

Agro-Industrial Development in Tanzania: Need for a Systems Approach

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Abstract

Strategic planning and implementation of agro-industrial ventures should take a systems approach taking account of farm produce growing, storing, processing and distribution. This approach is crucial now that the manufacturing sector is being privatized. With agricultural market liberalization, small holder farmers are relatively free to sell their produce to any buyer of their choice, putting agro-processors, especially large scale ones at risk, in as far as supplies of biological inputs are concerned. Understanding the agro-processing system and how the external environment and actors influence it, like government, and financial institutions is crucial. Possible organizational arrangements for linking producers and processors would allow adoption of the possible options for reducing the risk of relying on independent producers, under appropriate conditions. Possibility of going for contractual arrangement, explicit or implicit, seems to be an inescapable option to enable the agro-industrial system work more effectively.

Keywords: Agro-industrial, systems approach, linkages, support policies.

1 Introduction

The promotion of agro-industries in Tanzania or any economy dependent on agriculture, is essentially one of the corner stones of the economy's strategies for development. The complex nature of this subsector and its unique linkages demands that proper strategic planning and implementation of agro-industrial ventures should take systems approach. The systems approach emphasizes the interdependence and interrelated nature of all aspects of agribusiness, from farm supply to the growing, storing, processing, distribution and ultimately consumption (Goldberg, 1974). This is no more important to the agribusiness as run in developed countries or in developing countries by multinational companies, than it is to agribusiness run by the public or private sectors as in Tanzania.

The objective of this paper is to develop a theoretical framework of the agro-industrial subsystem, analyzing the linkages between the subsystems and strategic issues that need to be observed for purposes of improving the planning and implementation of the activities of the sub-sector as a whole in Tanzania (or any country that is agro based), both at the micro and macro level. The framework developed is simple but it touches on major themes that have often been ignored or taken for granted.

2 Agro-industrialization: conceptual framework

The attainment of a proper balance between the establishment of industries and the expansion of agriculture has been an elusive problem for many developing countries dependent on agriculture. In the 1950's and early 1960's, the literature on economic development and planning activities, deliberately emphasized the role of industry in economic development (see for example Chenery, 1975). Industrialization, it was believed, was likely to provide an immediate solution to the problems of poverty and general backwardness.

In the mid 1960's the emphasis shifted to agriculture. The application of science and technology to traditional agriculture produced dramatic results, especially in Asia. This "green revolution" it was contended, was to offer an unparalleled opportunity to break the chains of rural poverty (Wharton 1969; Johnson, 1967).

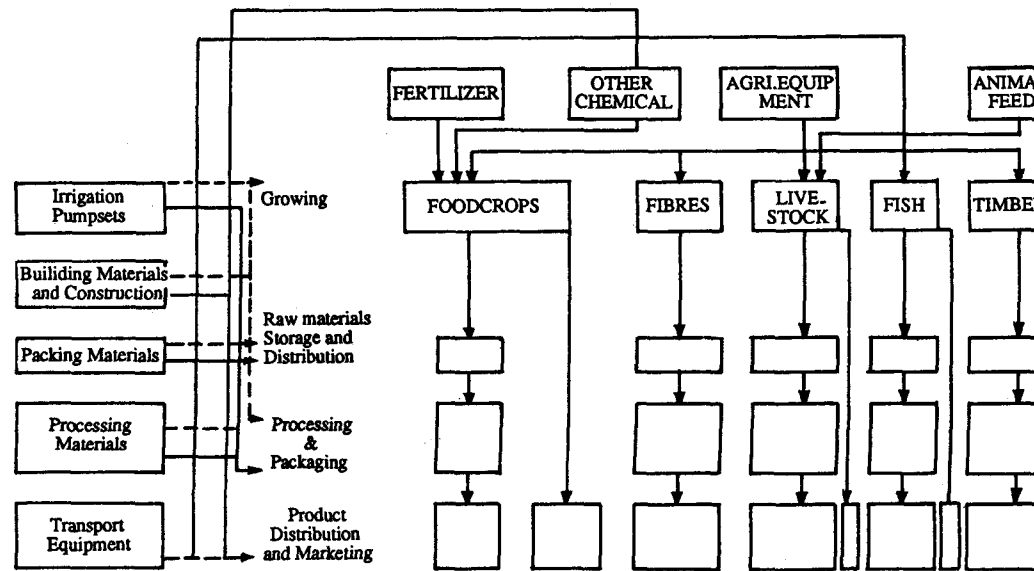
Today there is a growing recognition of the close interrelation between industry and agriculture and that each has a contribution to make on the other and on national development. However, the relationship between agriculture and industry (as will be shown below) entails many complex practical issues. Failure to look at them pragmatically has resulted into many countries failing to plan and implement activities of the two sectors well and thus missing the potential contribution of the two sectors to economic development of their countries. This has become apparent under the economic reforms undertaken by a number of African economies, and in particular Tanzania, where the private sector is now acquiring a dominant role in directly productive ventures.

The emergence of agro-industries in Tanzania and indeed other developing countries dependent on agriculture, has been both a historical and natural development process, as the need to process agricultural produce arose. The pattern of agro-industries created (both as to their type and location) to a large extent reflected the economic structures inherited from the colonial governments. Then, the aim was to provide the colonial powers with convenient forms of raw materials. After independence and up to recent times, these structures were linked to promoting rural and overall economic development. Agro-industrial schemes involving smallholder, who are a majority of the rural population, are thought to be a way of bringing about increased incomes to the rural population through integrating them to the market and provide them with better production techniques and opportunities.

2.1 Agro-industries defined

The term *agro-industries* is intended to cover the growing, storage, distribution, processing and marketing of biological products including food crops, nonfood crops, livestock, fish and forestry products. The term may also be widely defined to include industries whose principal market lies in providing inputs to growing, distribution and processing activities such as fertilizer, equipment, herbicides, and packing materials. In this paper concentration will be on the narrower definition, that is, the processors of agricultural produce, although the existing linkages within the wider definition will be touched upon. Figure 1 illustrates the wider definition of agro-industries with their possible linkages.

Figure I: THE STRUCTURE OF THE AGRO-INDUSTRIAL SECTOR



Dotted lines indicate industrial input into growing, distribution and processing activities.

Source: UNIDO Agro industrial Sector Year 2000, 1977

2.2 Agro-industrial activities

I) Food industry:

The main functions performed within the food industry include the following:

1. Processing of less perishable crops which includes:
 - extraction of edible component; for example, sugar milling, oilseed crushing,
 - conversion to more edible form, for example milling grains, tea processing, coffee processing,
 - conversion to new products, for example Bakery, confectionery and paste making, brewing, and
 - meeting consumer demand in local markets and abroad e.g. blending, refining according to market needs etc. and other quality standards.
2. Processing of perishable crops which includes:
 - extraction of edible component: e.g. crushing fruits juices,
 - conversion to new products: e.g. wine making, tomato paste,
 - preservation e.g.: drying, canning, freezing of fruits and vegetables.
 - Similar kinds of activities could be done for livestock and fish.

II) Non-food industry

Some of the main processes that can be undertaken in the non-food products derived from agriculture are as follows:

- 1) Apparel fibre: This could involve cotton ginning, wool scowling, spinning, weaving and dyeing, cloth making (tailoring).
- 2) Non-apparel fibre: For example rating and decorticating of sisal and/or jute, production of sacking, hessian, cordage matting, carpets.
- 3) Hides and skin: For example curing, tanning, production of shoes and other leather goods.
- 4) Fish: Production of fish meal, glue, fish oil.
- 5) Forest Products: Saw milling; manufacture of plywood, fibreboard, production of pulp, paper and paperboard; manufacture of packing materials, furniture and carvings.

2.3 Main characteristics of agro-industries

Since there are a great variety of industries using agricultural raw materials, it is difficult to generalize about their characteristics. It is important to note however that, a range of technological choices do exist both as to size (scale) and factor input mix (for example the capital - labour ratio), in undertaking the agro-industrial processes. At the end of the day and in order to successfully produce profitably, two important issues need to be taken into account.

2.3.1 Understanding the market needs

Undertaking market needs analysis both in the domestic and the foreign markets are particularly important when one is operating in a competitive environment. Under market needs analysis of the issues to be established should focus on demanded quantities, qualities, delivery times and price trends. For quite sometime in Tanzania the culture of quality has been lacking. Under a competitive system like the one Tanzania is transforming into, price is no longer the only important determinant of what should be bought and from who, since prices of similar products tend to equalize. With globalization of the market, product quality has taken a predominant role. Manufacturers in Tanzania need to build this culture if they are to compete effectively in both the domestic and foreign markets. Up to date information need to be obtained all the time in order to capture market changes. This will assist processors to decide on the scale of operation (in relation to production costs, availability of raw materials and output qualities). At times product promotion to influence demand has to be done, especially to attract new consumers. This could be a costly exercise if not done carefully. Firms, especially young ones, have to use cost effective methods of promoting their products, which include production and distribution of simple brochures and where affordable by attending trade fairs. Use could also be made of existing agencies such as PROMEX-PMA, which promote products from least developed countries. Special existing and new international market opportunities for semi-processed and manufactured goods should be explored and exploited in doing this. For example under the 1994 General Agreement on Tariff and Trade (GATT) multilateral round of tariff negotiation, there has been a substantial reduction in tariff for agricultural goods of interest to developing countries which are also of interest to Tanzania. The reduction for coffee, tea, cocoa and sugar is 35% and 29% for North America and Western Europe, respectively. Other opportunities are within the African economic regional groupings such as the Preferential Trade Area (PTA) comprising 18 countries in Eastern and Southern Africa and Southern Africa Development Community.

2.3.2 Available resource base

In many developing countries like Tanzania, agricultural raw materials and unskilled labour are in abundant supply. Hence most suitable industries to be established in the initial stages of industrial development should be those that maximize total output and returns to scarce factors (foreign exchange, imported equipment and spareparts and skilled technical and managerial labour). These should be used in combination with the abundant factors. This means that initial technologies chosen should be those with lower capital intensity and have low requirement for skilled labour (while the skills are built up) and also flexible to variations in market needs and supply of biological inputs. The resource base analysis has also got to address practical questions concerning sources of finance for capital investments, infrastructure support needed such as water, power, roads and other technical issues like skills creation and market information.

It is important to observe that the macro economic policies of the country including exchange rate policy, monetary policy, tax policy, industrial policies and the response of enterprises to these policies, would at the end of the day influence and determine the kinds of structures established. Inappropriate exchange rate policy based on controls and overvalued domestic currency, for example, will send signals to processors to rely on imported inputs, produce for the domestic market and will prevent competition from external invertors, a thing bound to create and protect inefficiencies. Inappropriate monetary and fiscal policies will cause inflation and high interest rates, which will

crowd out private investments by increasing the cost of capital. It is, therefore, important that the government designs a policy package that is conducive to promoting private sector investment, that ensures optimum utilization of the country's abundant factors and that has development and growth potential. This is the essence of economic and social reforms currently being undertaken in many developing countries, including Tanzania.

3 Potential roles of the linkages

Perhaps the most important contribution of agriculture to industrial development is its role as a supplier of food for industrial labour force, even though in the case of Tanzania the industrial labour force constitutes less than 12% of the total labour force. Growth productivity in agriculture leads to lower real prices of farm goods, including food. The effect of the latter is to increase real wages even if nominal wages are not increased.

In addition, in most developing countries especially in Africa, despite efforts to industrialize, agricultural exports still provide the bulk of foreign exchange earnings badly needed to finance imports of capital goods required for industrialization and other necessary consumer goods not produced in the country for sometime in the future. In Tanzania agriculture exports still account for over 80% of the country's total exports. Expansion of agricultural production is, therefore, likely to increase the import capacity of the economy and hence spur further investment and development.

But also significant is the fact that agriculture releases labour and finance to industry. Historically, growth that is accompanied with economic development has led to structural changes in the economy, with a decline in the relative contribution of agriculture to national income, while that of manufacturing expanded. As manufacturing expands it absorbs labour that is released from agriculture as a result of relatively lower marginal productivity and hence wages in agriculture.

More crucially is the fact that raw material from agriculture tends to dominate the early phase of industrialization (Donovan, 1996). In both Kenya and Tanzania, for example, agriculture provides supplies for more than 10 industry groups which together account for more than 50% of the manufacturing gross domestic product. These industry groups include food, beverage, tobacco, textile, leather, footwear, furniture and paper. On the other hand, the agricultural population provides a domestic market for industrial products, not only consumer goods but also a wide range of equipment, implements, and materials required for agricultural production. In effect, the most important aspect of the relationship could be summed up as that each sector depends very largely on the demand of the other for its products. It is, therefore, appropriate that a developing country whose current economic base is dependent on agriculture, should plan for the mutual development of agriculture and industry and more so the agro-industrial sub-sector. Given that a bulk of the population is in the rural areas engaging in agriculture, the most effective way to bringing about economic development is by increasing the productivity of smallholder agriculture producers and create a functioning and competitive market for their produce. Indeed any meaningful industrial policy for a country like Tanzania should focus on rural development. The link between agriculture and industry has thus the potential for bringing about this desired rural development. A proper understanding of the linkages is important to be able to deal with the complex policy and planning issues.

In the following section we develop a model of an agro-industrial system which can be used as a framework for analyzing the development problems and potential for the sector in Tanzania.

4 Need for a systems analysis: theory and concepts

Organization theory and management philosophies have undergone dramatic transformation in recent years with the development of a systems method in management. In general, the systems theory is a management approach that attempts to integrate and unify scientific information across many fields and attempts to solve problems by looking at the total picture rather than through the analysis of individual components (Kerzner, 1989:64). As earlier noted, there is a strong interdependency between agriculture and manufacturing and between these sectors and other sectors of the economy. These interdependencies can be looked upon both at the macro and micro level. At the micro level, we deal with specific organizations that are in any of the sectors, which are dependent upon each other. Decision making in these organizations is, therefore, subject to systems management. At the macro level, we deal with various government policies that affect the linked sectors, directly and indirectly. Once again, a look to the total picture becomes inevitable.

Systems theory as adopted in management today has its origin in the natural sciences. A biologist, von Bertalanffy (1951) is regarded as an original inventor of the systems theory. He was worried about the increasing specialization of knowledge within the sciences and tried to find a general framework or model to be used in all sciences. His departing point was by defining a system as any elements or combination of elements in a mass. The whole world could be looked upon as an indefinite number of different systems with some relation to each other (Jessen, 1983). Boulding (1956) classified the world as having nine levels, with the lowest level being the frameworks indicating the pattern or static structure of the universe. The fourth level is the cell, the lowest level of open system able to maintain themselves and multiply in connection to the outside world. The eighth level is social systems or organizations. We can, therefore, define a system as a set of related parts (components).

Rosenzweig and Kast (1974) translated the Boulding's general systems theory in business organization and defined business organization as a man-made system, which has a dynamic interplay with its environment (customers, competitors, labour organizations, suppliers, government and other agencies). Business organization is also defined as a system of interrelated parts working in conjunction with each other in order to accomplish a number of goals, those of the organization and those of the individual participants.

The above translation fits well the agro-industrial network, although the latter is more complex in terms of multi-organizational involvement in the system. The agro-industrial planning and management deals with work organizations and has characteristics of the lower and higher levels of human relations and social organizations. The system is by and large open in that it is dependent on its surroundings (other systems, policies etc.). In this paper we do not intend to apply directly the systems theory to solving administrative or management problems, but rather, seek to have an insight on the need to analyze agro-industrial issues in an integrated manner in order to provide strategies that can be used to improve the performance of the sub-sector. In the following section the agro-industrial sub-system is briefly analyzed, taking each of the system within the larger whole, one at a time. The main features of each component of the system and

how they fit to each other are described.

4.1 The subsystems

Even though for purpose of analysis we deal with one subsystem at a time, in practice all subsystems work and interact simultaneously. For the system as a whole to work the interrelationships between the subsystems have to work. Also the relationship of the agro-industrial system with the rest of the economy in terms of, for example, infrastructure support and resource allocation should be taken into consideration all the time.

Looking at the agro-industrial structure, we can identify what can be prescribed as four sub-systems covering *production, marketing of biological inputs, processing of biological inputs, and marketing of processed produce* as shown in figure 2. These activity sub-systems are supported by policy system and supporting services system.

4.1.1 Production

This subsystem has got the input side and output side. The input side, referred to as Input Supply in figure 2, provides means of producing farm produce. These means of production include farm equipment, ranging from simple tools like hand hoes to tractors (may include irrigation pump sets if irrigation is necessary), pesticides, medicine for livestock and fertilizer. Some of these means of production may need to be imported in to the country. This may complicate the situation if the country's external balance is not good, which may eventually lead to the depreciation of the local currency, leading to increases in the domestic price of imports. Another very important input is infrastructural and institutional support, which include passable roads, transport and extension. Also a very significant aspect linking this system, is workable credit arrangement for the heterogeneous needs of the heterogeneous actors, for the purpose of financing input supply or credit.

The resulting output are the various quantities and qualities of food and cash crops, livestock products of various kinds, fish, and timber that are produced for immediate consumption or as inputs into agro-industries for further processing. The ultimate effects of the system are (1) desired goods supplied to consumers (households) and firms (domestically and abroad) to facilitate efficient transformation of the biological inputs in accordance to further market needs, and (2) cash income that the growers get from sales of other output.

The big questions are (1) what motivates the production subsystem to meet the needs of the market both with respect to quantity and quality? and (2) which institutional linkage options will spur the needed action from the various actors in the production subsystem?.

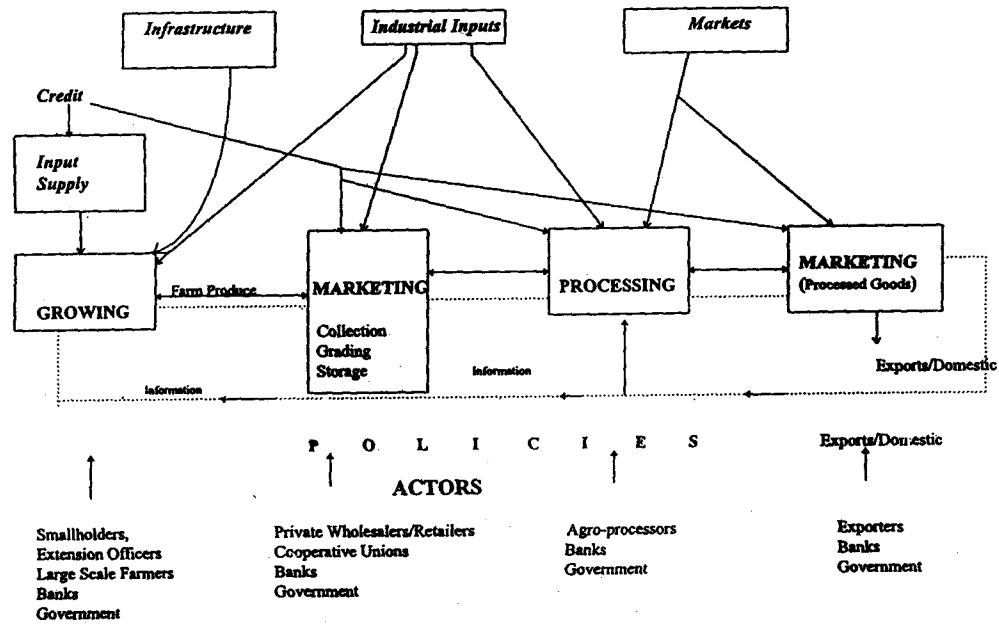
Actors

This subsystem involves at least four major categories of actors that include:

Agricultural producers: Smallholders, large-scale private commercial producers, nucleus farms and state farms;

Farm input suppliers: Cooperative unions, private suppliers.

CHART 2. THE STRUCTURE OF THE AGRO-INDUSTRIAL SECTOR AND THE SYSTEMS APPROACH



Credit suppliers: Commercial banks, cooperative banks, farmer's own credit societies, non-governmental organizations, etc.

Government: (Central and local government) - provide infrastructural support: roads, extension, research, and mobilization of the resources to provide such infrastructure.

It is important that all these actors work together while attaining their own self interest, so as to ensure a smooth throughput.

Possible support policies

The following policies are among the most important supporting and influencing this sub-system: agricultural policy (price, marketing), financial policy (credit policy), monetary and fiscal policies (controlling inflation), exchange rate policy (liberalized or controlled), land policy and industrial policy.

Performance indicators

For measuring the performance of this sub-system the following indicators could be used: Nature of organizational arrangements, whether or not they facilitate smooth transaction between the actors; number of existing incentives and degree of participation of actors in their respective areas; quantities and qualities of resulting farm outputs; and quantities of inputs provided and degree of support of the production subsystem to other sub-systems. These indicators and others could be applied at the sub-system as a whole or at units within the sub-system.

4.1.2 Marketing of farm produce

This subsystem is concerned with marketing of farm produce either to the final consumers (in the domestic market or abroad, in the case where farm produce can be consumed directly from the farm), or to the processing units, where the produce needs further processing before they can be consumed or exported. This subsystem interacts closely with the production sub-system and involves collection, grading, storage of the produce after harvesting and the distribution to the appropriate user points. Important inputs here include (i) storage facilities, in case these are not yet available, (ii) road network, (iii) transport equipment, (iv) appropriate and competitive marketing organizations that are efficient with respect to cost and time to ensure that desired quantities of farm produce are available in desired qualities at the right time at the user points, and (v) manageable credit facilities for capital and recurrent financing, where required.

This system also links forward through various forms of arrangements to processing firms in the country and also to external markets, in case the output is needed abroad in its raw form.

Actors

Actors here comprise those in both the production and marketing sub-system to include agricultural producers, farm input supplies, credit supplies, government and consumers of unprocessed products, domestically and abroad;

Possible support policies

Support policies here are more or less similar to those supporting the growing sub-system and include; trade policies, financial policy (credit policy), exchange rate policy, agricultural policy, overall fiscal and monetary policies.

Indicators of performance at the macro and micro level

Some of the indicators that could be used to measure performance of this sector include: Workable institutional arrangements, the number of incentives available to the actors, degree of participation of the actors, quantities of various outputs procured, timeliness in delivery and promptness in payments.

4.1.3 Processing of biological outputs (farm produce)

This subsystem transforms the biological inputs in accordance to subsequent user points demands and needs. Depending on the nature of the produce and the market requirements, this may involve several stages of post harvest processing. For example, sisal may be processed to fiber by decorticators and then processed to sisal products like carpets or twines to meet market requirements. Further processing may be done outside the country to meet external market requirements. For example, Tanzania processes skin into leather and export the leather abroad where it is required for production of various leather goods. The means required to effect this-sub-system include factory buildings, adequate processing equipment, adequate supply of other operating inputs including industrial chemicals, power, manpower of various skills, competent management and packing materials. Infrastructural and institutional support by way of power, water, roads and credit is also very important for efficient running of this sub-system as demonstrated in figure 2. In terms of linkage, this subsector links backwards to the production sub-sector, via the Marketing sub-system. The critical issue is obtaining desired quantities and qualities of inputs to meet the demand of the market in the forward link, which is the marketing of processed products. At the end of the day desired quantities in desired qualities of the processed output must be produced at the required time. Information about market needs, both domestic and foreign is a very crucial input.

Actors

The actors here include those in the production, marketing and processing sub-systems as follows: processing firms (owners or managers), suppliers of farm produce (private traders, cooperatives, marketing boards, producers), credit institutions, government (local and central), consumers of processed products (domestic and foreign markets), transporters (private, public), supplies of other industrial inputs (domestic, domestic); technical industrial staff; etc.

Support policies

The main support policies include the following: trade policy, exchange rate policy, investment policy, fiscal and monetary policies, financial policy (credit policy) and training policy (technical, engineering, managerial).

Performance indicators

Indicators that could be used to measure performance may include: working organizational arrangements (in the subsystem), the kind and number incentives available to actors, rates of capacity utilization of the firms, quantities of orders for processed goods, profitability measures and degree of competitiveness in the market.

4.1.4 Marketing of the processed products

This covers the distribution and marketing of the processed products within the country or in external markets, depending on demand conditions. This sub-system may be separate or it may overlap with (4.1.2) above. The important thing is that processed produce are marketed. The marketed produce should be made available on time, in required quality and quantities, be it in the domestic market or abroad. Ability to penetrate established markets both domestic and foreign is the bottom line for the successful working of this subsystem. Promotional strategies, transport arrangements and marketing channels are important means for effecting this subsystem.

Actors

The major actors in this sub-system include: agro-processors, wholesalers, retailers, exporters, consumers (domestic and foreign markets), credit institutions and government.

Possible support policies

Just like in the previous sub-system, important policies include monetary and fiscal policies, exchange rate policy, trade policy, and financial policy (credit policy).

Performance indicators

For purposes of evaluating the performance of this subsystem, performance indicators could include share of domestic market for locally produced goods, degree of competitiveness of domestically produced goods in the domestic markets; and export growth for various manufactured goods.

4.2 General observation and the operation of the system

The performance and behaviour of these sub-systems at various linkage points is influenced by the nature of the organization and institutional framework set up to manage the individual sub-systems and the system as a whole. The industrial and agricultural strategies and accompanying policies that a government adopts pertaining to the functions of these sub-systems, also influence the performance of the system. The Tanzanian case with respect to agro-industries is an interesting one at this particular moment in time, as the country is restructuring the industrial sector and as the economy moves from a state controlled trade regime to liberalized trade regime in both internal and external trade. Competitive elements that are being introduced into the markets, both for farm produce procurement and sale of manufactured goods, and other macro-economic policy reforms, are influencing the changes in the agro-industrial sector as well. Being an important sub-sector in the economy, it is important that the right strategic decisions are taken with respect to the various tenets important for the proper operation of this complex sub-sector.

As pointed above, for the system as whole to work harmoniously, the organizational arrangements and the policies adopted should be compatible. A good marketing organizational arrangement based on competition will be ineffective if it is not accompanied by adequate transport policy backed with good infrastructural and institutional support. A competitive marketing system allowing private buyers to buy biological produce directly from producers and sell according to market opportunities (in both domestic market and abroad), may break the system if arrangements are not made to provide institutional support that allow firms to get the inputs at competitive prices.

The policy and infrastructure sub-systems, which provide support to the agro-industrial subsystem, are a responsibility of a government. It is assumed that a government committed to real economic development will strive to create an enabling environment for the private sector to grow.

One way of effecting the systems approach in improving the planning and implementation of the agro-industrial subsector at the private level, is to consider running them under a number of possible organizational arrangements. In one extreme, there is an integrative organizational arrangement where all the activities in the system are done under one roof with one over all overseer. An intermediate case may have each subsystem with its own separate organization, which is formally linked through some form of agreed contractual arrangements by the actors involved at the respective levels. The other extreme case is where each organization operates separately and is informally linked simply by competitive forces of the market. A combination of all the three cases is also possible.

In the next section these possible arrangements of producer-processor links and how they may facilitate a systems approach to undertaking agro-industrial activities are examined.

5 Possible producer-processor links

Probably what has been and likely to continue to be one of the major problem for most agro-industrial firms in Tanzania is inadequate availability of biological inputs in terms of desired quantities, qualities and time by the processors. The nature of the problem depends on the nature of the crop grown and the processing required and on the type of producer-processor relation that exist. As was seen in Section 2.2, agro-processing varies from processing of perishable food crops (fruits, vegetables) to processing of less perishable non-food agricultural products. The former group is riskier and requires a closely supervised system. It is important that these relationship are understood in the context of the production organization that exist in a country, to be able to meaningfully design systems, policies and procedures that can ensure efficient operation of the agro-industries. This is particularly important at this time when significant changes are taking place as to the ownership of the agro-industrial units under the privatization exercise, and the whole set of measures being taken to revamp agricultural production under a liberalized system.

The producer-processor relationship may vary from a strong direct systematic link, where processors activities directly affect the producers and may require the producer to observe certain farming practices in order to attain a certain desired quality and quantity of output for the processor in turn to produce the required quality and quantities of goods as dictated by the market. The other extreme is where no systematic links or contacts exists between producers and processors. MacAthur (1980) identifies four types

of these links that are discussed below with respect to the Tanzania situation showing the implications of each.

5.1 Total integrated producer - processor situation

This is a situation where production and processing of agricultural produce is carried within a single firm under same management. Good examples in Tanzania include production and processing, tea, sugarcane, and sisal. This situation normally prevails in cases where the crop has to be processed immediately after it is harvested.

The advantage of this arrangement is that the processor has a direct influence on the quality of both farm and industrial produce and to some extent the quantity of biological inputs desired. On the other hand, it requires an efficient managerial system given the complexity of having to deal with production and processing.

In some situations and where convenient, this relationship has been supplemented by outside producers in form of smallholder outgrowers. For example, the case of tea in Mufindi and sugar cane production at Kilombero, or sometimes large-scale private outgrowers. Often the firm produces a certain critical minimum level of biological input(s), so as to minimise the risk of having to depend on a multitude of independent smallholders for its operation.

5.2 Producer -processor link through contract or single user

This is a situation where a processor and producer of agriculture produce are independent, but are linked through a contract or because the crop has a single buyer/user. This relationship may stand on its own as in the case of tobacco growers who used to sell their tobacco to the then Tobacco Authority of Tanzania (now Tanzania Tobacco Marketing Board). As indicated above, this relationship may be supplemental to the integrated system, as in the case of sugar cane, where through contracts outgrowers supply additional amounts of raw materials needed by the firm.

The effectiveness of this system will depend on the type of contractual arrangement (explicit or implicit) existing between the two parties. Experience on contractual arrangements would be useful.

5.3 Producer - processor linked through an intermediary

This is a situation where there is an indirect link between a producer and a processor through an intermediary. In the case of Tanzania this intermediary is currently being played by cooperatives and private operators. Previously this role was played by crop authorities. The role of the intermediary is to purchase from small holders, grade, bulk, store and transport produce to the processor.

5.4 Producer - processor link through an agent

This is close to (5.3) above except that the processor may commission an agent to provide services of purchasing, grading, bulking and transporting. The unique feature of (5.4) is that the ownership of the produce and, therefore, the risk involved in the purchase is with the processor as soon as the produce leaves the producer. The agent does not own the produce at any time.

6 Conclusion

The bottom line argument of this paper is that the agro-industrial sub-sector in Tanzania is a very critical one for the development and growth of the country, given the agro-based nature of the economy. It has been argued that due to unique linkages existing in this sub-sector, strategic planning and implementation of agro-industrial ventures should take a systems approach taking account of farm produce production, storing, processing and distribution. The actors involved in each of the sub-system need to work together and their dynamic linkages be well articulated so as to facilitate mutual beneficial exchanges. This approach is more crucial now when the manufacturing sector is being privatized. With agricultural market liberalization, the small holders who produce most of the agricultural produce are relatively free to sell their produce to any buyer of their choice. This may put agro-processors, especially large scale ones who depend on this source of supply at risk. Arrangements that can guarantee at least a certain minimum supply of biological inputs should be developed. Understanding the agro-processing system and how external environment and actors influence it, like government, and financial institutions is also crucial. Possible organizational arrangements for linking producers and processors would allow adoption of the available options under appropriate conditions. Possibility of going for contractual arrangement, explicit or implicit, may seem to be an inescapable option to make the agro-industrial system work.

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