

A Framework for the Development of New Crops Industries in South Africa

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INTRODUCTION

The grain industry (mainly maize and wheat) is the largest crop industry in South Africa under rain-fed conditions. Significant changes have taken place since deregulation in agriculture and the termination of subsidies from mid 1990s. The total area under grain has decreased by about 10% to 15% (C. Du Plessis, pers. commun. 2001) due to lower prices (based on import parity and free market forces) and the higher risk of production because of the absence of state subsidies. Consequently, grain planting has decreased significantly on low potential land as well as on high potential land in remote areas.

In future, global market forces will test the viability of all agricultural commodities being produced in South Africa. Agriculture is still an important part of the national economy and greatly influences rural economy. Diversification or substitution by new crops could provide opportunities to improve the viability of the agricultural sector *per se*. This would be the case where the production of commodities or other established industries, have become non-competitive. However, the development of most new industries or businesses is usually complicated because of the high risks involved. It is therefore necessary to develop guidelines, frameworks, and processes to improve the success rate of new agricultural industries.

There are examples of successful new crop industries established in South Africa. One is the canola industry in the Western Cape Province. It has grown from virtual no industry since early 1990s, to a production area of 30,000 ha currently, with two processing plants in place (B.F. Saaiman, pers. commun. 2001). This development is significant in a South African context.

The roots of this industry started with a contract Canadian researcher. His instruction was research on alternative crops for the wheat industry in the Western Cape Province. Canola proved to be the best alternative of crops tested. It was first considered for a domestic niche market. Farmers started to produce in small quantities and the crop was pressed at an existing oilseed company. The production of canola increased to such an extent that this plant could not handle the supply. Consequently, two plants were erected by agricultural co-operatives. This was not done simultaneously, but only after the capital investment was justified by regional levels of canola production. At present research is being carried out on uneven germination that poses a barrier to the growth of the industry (A.J. van W. Conradie, pers. commun. 2001).

FACTORS IN NEW AGRICULTURE INDUSTRIES

Janick (1999) classified food crops on the basis of their economic importance. **Major crops** are cultivated worldwide in adapted areas with high economic value and are associated with high genetic input. They include grains, forages, oilseeds and grain legumes, tuber crops, fruits, vegetables, and sugar crops. **Speciality crops** are niche crops that, while economically important, have small markets that can be filled by a relatively few growers. Included are a number of horticultural species including fruit, vegetable, and spice crops. **Under-utilized crops** were once more widely grown but are now falling into disuse for various agronomic, genetic, economic, or cultural factors. In general, they are characterized by much less genetic improvement than the major crops but they are being lost because they are less competitive. Examples include cereals such as emmer and spelt; pseudocereals such as buckwheat; and oilseeds such as sesame and safflower. **Neglected crops**, traditionally grown in their centers of origin and where they are important for the subsistence of local communities, are maintained by socio-cultural preferences and traditional uses. These crops remain inadequately characterized and, until recently, have been largely ignored by agricultural researchers and genetic conservation. Yet they may represent our most valuable potential resource for the future. In some cases, their lack of exploitation is an historical accident. Examples include the Andean root and tuber crops, and the minor millets such as *Panicum*, *Paspalum*, and *Digitaria* species. **New crops** include those recently developed from wild species whose virtues are newly discovered, formerly collected of wild-crafted species, or

synthesized crops created from interspecific or intergeneric crosses. They represent only a handful of cultivated species and very few are included as new foods. Totally new crops from wild species are mainly associated with industrial crops such as *Limnanthes alba* (meadow foam), a source of unique seed oils, or *Taxus brevifolia*, a source of Taxol®, a valuable anticarcinogen. **Genetically transformed crops** include those modified by recombinant DNA technology. Gene splicing is now an established technique with over 50 transgenic crops field-tested in the United States. Rates of adoption by farmers for transgenic cotton, soybean, and maize have been very high from the first releases in 1996.

When new crop industries are promoted it is important to make use of acquired experience, knowledge, and wisdom. There are many pitfalls to avoid and numerous risk factors to be managed. McKinna (1999) has identified critical success factors in new agricultural industries (Table 1). The two most critical factors on the list are capital availability and an effective market development plan.

Pasqual (1995), stressed the importance of a market driven approach to new crop selection. She further stated that the identification of crop opportunities with good prospects relies on ascertaining their demand by overseas consumers. A database has been developed and the following limits were placed in order to avoid duplication: (1) each product is unique in the database—there is only one entry for each type of product; (2) price information is limited to retail prices, (3) availability of a product in a certain country may not necessarily mean it is in demand, (4) fresh product information is limited to the season covered by the market survey; and (5) food products in demand by the food service sector and exotic or medicinal food preparations are not covered.

It is clear that development of new crop industries is basically the creation of new business opportunities. Risk is one factor that needs special attention in this regard. The reason for this is that new crop industries are usually considered higher risk enterprises than conventional crop farming. Future trading (market), financial (economic), physical (production) and social (personal and management) environments are more likely to be unknown and thus it is more difficult to generate the profit outcomes sought (Buffier 1998).

Krause (1996), recommended the following steps when new crop business opportunities are evaluated: (1) do a risk audit or develop a risk profile; (2) develop a business plan with goals, objectives, budgets and cash flows; (3) use financial modeling of cash flows to examine the impact of different events occurring; (4) calculate the profitability using appropriate measures such as npv (net present value) and irr (internal rate of return); (5) look at the risk/reward ratio relative to the level of risk that is acceptable; and (6) understand the “fall-back” position if the venture fails.

Industries or companies based on raw materials from agriculture differ distinctly from other business in one particular aspect; it is depended on agricultural production. Selection of new crops is not an easy task because a whole range of factors has to be considered. A checklist for the selection of new crops has been published in the Australian New Crops Newsletter (1998). The shortened list of criteria only as far as crops directly are concerned is: botanical/geographical, agronomic, production, production economics, domestic production, and funding of domestic research.

PROPOSED STRUCTURAL FRAMEWORK FOR THE DEVELOPMENT OF NEW CROP INDUSTRIES

A simplified, holistic outline of the main elements for the development of new crops industries is proposed in Fig. 1. It is an attempt to provide an organizational framework for use in different situations. Thus an individual intending to take advantage of a niche market, or a company wanting to implement vertical integration, could make use of these basic principals, which are essentially the same for all market entrants. The different segments of the value chain in Fig. 1 indicate domestic or foreign contributions to the total chain. For example, if a product for a sophisticated market is produced, it might be expected that only the agricultural part of the value chain would be done locally. There are therefore possibilities for strategic alliances and partnerships depending on specific situations. Where resources are limited, as is the case in South Africa, co-operation at all levels with local and foreign partners is crucial. Successful implementation requires attention to establishment of goals (Table 2) for each element in the value chain.

Table 1. Critical success factors in new agricultural industries.

Factor	Most important elements
An effective industry association	<p>Effective chief executive with good supporting staff.</p> <p>Expertise in finance, legal, marketing, business management, technical production, agropolitics and government relations.</p> <p>Full support from the industry with adequate representation.</p> <p>Adequate finance and financial mechanisms and structures.</p>
Adequately funding the commercial stage	<p>New industries must have sufficient capital to finance infrastructure, systems and research and development. Capital is required up front with the prospect of not being repaid for more or less five years.</p>
An efficient production capability	<p>The new industry must be profitable in the light of what is usually formidable global competition and hence must strive for world's best practice in production.</p> <p>Farms must be able to maintain their commercial viability as farm gate prices decline.</p> <p>Genetic material are at an early stage of evolution with growth, yields, and quality often low to that of the traditional industries.</p>
An efficient processing and value-added capability	<p>Establishing appropriate technology and production systems usually by adapting technologies from other industries.</p> <p>Skills development of the labor force.</p> <p>Achieving economic output levels of the value adding plant.</p>
A market driven product specification and quality assurance regime	<p>The key quality/performance specifications for a new product need to be determined, along with quality assurance procedures that predict the quality and performance of the product and its suitability for various end users. Hence, standards must be developed.</p> <p>Quality compliance might become too difficult for some producers. Selling outside the system results in the undermining of prices and return.</p>
An effective trading/distribution mechanism	<p>The economy of distribution is heavily driven by volume. A strategic alliance is recommended with organizations which distribute complementary but not non-competitive products to same customer base</p>
An effective market development program	<p>With new products the market is very thin; it only takes 5 to 10 tonnes of oversupply to flood the market and cause prices to free fall.</p> <p>Lack of funding. Market development activity, particularly promotion, is quite expensive and usually requires activity both locally and overseas.</p> <p>Product availability. Market development activities need to occur to create demand before the product becomes available for consumers to buy. Such activities can be restricted by a lack of product, including the problem of not having samples for prospective customers.</p>
A brand oriented marketing and promotional strategy	<p>Branding is a proven marketing tool. If done well, branding will generate brand loyalty and premium returns and will give an industry a greater degree of control over the market channel.</p> <p>Branding is more than labeling a product. It needs to be underpinned by a strong marketing strategy and culture, committed to quality.</p>

continued

Table 1. Continued.

Factor	Most important elements
The ability to dispose of all products at economically viable levels	Product markets usually have no difficulty in disposing of the top quality product at a high return. All industries inevitably produce a certain percentage of lower quality/less preferred product, regardless of their commitment to quality and this product must be disposed of satisfactorily.
Managing the transition from speculative (<i>the stage where pioneers foresee a huge commercial potential and start to interest others, who may be driven by an interest in capital gains and tax deductions</i>) to commercial stage.	There is a role for government in regulating the speculative stage. At the very least, it should tighten up the requirement for prospectuses on new enterprises. There is a need to ensure that potential investors or participants are well informed about what they are getting into, for instance the long-term prospects and critical success factors.
An adequate funded and well run R&D function	New industries need research and development on several fronts: on farm production; product description and quality; processing and value adding; product performance; transportation and distribution; and market research and intelligence. One of the key roles of the industry association is to identify R&D priorities and to ensure that the funding and expertise are in place.
Effective dealing with bioethical issues	New agricultural industries are likely to face novel bioethical issues which the industry associations must be ready to deal with effectively as they arise.

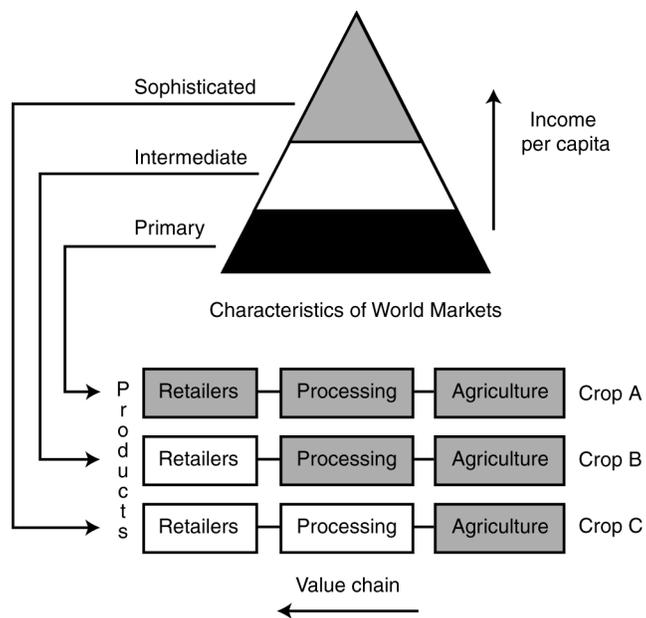


Fig. 1. Elements of new crop development. Shaded boxes indicate local activity (adapted from Alvaro Altuve 2001).

Table 2. Implementation of new crops: goals to achieve.

Element	Requirement
World market	Competent strategic management Market driven approach where consumer needs are most important Knowledge of possible markets Availability of detailed market information Market information continuously updated and stored
Agriculture	Crop selection basis (potential adaptability, productivity, and target market), complexity of production, availability of effective pesticides and herbicides, harvesting process and technology available, information and research backup, state of economy in present agricultural industry, capital requirements, compatibility with present agricultural activities and technology in use, risks involved, environmental implications, social acceptability Cost effective transportation of raw materials is in place New crops promoted only after development of a business plan Efficient growers association in place
Processing industry	Matching processing plant development (capital requirement) and agricultural production (volumes) Adaptation of existing technology to reduce initial cost Risk management in place Effective co-operation and communication Cost effective and economical production Products continuously produced according to the minimum standards required by the market Standards are in place, strictly according to market preference New products can be developed
Retailers and other service providers	Services needed to sell products are in place; outlets, promotion, market development, and distribution
Other important aspects	Competent strategic management is conducted (business development) Efficient services for every part of the value chain exist Research & development for every part of the value chain is in place

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