

Thesis Title A Feasibility Study for a Better Integrated Upland Mixed Farming System: A Case Study of Tabhing Commune, Vietnam

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ABSTRACT

This research study assessed the potential use of sources of unused organic matter such as livestock manure and agro-byproducts in Tabhing Commune, in the central part of Vietnam. The intent of this study is to propose nutrient recycling processes with higher levels of efficiency within the two main mixed farming system components. Data collection used several approaches, including formal questionnaires, group discussions, field observations, and the ten seed technique. Resource flow diagrams were developed to calculate the realistic availability of community resources. Linear programming models were developed to maximize total farm profits under the constraints of mass balance and environmental protection in order to determine optimum nutrient recycling allocation level.

By utilizing nutrient balance flows on an annual basis, enough livestock manure is available for use as potential fertilizer for crops; volume is estimated as equivalent to 2.0 ton of nitrogen (N), 2.3 ton of phosphate (P_2O_5), and 11 ton of potassium (K_2O). Similarly, the gross output of crop by-products is estimated at approximately 450 ton of dry matter (DM), equivalent to 170 ton of total digestive nutrients (TDN) per year in the study area. Applying the model

revealed that utilizing manure nutrient could realize a 13% increase in total income from crop production due to increased yields and recycling of crop residues as livestock feeds could allow farmers to increase their total income by 22%. The net profits from two rounds of recycling can increase total income by up to 45% through utilization of additional nutrient manure gained from increased numbers of livestock and supplied to crops. When factoring in the risk of livestock death, farmers will gain only a 71% increase in total income. If livestock death is not factored in, farmers will gain a 91% increase in total income, from utilizing 20% of available TDN from livestock.

This study reveals that a better farming system using optimum nutrient recycling processes is feasible and can achieve powerful positive results. Specifically, using such a system could help studied villages increase their total profits by more than 50%. Important guidelines on manure utilization and treatment methods to increase the use of crop byproducts are also discussed in this thesis. In order to implement this scheme successfully, however, pilot household farms need to be established, monitored and adjusted properly, along with capacity building for local people on how to apply the newly integrated farming system properly in both technical and managerial terms. Growing grass and forage for livestock feed and providing veterinary services for animal health care should also be taken into consideration for further study.

Keywords: integrated crop-livestock farming system / livestock manure / crop by-products / optimum nutrient recycling / farm profit maximization.