

SUBSISTENCE AGRICULTURE FARMING

Subsistence farming is a form of production in which nearly all crops or livestock are raised to sustain the farm family, and rarely producing surpluses to sell for cash or store for later use.

There are two major types of subsistence agriculture: **primitive and intensive**.

Primitive subsistence farming, which includes shifting cultivation, slash and burn, and pastoral nomadic farming is mainly practiced in marginal areas.

In contrast, intensive subsistence agriculture, is practiced in high potential arable land where land is scarce and the farmers have to maximize food production on relatively small fields. This type of farming exhibits a **high degree of diversification** (mixed crop-livestock systems), **inter-cropping and limited use of modern technologies and purchased agricultural inputs**. Intensive subsistence agriculture is widespread in many less developed countries where over 80% of their rural population is engaged in this type of farming. Intensive subsistence agriculture contributes substantially to economies of these countries and in alleviating food insecurity.

It has high potential for increased growth if given the necessary support. Despite this high dependence on subsistence agriculture, the farmers are faced with several challenges which unless addressed will continue to drag behind the economic development of these countries. **Primitive farming tools and applies minimal or no inputs to increase crop yield and productivity.** Although this type of agriculture occupies less than 10% of the world's land area. In sub-Saharan Africa, subsistence agriculture contributes 8-50% of the Gross Domestic Product (GDP) and employs 40-85% of the rural population.

FORMS OF SUBSISTENCE FARMING

- 1. Primitive subsistence agriculture-** shifting cultivation, slash and burn, and pastoral nomadic farming
- 2. Intensive subsistence agriculture-** Intensive subsistence agriculture is a type of agriculture in which the farmers maximize food production on relatively small fields. To maximize food production and to support the large populations on the small pieces of land, the farmers practice double and continuous cropping with no fallowing thus ensuring that no land is wasted. The farmers also use minimal amounts of fertilizers (usually manure and occasionally sub-optimal amounts of inorganic fertilizers) to increase crop productivity (FAO 2005c).

CHARACTERISTICS OF INTENSIVE SUBSISTENCE AGRICULTURE

1. Extremely small farm size (0.25-10 acres) and seasonal reconfiguration of sub-parcels within fields due to socio-economic factors and land tenure systems.
2. A high degree of diversification mixed croplivestock systems and a large number of different types of annual and perennial crops are planted together.

3. Low yields and high rates of crop failure. Due to poor farm management and agricultural practices such as continuous cropping and lack of adequate and appropriate external inputs (fertilizers and quality seed), the land does not produce according to its potential and yields are therefore persistently low.

4. Limited use of purchased input. There is a limited use of purchased inputs (seeds, fertilizers, pesticides) in the crop production process. Sub-optimal amounts of fertilizers and pesticides are occasionally applied to marketed crops by some farmers but no inputs are applied to many subsistence (non-marketed) crops

5. High transportation and other transaction costs for purchased inputs and marketed outputs, and a lack of formal markets for some inputs and outputs. The transaction costs, for example includes the cost of searching for seller of the inputs, bargaining costs, screening the potential seller for trustworthiness and reliability and also searching for the best price.

6. Lack of production credit. Production credit is unavailable at all and when available it is only through informal sources. This is because rain-fed crop production is susceptible to periodic crop failures and therefore cannot guarantee repayment of credit if and when given.

7. High labour intensity. Intensive subsistence agriculture is characterized by high labour intensity with occasional hired labour.

IMPACTS OF INTENSIVE SUBSISTENCE AGRICULTURE

1. Loss of biodiversity

As the diversity of plants diminishes, the loss of biodiversity in the soil ecosystem, which is largely invisible to the naked eye, is triggered. Ecosystem functions such as **breakdown of organic residues, nutrient cycling, plant pest and disease regulation, purification of water and detoxification of polluted sites are disrupted** (Wall 2004). Studies have clearly demonstrated that agricultural practices, in general and intensive cultivation in particular, reduce biodiversity in soil ecosystems opportunity cost of clearing indigenous forests are enormous. The situation is further aggravated by the recognition that **repair of what has been destroyed may take more than a lifetime, sometimes millions of years. Unfortunately, introduction of exotic plant species which are generally established in single species plantations has little value in restoring habitat, species and genetic diversity.**

2. Invasion of marginal and wetlands

3. Reduced water catchment areas

4. Soil nutrient depletion and infertility

5. Increased crop diseases and pests

6. Increased rural – urban migration

CHALLENGES OF INTENSIVE SUBSISTENCE AGRICULTURE

Low yields and high rate of crop failure-

The declining financial support and investment in agriculture by the various governments in developing countries which rely heavily on external aid makes the situation even worse for the subsistence farmer. Agricultural external aid from bilateral and multi-lateral financial institutions and donors has sharply dropped since 1990 and according to IFAD (2001), real net aid disbursement to developing countries has fallen from 2.7% of the GDP in 1992 to 1.4% of their GDP by 1998.

Land shortage and poor land tenure system

Not all farmers have access to as much land as they can cultivate. Socioeconomic conditions prevent expansion of the farms and especially if inheritance traditions require that a plot is split among the owner's dependents upon his death. In this case the farm sizes and therefore their productivity steadily decrease as the population increases.

Poor delivery of extension services- Poor technology distribution systems, reduced funding or budgetary allocations, the poor linkages between research, extension and farmer and the fact that research does not focus on the actual needs of farmers has led to the slow adoption of the new technologies by farmers and has partly led to the collapse of extension services.

Poor/lack of infrastructure

Poor government policies-

Government policies that are not supportive of subsistence farming have contributed to lack of incentives that would encourage the farmers to invest in subsistence agriculture. Recognizing that the farmer is the ultimate decision maker in adopting technologies and embracing policy and structural changes is key to active involvement of the subsistence farmers at all levels of policy formulation. Policies governing investments in rural development need to be revised to especially address the problem of rural infrastructure. Water management policies need to be strengthened and farmers sensitized on the economic use of water (FAO 2002). Market oriented policy reforms are also required with the commitment of the various government to engage in agricultural economic activities. Policies on subsidies or credit for the purchase of external inputs and access to extension services need to be clearly formulated to enable the farmers increase production sustainably.

Women in subsistence agricultural production-

The extensive and increasing male migration to urban centers in search of formal employment further leaves subsistence farming solely to the women. At the same time, the proportion of woman-headed households continues to grow, reaching almost one third in some developing countries. Despite the significant roles they perform, women have limited access

to financial, land and social assets; have fewer opportunities to improve their knowledge and skills; and less voice in public decision-making.

Effects of globalization on subsistence agriculture

Globalization raises risks of marginalization for countries which, because of their poor resource endowment or lack of skills and infrastructure, remain uncompetitive in world markets. Globalization also brings with it the risk of “knock-on” effects on countries which are heavily dependent on the export of a narrow range of agricultural commodities. These “knock on” effects are caused by unstable international financing systems and fluctuations in the performance of the world’s major economies. The extent to which developing countries are able to take advantage of new market opportunities emerging from globalization ultimately depends on their competitiveness and their capacity to increase the production of goods which are in demand. This may require substantial investments in infrastructure, technology and communications aimed at reducing costs and speeding up transport. But it also calls for developing institutional capacities to set and enforce high standards and for training of farmers in the production of marketable products of a high standard (Dixon et al. 2001a, 2001b; IFPRI 2001; World Bank 2005).

POSSIBLE INTERVENTIONS

The current mitigation tactic of providing food aid whenever there is famine in developing countries can only alleviate famine for a short time but does not solve the inherent problem of low subsistence production and can no longer be considered a long-term solution. Long-term strategies that maximize production per unit area (intensification) and diversification to higher value products on a sustainable basis, with minimal environmental degradation will play a key role in increasing productivity of the ever diminishing land sizes of subsistent farmers. Use of modern agricultural technologies, affordable irrigation schemes, improving extension delivery systems and increasing and facilitating the productivity of women. Other strategies that can be considered alongside those listed above include supporting the subsistence farmers to identify niche markets (for instance those for biologically grown produce) and establish viable market linkages; promoting small-scale agro-processing and value adding of farm products; encouraging farmer-based multiplication of quality seed; promoting self-sustaining, rural micro-finance systems to cater for farmers’ demand for short-term credit and strengthening the capacity of farmer associations and support farmers’ field schools where they exist

1. Use of modern agricultural technologies-

Many technologies, such as improved crop varieties, use of fertilizers and pesticides, better farm equipments, improved water-use efficiency, and, plant and animal husbandry have high potential in improving productivity and profitability of subsistence farming systems. Access to these conventional technologies is, however, still beyond the means of many subsistence farmers, as is evidenced by the very low levels of fertilizer utilization. Lack of access to these technologies is partly due to lack of input marketing and credit systems, high costs of transport (a function of poor roads and small volumes of trade) and lack of financial resources with which to buy the inputs.

2. Agroforestry

Agroforestry is partly designed to improve soil fertility by replenishing soil nutrient pools, maximizing on-farm recycling of nutrients and reducing nutrient losses to the environment. This technology has successfully been adopted by subsistence farmers in Nepal and Kenya. Biomass transfer involves cutting and chopping of leaves and soft twigs then spreading them evenly over the surface and incorporating them into the soil as green manure.

3. Use of agricultural biotechnology-

Broadly speaking, agricultural biotechnology consists of two components; cell and tissue culture and DNA technologies. Plant tissue culture, a relatively low-cost technology, aids crop improvement through; mass propagation of elite stock; production of pathogen-free materials; the selection and generation of somaclonal variants with desirable traits; the overcoming of reproductive barriers and the transfer of desirable traits from wild relatives to crops. DNA technology, on the other hand, involves genetic engineering which allows useful genes from any living organism to be transferred to crops or animals for improving their productivity. The transformed cells are regenerated into whole plants and evaluated for stable gene expression at acceptable levels in subsequent generations.

4. Affordable irrigation techniques-

rainfed, irrigation can dramatically improve the outputs and will increasingly play a significant role in assuring global food security in future as the opportunities for extending the agricultural frontier diminish. Even low-input irrigation is more productive than high-input rainfed agriculture. Drip irrigation, also known as trickle irrigation or micro irrigation is an irrigation method that applies water slowly to the roots of plants, by depositing the water either on the soil surface or directly to the root zone, through a network of valves, pipes, tubing, and emitters. The drip system minimizes water usage, fertilizer, and labour costs, exhibits high water distribution efficiency and improves the quality of the crop.

5. Improving delivery of extension services-

Given the importance of extension services to the subsistence farmer, measures must be put in place to enhance it and make it much more impactful. Innovative ways of delivering such services should be analyzed from a cost-benefit perspective and the necessary infrastructure put into place. The improved extension services have to be well-equipped (in terms of resources), efficient and armed with a broad technical mandate beyond technology transfer.

6. Raising productivity of women in subsistence Agriculture

7. Increasing women's access to resources
8. Involvement of women in decision making Process
9. Improving basic infrastructure

Whittlesey World Agricultural Systems/Region:

An area with similar functional attributes is as an agricultural region. The demarcation of agricultural region is also seriously constrained by the none availability of reliable data on the various aspects of agricultural patterns. The first scientific attempt for the Whittlesey in his proper. **Major agricultural regions** of the Earth published in 1936 in the annals of Association of American geographers (vol.26: 199-240) Whittlesey in his monumental paper delineated the agricultural system of the earth on the following five **characteristics** of agriculture—

- (1)The crop livestock association
- (2)The **methods used to grow** the crops produce the stock
- (3)The **intensity of application to the land** of labor capital organization the out turn of product which results
- (4)The **disposal of the products for consumption**
- (5)The ensemble of structures used to house facilitate the faring operations

With the Boris of above indicators **Whittlesey has identified the following types of agricultural system regions—**

1. Nomadic herding
2. Livestock ranching
3. Shifting cultivation
4. Rudimentary tillage
5. Intensive subsistence tillage (with paddy dominance)
6. Intensive subsistence tillage (without paddy dominance)
7. Commercial plantation
8. Mediterranean agriculture

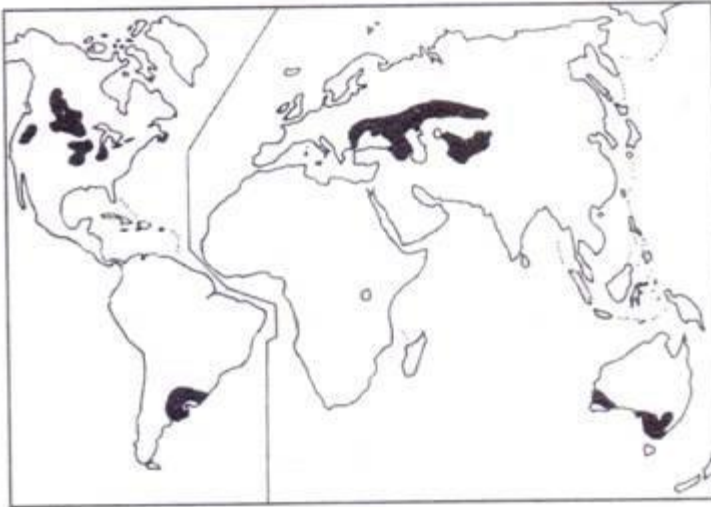
Commercial Grain Farming: Location and Characteristics

Commercial grain farming is an extensive and mechanised form of agriculture. This is a development in the continental lands of the mid-latitudes, which were once roamed by nomadic herdsmen. The continental position, well away from maritime influence, and the low precipitation (between 305 and 660 mm/12 and 26 inches) make crop cultivation a calculated risk. It was the invention of farm machinery which enabled farmers to cultivate grain on a large scale, and there is a marked specialisation in wheat monoculture in many areas. Communication with the outside world is mainly by railways and the bulk of the grain harvest is exported.

Location:

The major world regions of commercial grain farming are shown in Figure 4.7. The largest one, in Eurasia, stretches from Kiew in southern Russia to Onsk in western Siberia in a width of about 1,000 km from Caucasus to Saratov on the Volga River.

Figure 4.7
Areas of commercial grain farming



In North America, there are several areas of commercial grain farming. The largest area runs from Alberta, through Saskatchewan and Manitoba to Dakotas. Another centre is in Kansas and spills over into neighbouring states. Smaller regions appear in eastern Washington and Oregon, eastern Illinois and northern Iowa.

In South America, Argentina has a large region of commercial grain farming. Australia has two areas, one in the south-west and another in the south-east. In fact, commercial grain farming is a mid-latitude activity and mostly done in between 30° to 55° N and S latitudes.

Characteristics:

(i) Specialisation in single crop:

Commercial grain farming is highly specialised and generally one single crop is grown. In most commercial grain regions that crop is wheat. Both winter wheat and spring wheat is grown in these areas.

(ii) Farms are very large:

The wheat farms in mid-latitudes are very large, ranging from 240 to 16,000 hectares. Though average size of the farm in the USA is about 400 hectares. In these areas land is cheap that makes it possible for a farmer to own very large holdings.

(iii) Highly mechanised:

The commercial grain farming is highly mechanised. Cultivation from ploughing to harvesting is often entirely mechanised. The use of tractors ploughs drills and combines harvests which reap, thresh, winnow and sack the grain all in one operation is common.

(iv) Low yield per acre but high yield per man:

In this farming wheat grown gives comparatively low yields. The average yield is seldom more than 1,700 kg per hectare, whereas under intensive cultivation the yield is more in many countries. But because of mechanisation, less labour force is required; therefore, yield per man is high.

Other features of the commercial grain farming are:

- (a) Lack of irrigation
- (b) Farm ownership
- (c) Prone to climatic hazards
- (d) Dependence on market fluctuations, etc.