FACULTY OF AGRICULTURE SCIENCES AND ALLIED INDUSTRIES

RESOURCE USE EFFICIENCY AND OPTIMIZATION TECHNIQUES

The objective of ay farming system research and development effort s to improve the efficiency and productivity of the use of basic resources in the production process. In order to determine the expected benefits, losses and other implications of a proposed change, it is necessary to evaluate the management and performance of both the existing production systems and the recommended improvements. Consideration of economic factors together with bio-physical factors provides a logical framework for comparing traditional and alternative systems. Economics provides a rational basis for making decision in allocating scare resources among various options to achieve competing goals.

Evaluation of FSR/IFS

- Productivity per unit area
- Economic analysis
- Employment generation
- Productivity of livestock components
- Mushroom
- Water requirement
- Residue addition
- Energy efficiency
- Nutritive value

Resources use efficiency (RUE)

RUE in agriculture is defined to include the components of technical efficiency, allocative efficiency and economic efficiency.

- Cultivated land utilisation index (CLUI)
- Fertiliser use efficiency (FUE)
- Energy efficiency (EE)
- Water use efficiency (WUE)
    - Crop water use efficiency
    - Field water use efficiency
- Linear programming (LP)

Linear programming was developed by George B Dantzing (1947) during Second World War. It has been widely used to find the optimum resource allocation ad enterprise combination. It is defined as the optimization of a linear function subject to specific linear inequalities or equalities.

Assumptions of Linear programming

- Linearity
- Additivity
- Divisibility
- Finiteness of activities and resource restrictions
- Non negativity
- Single value expectations

Advantage of LP

- Allocation problems are solved.
- Provides possible and practical solutions.
- Improves the quality of decisions.
- Highlights the constraints in the production.
- Helps in optimum use of resources.
- Provides information on marginal value products (shadow prices).

Limitations of LP

- Linearity
- Considers only one objective for optimization.
- Does not consider the effect of time and uncertainty.
- No guarantee of integer solutions.
- Single valued expectations.