

STUDYING ON SOLUTIONS AND MODELS FOR CROP – ANIMAL PATTERNS IN SOUTH-EASTERN PROVINCES

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ABSTRACT

The factors that affected on the changing of crop-animal patterns in the South-eastern (SE) region of Vietnam are: (i) Price of agro-products; Benefit of each individual crop-animal and whole agricultural system; (iii) Stability of target agro-products consumption in the market; (iv) Policies and mechanisms supported for agriculture; (v) Feasibility in application of new technologies (adapted with capital, human and land resources).

The analysis of present crop-animal systems in SE pointed out that the systems of annual crops combined with animal husbandry have been developed constantly and given an important income source for farmer households in parallel with the systems of perennial crops combined with animal husbandry. In recent years, the typical group of annual crops, in which, the cassava and hybrid maize is a priority selection of farmers because of four reasons: (i) Economic efficiency is higher than that of other crops; (ii) Required farming techniques are much simple; (iii) Market of these commercialized products is stable; (iv) Requirement for capital input and labor force is suitable with poor farmers.

The testing models on several crop-animal patterns that may improve the farmer household's incomes, to use better natural resources and to meet the capital investment of the poor people such as: (i) High-yield cassava variety in replacing local varieties; (ii) Intercropping cassava and peanut, cassava and maize; (iii) Chicken husbandry towards organic farming. These testing models is highly evaluated in term of efficiency, profit, diversification, sustainability and adopted by the farmers in some South-eastern provinces.

Keywords: *crop-animal patterns, sustainability, diversification, market..*

1. BACKGROUND

Studying on transfer of crop-animal pattern in South-eastern (SE) region of Vietnam not only contributes to the agro-products diversification, reducing of risk, increasing of income and productivity for farmer households but also ensures the sustainability and optimize in use of farmers' available resources.

2. METHODOLOGY OF RESEARCH

The survey was carried out on 600 households whom located in the South-eastern provinces by using both methodology of quantitative and quality such as PRA, KIP, SWOT, cost-benefit analysis, risk analysis and KITE diagram. The potential models were tested, evaluated economic and sustainable impacts and will disseminate to farmers in this region.

3. RESULTS AND DISCUSSION

3.1 Literature review on crop-animal pattern in South-eastern since 1990s

The previous studies in SE pointed out that:

Many agro-products (maize, sugar-cane, rice, coffee, fruits, beef meat, poultry and pork meet) that probably supply for processing industry, but most of them are cultivated by the small households, the quantity and quality do not meet the factories' standardized demand, unit-price fluctuated and less competitive compared to similar products of other regions, a main part of products was only supply for family consumption. Cultivation of black pepper in Ba Ria-Vung Tau and cashew has high productivity, profit, comparative advantage and low costs (NPV; IRR is 54.4; 22.8, respectively).

Arable land is irrigated in SE occupied only 13% (36% in whole country). About 45% of arable and annual-crop area is mechanized in land preparation. Therefore, the change of cropping patterns in SE meets many constraints and its productivity depends on rainfall.

According to Ministry of Planning and Investment (MPI), up to next 10 years, the strategies for development of agricultural sector in SE are: "...strengthen growth of industrial crops (such as rubber, coffee, cashew, sugar-cane and cotton), fruits, industrial husbandry, and ruminant feeding, formulate the agricultural raw-materials production zones in linkage to processing industry". The state government has given strategies and policies for transfer of economic structure and agro-products consumption by the selection of products that have high competitiveness, to meet demand of market, adapt socio-economic and ecological conditions.

Factors that influence to farmer's decision in selection of crop-animal patterns: (i) Resources; (ii) Technologies; (iii) Market and Institution (Ken D. Olsm, 2004).

3.2 Identification of ecological, socio-economic condition and transfer of crop-animal patterns in South-eastern region, 2000-2007

Land use and its concentration: 10% and 80% of households have fewer 0.5 and 3 hectares of land, respectively. Trends of land concentration: (i) Keeping small land area of fewer 3 hectares per household; (ii) Increasing households who have large area and farm. Agricultural land allocation is following by trends: (i) Households who have large area often grow perennial crops (rubber, cashew, coffee) and large-scale husbandry (beef cattle farm); (ii) Households who have intermediate area of 3 hectares cultivate parallel annual and perennial crops depending on the variation of selling price in market; (iii) Small households who have small area only grow annual and short growth of circle crops.

Animal husbandry included systems: (i) Use of industrial feed and agro-products of family as feed (pork); (ii) Use of by-products of crops as feed (beef cattle, buffalo and goat).

Generated income sources of household main comes from agricultural sector (70%), in which, annual crops contribute 40% and 10% from perennial crops. Non-agriculture and agricultural services activities bring 16% and 9% of income, respectively. Per household income is 42 million dong yearly; it equivalent 0.7 million dong per capita monthly.

3.3 Efficiency of crop-animal systems

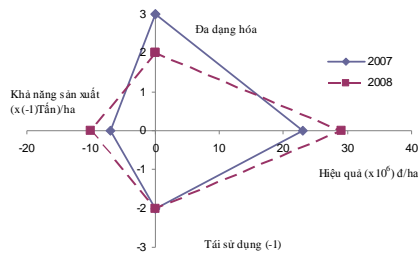
In the SE region, period 2000-2007, the crop-animal systems are diversified. In the systems or patterns that annual or perennial crops combined with animal husbandry (beef, pork) gave high benefit because by-products of crops/animals are input materials of others in whole system (ex: animal manure is used for crops; maize stem is used for beef cattles as feed). The farmer's selected crops and animal are maize, tobacco, hybrid maize, cassava and beef cattle. Depending on the ecological and market condition, these crops are priority chose in order to get convenient profit and income. Price of sugar-cane tends to reduce in recent years; therefore, other annual crops (cassava, tobacco) are cultivated instead of sugar-cane in cropping patterns. Causes: (i) Invested cost of these crops is relatively low; (ii) High price and profit; (iii) Subsidized invested inputs and contracted to factories to consume whole products with reasonable prices. Maize cultivation is grown in SE since last decades and given per hectare benefit about 7 million dong. Efficiency on input of materials and labor force is 1.7 and 2.8, respectively. However, maize will be shifted to other crops (tobacco or peanut) as its selling price is down to 3,000 dong per kg. Tobacco is adopted in grey soil areas. Tobacco processing factories signed farming contracts with farmers to supply leaf tobacco under fixed price about 17 thousands dong/kg (grade 1), per hectare benefit is 15 million dong that is higher than that of maize crop. Efficiency of labor and input materials is very high (3.4 and 2.1, respectively). In case price of leaf-tobacco falls down to 15 thousands dong/kg (grade 1), maize will be priority chose for replacing, then peanut and cassava. Cassava can be grown in

all type of soils in SE region and it's very suitable for poor farmers in term of low costs, large market for consumption and acceptable profit. It's also intercropped under shade of cashew or rubber plantation and gives benefit of 7 million dong/ha. However, in gray soil region, if selling price of unprocessed cassava is 300 dong per kg, the peanut, tobacco, sugar-cane, rubber will be replaced cassava in cropping patterns. Similarly, in the red soil region, if the cassava selling price falls down (650 dong/kg), the maize, peanut, greenbean, cashew will be selected in changing cropping pattern. The beef cattle is major animal in crop-animal systems in SE region. Above 50% of households are feeding beef because of its need for labor force, may use of crop by-products as feed source, using of manure as a fertilizer, available cash flow in family's activities and low invested costs.

3.4 Potential models of crop-animal patterns

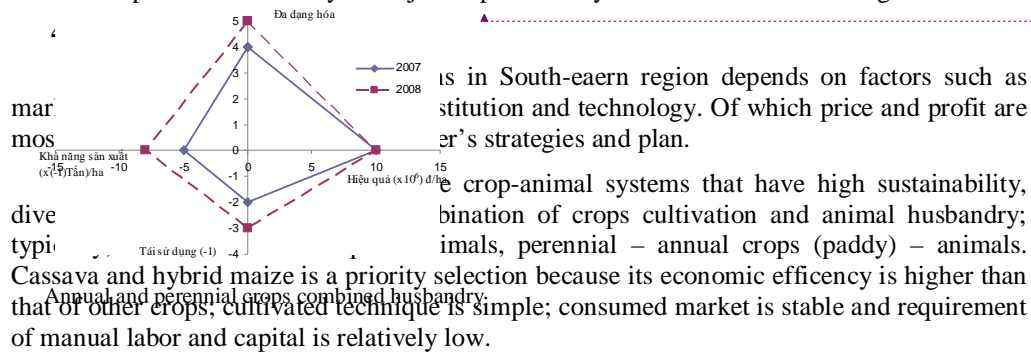
Model 1, high-yield variety of cassava (KM140) is replaced local variety (KM84) improved by 15-20% of productivity and profit varied from 2.8 to 3.7 million dong/ha. Model 2, intercropping local cassava (KM94) with peanut and maize DK888, it improved vegetal productivity, fertility of soil, income and profit (5,5 to 20 million dong/ha), MBCR is 2.4 and 2.2, respectively. Model 3, chicken feeding by organic-farming way, use of family agro-products as corn, rice, cassava, rice flour, reduced death rate and risk, increased benefit by 9 thousand dong per head of chicken weight 1.7 kgs.

The existing crop-animal systems that are sustainability by KITE evaluation: (i) Annual crops combined animal husbandry (very sustainable) because of increasing economic efficiency, high reproductivity and diversification (graph 1); (ii) Rice combined annual crops and husbandry (beef cattle, chicken) is very sustainable because of high income, benefit and reproductivity; (iii) Perennial combined with annual crops or rice and husbandry is sustainable.



Annual crops combined animal husbandry

Graph 1. Sustainability of major crop-animal systems in South-eastern region.



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Some potential testing models that combined crops and animals, reasonable use of resources, high sustainability and adopted by farmers in SE are high-yield cassava variety, intercropping of cassava and maize or peanut, organic-farming chicken./.