of Conditions, Trends and Government Strategy." *World Bank Report* No. 28612-ME. Washington, DC: World Bank. <<http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTPOVERTY/EXTPA/0,,contentMDK:20269019~menuPK:443285~pagePK:148956~piPK:216618~theSitePK:430367,00.html>>. Accessed 15 September 2014



**International Policy Centre for Inclusive Growth (IPC-IG)**  
United Nations Development Programme

SBS, Quadra 1, Bloco J, Ed. BNDES, 13º andar  
70076-900 Brasília, DF - Brazil  
Telephone: +55 61 2105 5000

[ipc@ipc-undp.org](mailto:ipc@ipc-undp.org) ■ [www.ipc-undp.org](http://www.ipc-undp.org)

I6354EN/1/11.16