

**FACULTY OF AGRICULTURE SCIENCES AND
ALLIED INDUSTRIES**

HEIA, LEIA AND LEISA AND ITS TECHNIQUES FOR SUSTAINABILITY

High external input agriculture (HEIA)

High external input Agriculture (HEIA) are technologies that utilize high external inputs such as inorganic or chemical fertilizers to increase nutrient depletion from the soil, pesticides to control pests and diseases, herbicides to control weeds and irrigation facilities for water management in the farms. These technologies are often beyond the financial reach of the small -holder farmers.

Advantages	Disadvantages
1. Agricultural Production could be rapidly increased to meet the demand for food for the increasing population.	1. Collapse of environmental balance due to lack of biodiversity by planting a few cash crops.
2. As a result of availability of adequate food stuffs many problems related to diseases caused by malnutrition and deficiency were prevented or reduced.	2. Increase in soil erosion due to constant furrowing by machinery.
3. New improved varieties gave yields within a short period of time.	3. Dependence on imported machinery, chemical fertilizer, pesticides, hybrid seeds and other inputs.
4. Mechanization solves the problem of labour shortage.	4. Extensive use of pesticides disturbed the natural mechanism of controlling pest and diseases as the artificial pesticides kill both pests and their natural enemies.
5. Income and profit margins of the products were increased.	5. Use of artificial agro-chemicals adversely affected the soil pH, cation exchange capacity, soil structure, soil texture and soil organisms. Consequently the microbial activities of the soil tend to reduce forming dead soil.
6. Productivity of land increased.	
7. Increased market facilities for production.	

Low-external input Agriculture (LEIA)

Low-external input Agriculture (LEIA) is based on reduction-but not necessarily elimination-of chemical fertilizers, insecticides and herbicides. Farmers are adapting these practices primarily to reduce costs, but also because they want to minimise impact on the environment or because they perceive future pesticide regulations.

The term LEIA has been defined as a production activity that uses synthetic fertilizers or other agro-chemicals below rates commonly recommended. It does not mean elimination of these

materials. Yields are maintained through greater emphasis on cultural practices, IPM and utilization of non-farm resources.

Characteristics of LEIA and LEISA

LEIA	LEISA
1. Farm management which optimizes the use of locally available natural and human resources and indigenous technical knowledge o enhance diversity cyclic flow patterns and to build up living soil.	1. Farm practices characterized by the use of inorganic fertilizers, low degree of recycling and low degree of optimizing nutrient availability.
2. Characterized by a conscious drive towards sustainability.	2. Lack of conscious drive towards sustainability.
3. One approach to sustainable agriculture.	3. Refers to maintain stream farming practices carried out by majority of farmers in the research sites.
4. Low cost input approach, high reliance on recycling of on-farm resources.	4. Spread and adaptation facilitated by government agencies.
5. Inclusion of biological nitrogen fixing legumes.	
6. Emphasis of green manure crops.	

Low-external input sustainable agriculture (LEISA)

Low-External Input Sustainable Agriculture (LEISA) is a series of practices which serve to reinforce ecological principles that are in line with local ecosystems.

Practices such as recycling of plant nutrients (nitrogen and others), minimizing crop losses due to insects and pests, and securing favorable soil conditions for plant growth are just the tip of the hat.

An integral component of LEISA is in ensuring that this environmental awareness remains connected to the daily lives, needs and concerns of farmers who rely on these ecosystems for their livelihoods.

The LEISA relies mostly on the inputs from the local farm, village or region and deliberate action is taken to ensure sustainability.

The principles are:

- Securing favorable soil conditions for plant growth particularly managing organic matter and enhancing soil life.
- Optimizing the nutrient availability and balancing the nutrient flow, particularly by means of nitrogen fixation, nutrient acquisition and complementary use of external fertilizers.

- Minimizing the losses due to plant and animal pests by means of prevention and safety treatment.
- Minimizing losses due to flows of solar radiation, air, water by way of microclimate management, water management and erosion control.

Characteristics of HEIA and LEISA

HEIA	LEISA
1. The farming pattern depends heavily on external and chemical inputs.	1. LEIA relies on the optimal use of natural processes.
2. The focus is mainly on maximizing yields coupled with increasing specialization of production	2. The focus is on the sustainability of farming system.
3. There is a great damage to the environment	3. Environmentally sound and that have the potential to contribute to the long-term sustainability of agriculture.
4. The continuing drop in prices of farm produce and the rising costs of agricultural inputs have made farming increasingly unprofitable	4. Greater emphasis is on the long-term nourishment and balance between the profit and livelihood.
5. HEIA depends on the higher production and profit, without consideration of the local needs and local market	5. LEISA depend largely on local agro-ecological conditions and on local socioeconomic circumstances, as well as on Farmers' individual needs and aspirations.
6. Primarily one or two commodity driven development, lack of diversity in the farming practices; as a result, there is greater risk of failure and price fluctuation. The number of products and commodities are very minimum.	6. One way of LEIA is to diversification of farms; with a range of crops and/or animals, farmers will suffer less from price fluctuations or drops in yield of single crops. Maintaining diversity will also provide a farm family with a range of products to eat or sell throughout a large part of the year.
7. Under HEIA system, soil quality deteriorates, and there is resurgence of pests, lack of resilience in the soil plant system	7. LEIA maintains a healthy soil, recycling nutrients on the farm, and utilizing approaches such as integrated pest management (IPM).
8. In HEIA, there is lack of use of indigenous technologies.	8. Best bet technologies, for example, soil and water conservation (terraces, ditches, and vegetation strips on sloping land), better timing of operations, improved crop spacing and densities, manure or compost and water application based on local conditions.