

*ORION*, Vol. 1, No. 1, pp. 16-27

A HOLISTIC APPROACH TO PLANNING AGRICULTURAL DEVELOPMENT:

A COMPARATIVE STUDY OF TAIWAN AND TRANSKEI

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ABSTRACT

The study discusses the application of a systems approach model to agricultural development in Taiwan and Transkei in determining development needs and priorities. The model consists of the interactions between and within four groups of factors: (i) physical and ecological, (ii) institutional and operational, (iii) the human potential, and (iv) the agri-milieu.

UITTREKSEL

Die studie behandel die toepassing van 'n model gebaseer op 'n sisteem-benadering ten opsigte van landbou-ontwikkeling in Taiwan en Transkei in die bepaling van ontwikkelingsbehoefte en voorkeure. Die model bestaan uit die interaksie tussen vier groepe: (i) fisies en ekologies, (ii) institusioneel en operasioneel, (iii) die menslike potensiaal en (iv) die landbou milieu.

1. INTRODUCTION

It is apparent from existing relevant literature that agricultural and rural development programmes and projects in less developed countries, and in Africa in particular, have rarely been successful. Exceptions to this are Israel, Taiwan, Japan and Korea (Ward [1]). In general, throughout the Third World, rural development, both as an ideology and a practice has not achieved its goals (Heyer, Roberts and Williams [2]).

Experience in less developed countries of Africa suggests that there is a need for a fresh approach to improving agriculture, which is the first step towards improving economic and social welfare. The lack of political commitment, which is so often mentioned as the main barrier to change, may not be solely the fault of politicians. There is strong evidence that agricultural planners and specialists have been guilty of advocating policies without the necessary institutional support, as well as technologies which are incompatible from a technical and human point of view.

Agricultural development is an integral part of general social and economic development, involving a movement from subsistence to cash economy agricultural production. In most less developed countries, agriculture has been the weakest link in the development chain. Food production has failed to keep pace with population growth.

It is clear from the literature that there is no satisfactory theory of rural change for less developed countries (Fenyés [3]). The problem lies in the mobilising of institutional, human and physical resources.

This paper suggests a systems approach to agricultural and rural development, aimed at identifying both constraints as well as the potential for development, which hopefully will serve as a starting point from which a "how" strategy may evolve.

The model is used in comparing the characteristics of the relatively modern small-scale farming economy of Taiwan (Bembridge [4]), with the more traditional small-scale farming economy of Transkei in Southern Africa (Bembridge [5]). The approach described is designed to pinpoint the type and necessary content of development programmes, as well as to indicate the institutional reforms required. It involves planning and implementation of development programmes on an inter-disciplinary basis in co-operation with local communities.

## 2. A SYSTEMS APPROACH

There are basically four interacting forces which, in combination, determine the type of farming system being practised and the level of agricultural production in any given agro-ecological area.

Firstly, there are the physical resources and environment (A factors) which determine the type of agriculture which can be practised, the potential of an area and the optimum use of natural resources. While certain physical factors cannot be changed per se, water resources can be conserved and improved, and measures can be applied to combat endemic plant and animal diseases through the use of modern technology (See Figure 1).

In the second place there is the agri-milieu (B factors) which is a combination of development factors which affect agriculture (Mosher [6]). These include political stability, government policies, population increase, growth of the economy, income distribution, physical infrastructure, community and social services, as well as general institutional factors, including the influence of farmers in economic and political life (See Figure 1).

Thirdly, there are the institutional factors (C factors), which include agricultural policies, prices, marketing, research, agricultural education and extension, availability of inputs, credit, marketing and land tenure. All these factors have a profound influence on the farming system in terms of results and outputs (See Figure 1).

Finally, the farmer and his family are the central figures in the production process. Characteristics of farmers and farming communities (D factors) must be known, if governments and development agencies are to bring about effective change (Rogers and Shoemaker [7]) (Refer Figure 1).

Human characteristics can influence agricultural and rural development either positively or negatively. Of cardinal importance is the fact that, with the exception of certain personal factors, many of the human factors are amenable to change through effective communication, education and extension, reinforced by the necessary institutional and political support.

The approach outlined in Figure 1 includes a description, as well as quantifying, analysing and evaluating the types of farming system being practised in an area including : (a) how the present system operates; (b) the system outputs and results in terms of production, incomes, employment, effects on physical resources etc.; and (c) how the outputs are utilised by farm families - for subsistence, cash savings, farm improvements or cash operating costs. This enables both internal and external constraints to improved production to be identified as per Figure 1.

Finally, it is possible to assess the optimum potential production and results which could be achieved for various farming systems if constraints to the "A" and "D" factors were removed or modified as indicated by feedback arrows in Figure 1. The types of changes or improvements required can then be formulated and implemented by adjusting or modifying the various policies or institutions listed under "C" factors. These external determinants should be adjusted to encourage and positively influence farmers' actions and decisions to achieve optimum potential production.

### 3. THE SYSTEMS COMPARED

#### 3.1 Development objectives

For the purposes of analysis, comparisons between the two countries are made according to the sub-systems outlined in Figure 1.

There are three basic agricultural development objectives of equal importance to all nations, all of which can be achieved by a systems approach to agricultural development (Carpenter [8]):-

- a) to improve the income levels of rural people, in order to provide them with their basic subsistence needs and satisfy their rising expectations for improved living standards.
- b) to increase the agricultural production of each area commensurate with the potential of available land and water resources;
- c) to conserve, maintain and improve the natural resources of soil, vegetation and water through sound land-use practices.

Taiwan has come a long way over the past 30 years, achieving a large measure of success in all three of the above development objectives, whereas many less-developed countries, such as Transkei, have yet to achieve a breakthrough towards achieving these objectives.

### 3.2 Use of Physical Resources ("A" factors)

It is not within the terms of references of this paper to discuss the physical resources of the two countries in detail. A general conclusion arrived at from the Taiwan study was that a high degree of utilisation of the physical potential, coupled with sound land-use practices, have been an important contributory factor to successful agricultural development.

Evidence from the Transkei study has shown that already part of the arable land potential is being damaged to the extent that its cropping potential has declined, while progressive deterioration is taking place on a large proportion of the remainder of cultivated land. Furthermore, much of the grazing area is in varying stages of deterioration. Water resources for irrigation are being utilised at only a fraction of their potential.

Resource endowment is not a constraint to agricultural development in either country.

### 3.3 The Agri-milieu ("B" factors)

The degree of modernisation and development in a country profoundly affects the agri-milieu in which agricultural and rural development takes place.

A general conclusion from the two studies (Bembridge [4] and [5]), taking into account development indicators of per capita income, population growth rate, infrastructural development, education levels and facilities, health, nutrition and industrial development, is that Taiwan is probably 30 to 40 years ahead of Transkei on the development continuum. The agri-milieu in Taiwan is favourable for growth and development of the agricultural industry, whereas in Transkei present policies and the general agri-milieu are not conducive to agricultural growth and development. However, the adoption of operational policies and an improved institutional framework could accelerate agricultural production in countries such as Transkei.

### 3.4 Institutional Factors ("C" factors)

Characteristics of institutional factors in the two countries are summarised in Table 1.

Viable institutions responsive to changing needs are basic to attainment of successful development. Of fundamental importance to the success of agricultural and rural development in Taiwan is a multi-discipline agricultural planning and co-ordination body responsible directly to the Cabinet. It has the responsibility of advising on policy and, together with the Bureau of Agriculture, implementing operational policies. Transkei has no central planning authority for agriculture, and an operational policy has, by and large, still to be formulated.

A general conclusion from Table 1 is that successful agricultural development in Taiwan can be attributed largely to the inter-related institutional variables, which, as hypothesised in Figure 1, determine the success of farming systems.

Transkei has yet to meet the institutional needs of agricultural development. Each variable shown in Table 1 should be considered within the total context of the problems of agricultural development and will require careful research, planning and management if it is to be successfully implemented.

Problems facing agriculture in the industrial economy of Taiwan include developing technology for the use of marginal land, further development of high value crops, integrating animals into the farming system, post-harvest and food processing technology, mechanisation of farming operations, further land reform, the strengthening of research and extension, as well as the establishment of further rural industries. Problems of labour migration and increasing farm incomes also have to be tackled.

### 3.5 Human Resources ("D" factors)

Because of socio-economic problems, the rural population of Transkei, in contrast to that of Taiwan, has a larger proportion of women and older people. Education levels are lower than in Taiwan, and there is a higher level of illiteracy. These are definite constraints to modernisation, but can be overcome by educational programmes.

A knowledge of the economic behaviour, motivation, norms, values and attitudes of small-scale farmers is a pre-requisite for the success of any rural development programme.

### 3.6 System. Outputs

In terms of levels of income, Taiwan's average farm family income in 1980 was over US\$15 000, compared with approximately US\$1 000 in Transkei. Agricultural production in Taiwan has increased phenomenally over the past 30 years, in terms of both total production as well as production per unit area.

In Transkei approximately 70 per cent of families are estimated to be living below the poverty datum line, and thus have little in the way of resources to improve agricultural production or their quality of life. Agricultural production is showing signs of decline in terms of both total production and per unit area.

In short, Taiwan has been something of a model of rural development: it has combined fast growth of total and per unit agricultural production, as well as rapid absorption of its under-employed labour force, with improved income distribution and a better quality of life in terms of improved nutrition, increased life expectancy, energy supplies and availability of vehicles, education and the luxuries of modern living (Ranis [9]).

#### 4. CONCLUSION

The keypoint of this paper is to show that it is possible to assess the potential production and the results which could be achieved if the improvements in the A, C and D factors (see Figure 1) were achieved and constraints removed, as indicated on the feedback arrows shown in Figure 1. The types of changes or improvements should then be formulated and implemented by adjusting or modifying the various physical, human and institutional factors.

The lesson to be learnt from Taiwan's development experience is that successful rural development is dependent upon a combination of factors, as outlined in Figure 1. No single sub-system or element alone can produce sound agricultural growth and rural development. Taiwan's example clearly shows all factors must be adequately provided. Taiwan has shown that a sound agricultural base is essential for industrial development.

Under the systems approach of analysis advocated in this paper, the study of Taiwan showed that despite the significant improvements which have been achieved, the country is still faced with a number of problems, which have to be tackled on an inter-disciplinary basis.

Many of the factors found to be the basis of successful rural development in Taiwan were found to be deficient in varying degrees in Transkei. These include a balanced operational development policy, wise use of natural resources in accordance with their potential, the development of the human potential, and the provision of the necessary institutional support. All these factors need to be tackled simultaneously on a planned basis.



Although conditions are very different and development much more advanced in Taiwan, there are a number of lessons which Transkei can learn from the development experience of Taiwan. Foremost is the need for an operational agricultural and rural development policy, supported by a central agricultural planning organisation, provision of inputs, credit and marketing, together with effective extension and adaptive research. Other important lessons are the need for land reform so that rural families can make a reasonable living, the strengthening and development of local farmer organisations and leadership, as well as a co-ordinated approach to rural development (see Table 1). While implementation of these institutional improvements will undoubtedly take considerable time they are nevertheless necessary pre-requisites for a viable and productive rural economy.

A general conclusion is that, with the application of the analysis described in this paper, it is possible to pinpoint the type of intervention necessary for successful rural development, irrespective of the stage of development and the agro-ecological conditions prevailing in a specific area or country. The approach is essentially inter-disciplinary, involving reconnaissance surveys followed by more detailed macro-level studies.

Constraints found to be most limiting in the farming system become the focal point for developing rural development strategies.

Decisions to accept or reject proposals to remove many of the barriers to agricultural development found in Transkei, which are common to many other less developed countries, rest solely with government officials and politicians.

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TABLE 1

Comparison of institutional factors between Taiwan and Republic of Transkei.

Factor variable	Present situation	
	Taiwan	Transkei
Policy	Successive four-year objective development plans.	Lack of operational policy and specific objectives.
Planning	Central agricultural planning and development authority responsible to cabinet.	Lack of central agricultural planning organisation.
Rural infrastructure	High degree of rural infrastructural development	Poor water distribution, roads, communication and schools.
Inputs/services	Readily available inputs and services.	Lack of readily available inputs and services.
Marketing/prices	Marketing and pricing for 20 major commodities.	Lack of organised marketing and price incentives.
Agricultural credit	Credit through Farmers' Associations and commercial sector.	Lack of credit facilities.
Agricultural research	National research network	Lack of local research institutes.
Agricultural extension	Well organised extension through farmer organisations.	Inefficient and ineffective extension.
Land tenure	Phased land reform programme.	Lack of security and negotiability of land rights. Uncontrolled communal grazing.
Development co-ordination	Co-ordinated development from Central Government.	Unco-ordinated agricultural development approach.
Farmer organisations	Nation-wide network of multi-purpose farmer organisations.	Lack of suitable local farmer organisations.
Local leadership	Well developed local leadership.	Lack of dynamic local leadership.

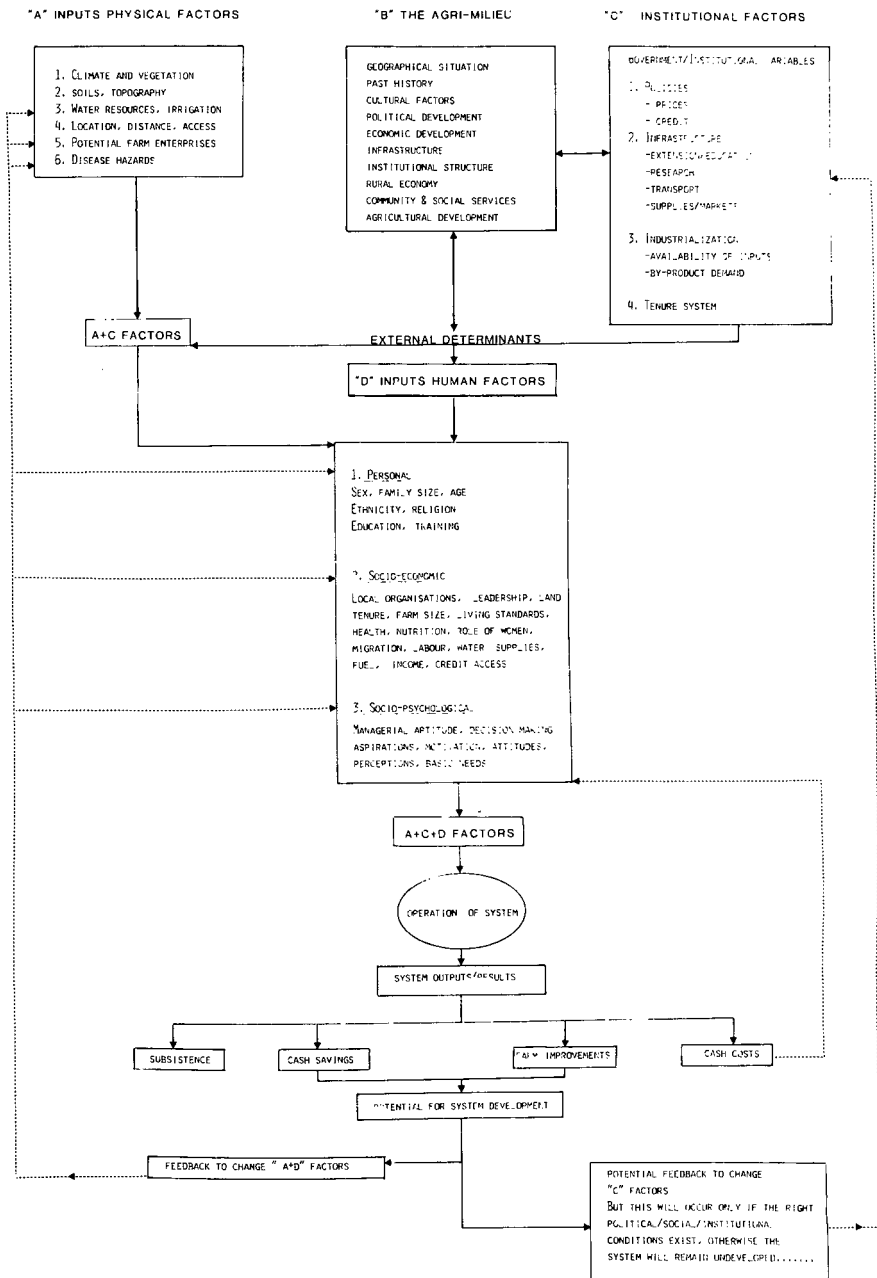


Fig. 1 Determinants of a Farming System