Technology Fact Sheet for Adaptation

E. Integrated crop-small livestock-fish-poultry-vegetable production system [i]

E.1 Introduction

Mixed farming helps to spread out risk among enterprises on the farm. Although this is known and widely practiced among small and medium farmers, mixed farming as a specific response to climate change is rarely considered. An integrated farming small livestock-fish-poultry-vegetable-crop production system is proposed. It is rarely practiced in Zambia although common in some Asian countries like China.

E.2 Technology characteristics

An integrated small livestock-fish-poultry-vegetable-crop production system operates on the premise of inter-dependency. Crop production depends on the supply of animal manure. Livestock plays a key role fertilizing the fish pond and field crops. The small livestock depends on extensive grazing of natural pasture and crop residues during the dry season. This is a closed system in which waste products from one activity are used as input in the other activity. For example, the waste products from crops and vegetables are used by livestock and fish.

E.3 Country specific applicability and potential

Integrated farming can be applied throughout the country. However, it may be hindered in areas which do not support intensive cropping, e.g. semi-arid areas as in Agro-Ecological Zone I. Adoption may also be difficult for many farm households because it is labour intensive, a challenge for households with labour shortages. It therefore can only be suitably promoted alongside strategies to relieve labour constraints at farmsteads.

E.4 Status of technology in country

In Zambia, mixed farming of crops and livestock is widespread across all the three Agro-Ecological Regions. Crop/livestock production activities among small-scale farmers are most predominant in Agro-Ecological Region I and II. However, integrated mixed farming systems involving livestock-fish-poultry-vegetable are not common in Zambia. Most small scale farmers do not have the capital and knowledge required to engage in an integrated mixed farming system of this nature.

E.5 Benefits to economic / social and environmental development

Uses land more intensively and efficiently. It improves soil fertility as animal manure is added to the soil. Allows diversification of risks and uses labour more efficiently. Given the higher land and labour productivity, integrated farming has a much higher potential for the generating of household income.

E.6 Climate change adaptation benefits

The main climate change benefit of mixed farming in general and integrated farming in particular is that farmers have chance to spread their risks across several enterprises. The effects of failure of one enterprise as a result of climate change hazards is somewhat mitigated by the other enterprises that continue to operate. And yet at the same time, the interdependence of enterprises makes them more resilient to climate change hazards.

E.7 Financial Requirements and Costs

The total investment cost for integrated crop-small livestock-fish-poultry-vegetable production system is **ZMK 15,226,900 ($ 2,873)**. The key assumption is contained below. This is under the following assumptions: mixed farming involving production of crops (sorghum & sugar beans), vegetables (cabbages), poultry (10 ducks), small livestock (10 goats) and fish farming (3100 fingerlings); production system engaged by emergent farming household; total costs are 10% more than integrated mixed farming; 1 ha of land under utilization (crop=0.50 Ha, Vegetables=0.25 ha & Fish pond=0.25 ha); land is valued at zero due to unlimited supply in rural areas; farming household spends 5 hrs per day in the field; unit price of labour is $3.3 per day/person; total of 50 man-days; 4 rippers and 8 oxen bought at USD $ 849 (ZMK 4,500,000) per ripper & 2 oxen. The shadow prices ZMK/Kg are as follows: the price of sorghum is ZMK 1,632, sugar beans is ZMK 5,000, cabbage is ZMK 1,200, fish is ZMK 12,000, ducks is ZMK 12,500 and goats is ZMK 5,700 per Kg. The annual production of mixed farming (without synergies & interdependence) is as follows: sorghum (188 Kg), sugar beans (138 Kg), cabbage (7,500 Kg), ducks (20 Kg), fish (1,705 Kg) and goats (525 Kg). Hardware equipment (rippers) depreciates in 10 years. Annual maintenance cost is 5% of hardware technology (4 Rippers & 8 Oxen).

[i] **This fact sheet has been extracted from TNA Report – Technology Needs Assessment for Climate Change Adaptation – Zambia. You can access the complete report from the TNA project website http://tech-action.org/**