THE STRATEGIC POLICY OPTIONS TO DEVELOP MAIZE AND FEED INDUSTRY IN INDONESIA

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INTRODUCTION

Background

Maize is the most popular ingredient of manufactured feed in the world, especially in the tropic region. In Indonesia, maize is a major component of feed, accounting for about 51 percent of feed ingredient. Efforts to substitute some other crops for maize in Indonesia is likely unsuccessful (Tangedjaja, 2003). Thus the main feed crop for manufactured feed in Indonesia is maize.

Maize is also the second important food crop after rice. It was indicated by the percentage of area planted to maize, relative to total area planted for food crops. Kasryno (2002), reported that area planted to maize was about 19 percent of the total area planted to food crops during 1970-2000. Rice occupied about 61 percent of the total area planted to food crops. Another 20 percent were for other food crops (palawija) such as: soybeans, mungbeans, peanuts, cassava, and sweet potatoes.

For the last three decades, maize production has shown a substantial growth from 2.83 million tons in 1970 to 9.35 million tons in 2001 (FAO, 1971-2002). This increase was mainly attributed to the adoption of improved technology, especially high yielding varieties, including hybrids, resulting in a higher productivity. The rapid growth of production, however, failed to meet the domestic demand, causing a rapid increase in net import.

In the 1969-1975 period, Indonesia was self sufficient in maize, with the sufficiency indices of 1.02 to 1.26 (Swastika, 2002). The net import was increasing from 0.05 million tons in 1976 to 0.60 million tons in 1996 and reached its peak of 1.26 million tons in 2000. There should be a breakthrough to obtain self-sufficiency on maize for both food and feed. This study aims to identify the potential, opportunity, and constraints of maize and feed production system, and formulates strategic policy alternatives to develop maize and feed production.

Objectives and Expected Output

Objectives of this study are: (i) to evaluate potential, weaknesses, opportunities, and constraints for expanding maize and feed production in

Indonesia, and (ii) to formulate strategic policy options to promote sustainable development of maize and feed production in Indonesia.

Expected output of the study consists of: (i) better understanding on potential, weaknesses, opportunities and constraints for expanding maize and feed production in Indonesia, and (ii) the strategies and policy recommendations to promote maize and feed production in Indonesia,

SWOT ANALYSIS

SWOT analysis is applied in order to have better understanding on potentials and constraints of maize production and feed industry in Indonesia. Following Sianipar and Entang (2001), the analysis comprised of various steps. Step 1, identification of internal and external factors. Step 2, determination of percentage of weighted internal and external factors (BF). Step 3, evaluation on supporting value of each internal and external factors (ND) by using score 1 to 5. Step 4, computation of supporting weighted value of those factors (NBD). Step 5, evaluation on level of linkage among internal factors and external factors using score 1 to 5. Step 6, computation of average value of factors linkage (NRK). Step 7, computation of linkage weighted value among internal and external factors (NBK) = BF * NRK. Step 8, computation of total weighted value (TNB) = NBD + NBK.

Based on the value of TNB, the most important strength, weakness, opportunity, and threat of each feed and feed crops expansion is respectively determined. Thus, strategy, policy option, programs and ultimate goal of feed industry as well as feed crops expansion in Indonesia is then formulated (Adnyana 2004).

RESULTS AND DISCUSSION

Analysis of Maize Production

Domestic maize production is characterized by strengths and weaknesses (internal factors) and opportunities and threats (external factors) such as depicted in Table 1. Strengths of maize production are: (1) low labor wage, (2) abundant land resource, and (3) well developed hybrid seed industry. On the other hand, weaknesses of maize production consist of: (1) inappropriate post harvest handling leads to low quality of grain, (2) low direct access to sources of capital, and (3) seasonal price fluctuation. Some opportunities are available to expand domestic maize production, namely; (1) strong domestic demand for maize used as one of main feed raw materials, (2) production partnership between feed producers and maize growers, and (3) highly potential yield improvement through application of hybrid varieties. There are some threats, however, relatively potential to constraint

maize production, those are: (1) increasing trend of maize import, (2) long drought possible to hamper maize production, and (3) high competition with other crops in term of planted area.

Table 1. Internal and External Factors of Maize Production in Indonesia, 2004

Internal Factor		External Factor	
Strength	Weakness	Opportunities	Threats
Low labor wage	Inappropriate post harvest handling	Strong domestic demand	Increasing trend of maize import
Abundant land resource	Low direct access to sources of capital	Production partnership between feed producers and farmers	Long drought
Well developed hybrid seed industry	Seasonal price fluctuation	Highly potential yield improvement	High competition with other crops

Based on the phases of SWOT analysis, the most essential internal and external factors are concluded as follows: (1) existing hybrid seed industry is highly developed (strength); (2) farmers usually do not conduct post harvest handling appropriately (weakness); (3) strong domestic demand for maize as the main raw materials for feed industry (opportunity); and (4) increasing maize import directly competing with domestic maize production. Following identification of four internal and external factors, the strategy of developing domestic maize production is formulated as: (1) increasing maize yield by utilizing hybrid seed to encounter strong domestic demand, (2) enhancing domestic maize production by utilizing hybrid seed to reduce dependence on imported maize, (3) improving maize grain quality by adopting proper post harvest technology to satisfy domestic demand, and (4) developing grain quality of maize by adopting appropriate post harvest technology to partially substitute imported maize (Table 2).

The goals of domestic maize production are set based on the results of SWOT analysis, those are: (1) competitive domestic maize production in terms of production cost and grain quality, and (2) improved maize farmers' income. It implies that efficient maize production and characterized by good quality of grain will improve maize farmers' on-farm income. To attain the goals, four strategies are established consisting of four policy options and eight programs. The policy options are: (1) promotion of hybrid seed application, (2) intensive application of appropriate maize post harvest technology, (3) expansion of area planted to hybrid maize, and (4) maize grain quality improvement.

Table 2. Strategy Formulation of Maize Production in Indonesia, 2004

INTERNAL FACTOR / EXTERNAL FACTOR	**STRENGTHS** Well developed hybrid seed industry	**WEAKNESS** Inappropriate post harvest handling
OPPORTUNITIES Strong domestic demand for maize	**STRATEGY : SO** Increasing maize yield by utilizing hybrid seed to encounter strong domestic demand.	**STRATEGY : WO** Improving maize grain quality by adopting proper post harvest technology to satisfy domestic demand.
THREATS Increasing trend of maize import.	**STRATEGY : ST** Increasing domestic maize production by utilizing hybrid seed to reduce dependence on imported maize.	**STRATEGY : WT** Improving grain quality of maize by adopting appropriate post harvest technology to partially substitute imported maize.

Note : SO = the strategy based on strength and opportunity
WO = the strategy based on weakness and opportunity
ST = the strategy based on strength and threat
WT = the strategy based on weakness and threat

The programs comprise: (1) maize intensification, (2) soft credit for maize production, (3) farmers training on post harvest handling, (4) provision of post harvest machineries through farm credit, (5) maize intensification, (6) partnership between farmers/farmers-group and feed mills or food industry, (7) post harvest handling field school, and (8) grain quality promotion (Table 3).

Table 3. Ultimate Goal, Strategy, Policy Options and Development Programs of Maize Production in Indonesia, 2004

Goal	Strategy	Policy Options	Program
Competitive domestic maize production in terms of production cost and grain quality. Improvement of maize farmers' income.	**SO** Increasing maize yield by utilizing hybrid seed to encounter strong domestic demand.	Promotion of hybrid seed use	1. Maize intensification 2. Soft credit for maize production
	WO Improving maize grain quality by adopting appropriate post harvest technology to satisfy domestic demand.	Intensive application of appropriate maize post harvest technology	1. Farmers training on post harvest handling 2. Provision of post harvest machineries through farm credit.

Table 3. (continue)

Goal	Strategy	Policy Options	Program
	ST Increasing domestic maize production by utilizing hybrid seed to reduce dependence on imported maize.	Expansion of area planted to hybrid maize	1. Maize extensification 2. Partnership between farmers and feed & food industries
	WT Improving grain quality of maize by adopting appropriate post harvest technology to partially substitute imported maize.	Maize grain quality improvement	1. Post harvest handling field school 2. Grain quality promotion

Analysis of Feed Industry

The internal (strengths and weaknesses) and external (opportunities and threats) factors of feed industry in Indonesia are identified, as presented in Table 4. This table exhibits that the strengths of feed industry are: (1) abundant labor and low wage, (2) strong vertical integration between feed and poultry industry, and (3) well develop feed production technology. Meanwhile, the weaknesses are identified such as: (1) low quality of feed, (2) feed market structure tend toward oligopolistic, and (3) present status that feed factories remain under capacity. On the other hand, opportunities to expand feed industry still widely open such as: (1) strong domestic demand, (2) there are opportunity for export promotion for standard quality feed, and (3) high potential to improve feed production quality. Nevertheless, serious threats are remain faced by feed industry in Indonesia such as: (1) highly dependence on imported raw material, (2) high interest rate of credit, and (3) immediate outbreak of poultry that significantly affecting feed industry.

After exercising all steps of SWOT analysis, the most important internal and external factors were successfully identified. They are: (1) strong vertical feed industry (strength); (2) under capacity of feed industry (weakness); (3) domestic strong demand of feed (opportunity); and (4) highly dependence on imported raw material (threat). Based on these four internal and external factors, the strategy of feed industry development in Indonesia is then formulated that comprised of four main strategies such as: (1) maintaining feed industry vertical integration to increase production to meet domestic strong demand of feed (SO strategy); (2) strengthening vertical integration to optimally use the domestic raw materials (ST

strategy); (3) improving production capacity of feed factories to fulfill domestic strong demand for feed (WO strategy), and (4) improving production capacity of feed factories based on domestic resources (Table 5).

Table 4. Internal and External Factors of Feed Industry in Indonesia, 2004

Internal Factor		External Factor	
STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
Abundant labor and low wage.	Low quality of feed.	Strong domestic demand of feed.	Highly dependence on imported raw material.
Strong vertical integration between feed and poultry industry.	Oligopolistic feed market structure.	Feed export promotion.	High interest rate of micro credit
Well develop feed production technology.	Under capacity of feed factory.	Potential to improve feed production capacity.	Immediate outbreak of poultry diseases

Table 5. Strategy Formulation of Feed Industry Development in Indonesia, 2004

. **INTERNAL FACTOR** / **EXTERNAL FACTOR**	**STRENGTHS** Feed industry vertical integration	**WEAKNESS** Under capacity of feed factories
OPPORTUNITIES Domestic strong demand for feed	**STRATEGY: SO** Maintaining feed industry vertical integration to increase production to meet domestic strong demand of feed.	**STRATEGY : WO** Improving production capacity of feed factories to fulfill domestic strong demand for feed.
THREATS Dependence on imported raw materials	**STRATEGY : ST** Strengthening vertical integration to optimally use the domestic raw materials.	**STRATEGY : WT** Improving production capacity of feed factories based on domestic resources.

Based on the outputs of SWOT analysis, goals of feed industry in Indonesia are then formulated for future expansion, that are: (1) resilient and domestic resource based feed industry and (2) efficient and competitive feed industry especially export standard quality. In other word, least-cost is one of the

characteristics of competitive industry, means that feed industry in Indonesia should produce better quality of feed with less cost. In order to achieve above goals, four strategies are proposed that include four policy options and eight alternative programs. Policy options are: (1) increasing investment in feed industry closer to maize production areas (rural agro industry), (2) enhancing partnership between feed industry and maize growers to sustain supply of domestic raw materials, (3) promoting new investment on domestic maize production under nucleus-estate system, and (4) optimizing feed factories capacity through higher procurement of domestic maize production.

Meanwhile eight development programs include: (1) rural feed industry development, (2) rural micro finance for maize grower (3) contract farming, (4) farmers consolidation in corporate farming, (5) investment on maize nucleus estate system, (6) soft credit for maize growers (7) promotion on domestic maize use for feed industry and (8) maize post harvest handling improvement (Table 6).

Table 6. Ultimate Goal, Strategy, Policy Options and Development Programs of Feed Industry in Indonesia, 2004

Goal	Strategy	Policy Option	Program
Resilient and domestic resource based feed industry Efficient and competitive feed industry	**SO** Maintaining industry vertical integration to meet domestic strong demand for feed.	Increasing investment in feed industry closer to maize production areas (rural agro industry).	1. Rural Feed Industry Development. 2. Rural Micro Finance Development
	WO Improving production capacity of feed factories to fulfill domestic strong demand for feed.	Enhancing partnership between feed industry and maize growers to sustain supply of domestic raw materials.	1. Maize Grower Contract Farming. 2. Farmers Consolidation in Corporate Farming.
	ST Strengthening vertical integration to optimize use of domestic raw materials.	Promoting new investment on domestic maize production under Nucleus Estate System.	1. Investment on Maize Nucleus Estate System. 2. Soft Credit for Maize Growers.

WT		
Improving production capacity of feed factories based on domestic resources.	Optimizing feed factories capacity through higher procurement of domestic maize production.	1. Promotion on Domestic Maize Use for Feed Industry. 2. Maize Post Harvest Handling Improvement.

Performance of Maize Production and Feed Industry in Indonesia

Mapping of domestic maize production and feed industry in Indonesia is carried out based on the net value of total weighted value (TNB) of each internal factors and external factors. For maize production, the value of TNB of internal factor is equal to –1.36 (Table 7), indicated that internally maize production in Indonesia is weak, such as characterized by farmers capital constraint, poor post harvest handling and low price of maize grain. In other words, maize production in Indonesia faced more weaknesses rather than strengths. However, in terms of external factors, the result is positive (0.36). It means that maize production in Indonesia has more opportunity than threat, indicating good opportunity to develop.

Mapping the results in Table 7 in the form of graph is as depicted in Figure 1, where horizontal axis represents internal factors, while vertical axis represents external factors. Figure 1 shows that maize production in Indonesia located at Quadrant II. This position indicates that maize production is in alert. Because, if there is an unfavorable change in external factors, it will fall into quadrant III and will be collapsed.

Table 7. Performance Mapping of Feed Industry and Domestic Maize Production

Industry	Internal Factor	External Factor
Feed Industry	1.34	0.01
Domestic maize production	-1.36	0.36

The value of TNB of internal factors for feed industry is equal to 1.34, in which indicates that internally feed industry in Indonesia is strong enough or strengths overvalued its weaknesses. This is mainly due to strong vertical integrated and oligopolistic structure. However, between opportunity and threats almost in the same position. In other words, there are wide opportunities, but there are also serious external threats. Mapping shows that feed industry in Indonesia located at the lower part of Quadrant I. This indicates, that industry must be in alert, because with very small external distortion, it will fall into Quadrant IV or

become weak or almost bankrupt (Figure 1).

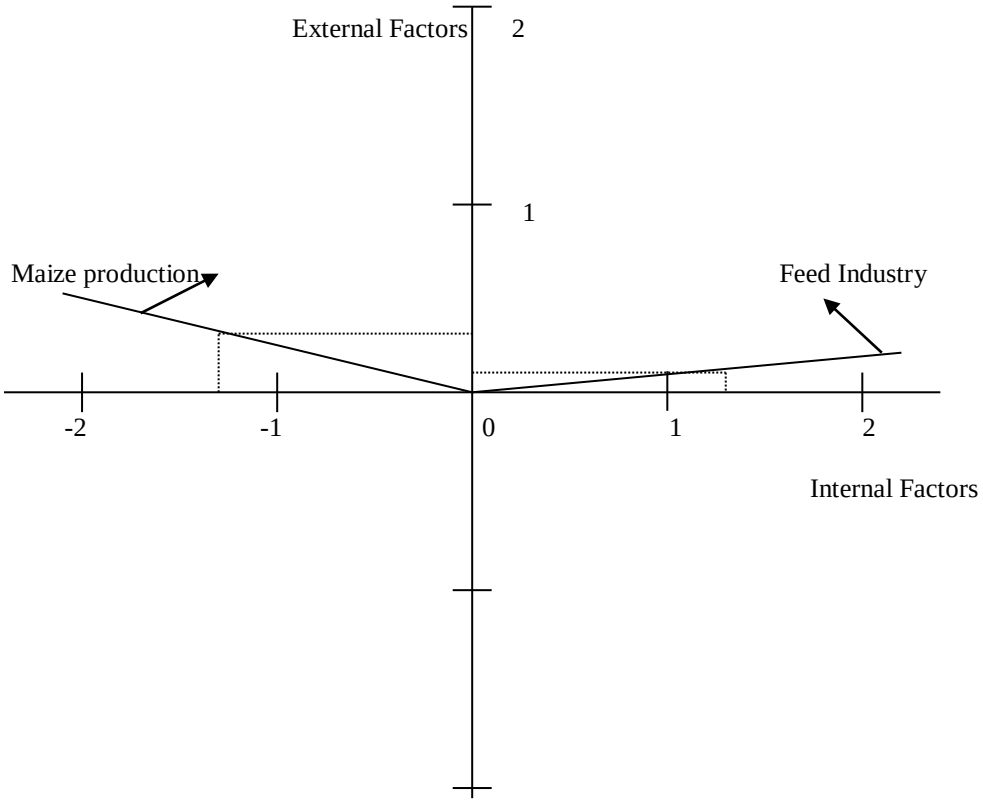

Figure 1. Performance Map of Feed Industry and Maize Production in Indonesia

CONCLUSION AND POLICY RECOMMENDATION

Based on the above results and discussion, there are some conclusion can be drawn as follows:

1. The results of SWOT analysis showed that the domestic maize production should directed to various goal and objective such as: (1) competitive domestic maize production in terms of production cost and grain quality, and (2) improved maize farmers' income. It implies that efficient maize

production and followed by good quality of grain will improve maize farmers' on-farm income.

2. To attain the goals, four strategic policy options are recommended. The policy options are: (1) promotion of hybrid seed application, (2) intensive application of appropriate maize post harvest technology, (3) expansion of area planted to hybrid maize, and (4) maize grain quality improvement.
3. The action programs that are necessary to implement comprised of eight prioritized programs: (1) maize intensification, (2) soft credit for maize production (subsidized interest rate), (3) farmers training on post harvest handling and processing, (4) provision of post harvest machineries through farm credit, (5) maize extensification, (6) partnership between farmers and feed as well as food industries, (7) post harvest handling field school, and (8) promotion of grain quality management.
4. The outputs of SWOT analysis on domestic feed industry indicated that, the goals of domestic feed industry are: (1) resilient and domestic resource based feed industry, and (2) efficient and competitive feed industry.
5. In order to achieve above goals, four strategies are proposed, namely: (1) increasing investment in feed industry closer to maize production areas, (2) promotes partnership between feed and food industries and maize growers to sustain supply of domestic raw materials, (3) promoting new investment on domestic maize production under nucleus-estate system, and (4) optimizing feed factories capacity through higher procurement of domestic maize production.
6. To support those above strategies, eight development programs are recommended include: (1) rural feed industry development, (2) rural micro finance for maize grower (3) legal contract farming, (4) farmers consolidation in corporate farm management, (5) investment on maize nucleus estate system, (6) soft credit for maize growers (7) promotion on domestic maize use for feed industry and (8) maize post harvest handling improvement.

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