

CROP AND LIVESTOCK INTEGRATION

The winning combination beyond meat, milk, and eggs

1. INTRODUCTION

Crop and livestock integration - as a principle of agro-ecology - consists of a range of resource-saving practices that favors an efficient recycling of natural resources by creating a beneficial synergy between crop and livestock production, thus using the outputs of one system as inputs or resources for the other system. This integration is based on four main pillars:

1

Feeds produced from crop production used in favor of animal production (forage crops, crop residues, fallow), etc.

2

Livestock as source of diverse food and non-food products, such as milk, meat, honey, wool, leather and eggs, and sources of biogaz, fuel.

3

Transport and draught power in favor of crop production and other farming activities, such as tillage, irrigation, sowing, weeding, transport of harvest, etc.

4

Livestock as inputs for farming activities, such as manure, pasture management, and animal trampling enhancing soil structure by breaking up the hard soil crusts.

Added to the above four pillars are some economic flows: cash generated from crops providing incomes to buy animals, or cash from selling the animals allowing investment in crop production.

2. COMPONENTS AND CONDITIONS FOR THE INTEGRATION

A common feature of crop and livestock integration is the combination of crop and livestock, including in some cases agroforestry and aquaculture. However, the modality of the combination strongly depends on local socio-economic and agro-ecological conditions. For example, the selection of crops and animal are dependent on preferences based on family consumption, market, soil type, animals raised and availability of resources (CARDI, 2010).



THE LIVESTOCK SECTOR PROVIDES FOOD AND INCOME FOR 1 BILLION OF THE WORLD'S POOR (FAO, 2015).

LIVESTOCK MAKES A SUBSTANTIAL CONTRIBUTION TO FOOD SECURITY & NUTRITION, PROVIDING ONE THIRD OF HUMANITY'S PROTEIN INTAKE.

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3. ADVANTAGES AND LIMITATIONS OF CROP & LIVESTOCK INTEGRATION

Crop and livestock integration presents the following agro-economic, social, economic and ecologic advantages (CARDI, 2010):

- ◆ It improves space utilization and increases productivity per unit area
- ◆ It provides diversified products, thus enhancing food security and nutrition
- ◆ It provides coping and risk management strategies (animals as “*banks on hooves*” allow to raise money in times of need)
- ◆ It improves soil fertility and soil physical structure from appropriate crop rotation and using cover crop and organic compost
- ◆ It reduce weeds, insect pests and diseases through animal grazing and crop rotation
- ◆ It recycles and utilizes crop residues and livestock wastes
- ◆ It strengthens farmer’s autonomy (less reliance to external inputs – fertilizers, agrochemicals, feeds, energy, etc.)
- ◆ It allows higher net returns to land and labour resources of the farming family

Crop and livestock integration may present the following constraints and limitations:

- ◆ Overgrazing removes the soil cover, fostering soil erosion and reducing important soil functions such as climate regulation
- ◆ Inappropriate management of animal manure can lead to soil and water contamination, thus having a negative impact on the environment
- ◆ Disease transmission to human beings, thus impacting health and nutrition
- ◆ Unavailability of animal feeds in quantity and quality in some regions
- ◆ Conflict between human foods and animal feeds due to the increasing demand for animal source foods.

CRITICAL ASPECTS TO BE CONSIDERED IN CROP AND LIVESTOCK INTEGRATION

The following criteria should be taken into account to achieve an effective crop and livestock integration (FAO and TECA, 2015)

1. SUITABILITY OF THE FARM FOR INTEGRATING CROP & LIVESTOCK

Before engaging in any crop and livestock integration, there is need to assess farm suitability in terms of space for animal shedding and grazing, sufficient fodder or by-products to feed, sufficient know-how on keeping, feeding, and treating the specific kind of animals

2. BENEFICE OF THE INTEGRATION

Assess whether the integration allows the livestock to fulfil its input and output functions (utilization of animal manure, use of animal products for own consumption or sales)

3. ACCESS TO LIVESTOCK INPUTS

It is important to have sufficient labor available inside and outside the farming system, enough fodder and water of good quality, veterinary support, and suitable breeds of animals

4. ANIMAL POPULATION

When defining the number of farm animals, keep in mind that the economic benefit will be higher when fewer animals are kept, but fed well. Not only the amount, but also the quality of the available feed must be considered.

5. ANIMAL SELECTION

The criteria of animal selection include feeding requirements, growth duration, production potential, adaptability to local conditions, use of livestock outputs for food and non food benefits

AGRO-ECOLOGICAL PRINCIPLES FOR CROP AND LIVESTOCK INTEGRATION

ADAPT LIVESTOCK PRODUCTION TO THE LOCAL ECOSYSTEM

Livestock productions whose requirements are suitable for the resources available locally, breeding of suitable local species, respectful of local agro-ecological and social conditions

PROMOTE LIVESTOCK SYSTEM THAT USES LOCAL RESOURCES

Production and use of animal feeds on the farming system, production of organic matters on the farm, possibility of livestock and crop diversification.

INTEGRATE FORAGE CROPS AND TREES IN THE FARMING SYSTEMS

Promote crop rotation, crop association and agroforestry that include production of animal feeds and forage crops and trees.



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