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The WRC operates in terms of the Water Research Act (Act 34 of 1971) and its mandate is to support water research and development as well as the building of a sustainable water research capacity in South Africa.

TECHNICAL BRIEF

Water and agriculture

Water use and agricultural value chains

The WRC funded a study in which an economic analysis of the contribution of water use to agricultural value chains was undertaken.

Background

Small-scale farmers can contribute significantly to the reduction of food insecurity. Agriculture contributes to economic development and rural livelihoods by providing food products. It also represents a range of opportunities for earning income in production, processing, distribution and retailing phases of the food value chain. The role of agriculture thus extends the mere provision of food to rural communities.

Since 1994, government has committed itself to working towards decreasing rural poverty through the implementation of policies that include initiatives to link emerging farmers to commercial agricultural value chains. Government has also spent a large amount of money on research projects on ways to successfully link emerging farmers to commercial agri-food chains, and on the revitalisation of smallholder irrigation schemes.

Objectives of the WRC study

Despite the commitment from government, however, actual success stories where emerging farmers are successfully operating in commercial agri-food chains are scarce.

Thus the WRC study set out to:

- Develop a conceptual framework based on a literature review on value chain analysis with specific reference to water utilisation and competitiveness in agriculture
- Demonstrate the application of the conceptual framework for commercial and emerging agriculture in the horticulture and field crop industries (or a combination of both)
- Determine the research approach, method and models for analysis of value chains with application to commercial and emerging agriculture in the horticulture and field crop industries (or a combination of both)
- Empirically analyse and model selected value chains in commercial and emerging agriculture in the horticulture and field crop industries (or a combination of both)

A conceptual framework was developed that could be used to analyse the value chains within which emerging farmers could be integrated. This framework consists of a problem tree analysis and an integrated New Institutional Economics (NIE) and Structure-Conduct-Performance (SCP) analysis of the three levels (micro, macro and meso) that comprise the value chain within which the emerging farmers are participating.

The integrated NIE and SCP framework was applied to three case studies: the case of raisin producers from Eksteenskuil in the Northern Cape Province, the case of vegetable producers from Zanyokwe Irrigation Scheme, and the case of maize and vegetable producers from Thabina Irrigation Scheme.

Results and conclusions

The results from the analyses of the distribution of water use along the value chains show that the bulk of all of the water that is used along the value chain is used at farm level to produce the food products. Efforts to increase the efficiency with which water is used along the value chain thus should focus the attention on water use at farm level.

The enforcement of water institutions has a major role to play in improving water use efficiency at farm level.

Optimising water use along the value chain depends on the reasons for providing emerging farmers with irrigation water. The results from the analyses show that the marketing

channel that is associated with the highest total value added to the physical product is not necessarily the option that yields the highest return for the farmers.

Similarly, the marketing channel that is associated with the highest total value added to the water that was used along the chain is not necessarily the channel that earns the highest return for the farmers from the water that was used to produce the product. Care should thus be taken to scrutinise the definition of optimal water use when advising emerging farmers with the aim to optimise water use along the value chain.

The study found that while emerging farmers who use marketing channels other than the high paying channels (i.e. hawkers and retail stores) may seem to make sub-optimal decisions, the attributes of their products may mean that they do not have access to the high paying options. In such a scenario the seemingly sub-optimal decision may actually be the optimal choice.

A comprehensive understanding of the attributes of the product and the requirements of the different marketing channels thus is necessary before advising the farmers in terms of the specific marketing channels to target to ensure that the advice will result in the optimal outcome.

A number of key success factors were also identified from the results of the study that prove to have great potential to contribute towards the successful participation of emerging farmers in commercial agri-food chains.

The key success factors include, among others, effective support to emerging farmers; effective collective action among emerging farmers; actions to minimise the potential negative impact of cultural activities on the performance of the farm businesses; secure tenure; tailor made financing schemes; and coordinated efforts to overcome stumbling blocks.

The results from this study show that emerging farmers have great prospects to increase their production levels by using their production inputs more efficiently. The results also show that farmers can substantially improve their cash flow positions by improving the degree of efficiency with which they use their inputs.

It is important to note that the results show that the farmers can increase their production at current input levels and within their existing technology set. Thus, despite the cash flow constraint that constrain emerging farmers from applying recommended levels of production inputs, and the factors that exclude them from adopting sophisticated technology, the farmers still should be able to increase their production levels.

Effective support is required to help the farmers to improve the degree of efficiency with which they use their production inputs. The results also show that (private sector) lead firms in the value chain have an important role to play in providing the required support. Lead firms have a comprehensive understanding of the quality requirements, and also often have technical advisors that have the knowledge and experience to support farmers to produce larger volumes of good quality crops.

Lead firms, however, need incentives to invest in the support of emerging farmers. If the lead firm can only access the incentives (i.e. tax benefits) through the performance of the emerging farmers, a complementary relationship will exist between the lead firm and the emerging farmers.

Such a lead firm will have a vested interest in the performance of the farmers, and hence a strong incentive to actively support the farmers to improve their performance. The complementary relationship may also convince the lead firm to enter into a formal vertically coordinated relationship (i.e. relation based or equity based alliances) with the farmers.

The optimal type of relationship depends on the characteristics of the transaction. Care should be taken not to force specific types of relationships (i.e. strategic alliances) on emerging farmers and the lead firms, but rather to allow for a comprehensive analysis of the transaction to identify the appropriate type of relationship.

The second key success factor relates to effective collective action. The results show that the scale of operations of emerging farmers typically is small. Collective action is required for emerging farmers to benefit from scale advantages, and to contribute towards decreasing the transaction costs faced by the buyers in commercial agri-food chains who deal with emerging farmers.

Collective action per se, however, is not the sufficient condition for the successful participation by emerging farmers in commercial agri-food chains. The farmers should organise themselves into a collective entity to develop their businesses and not merely to access government grants as is currently the case in South Africa.

The farmers should also be allowed to organise themselves in any type of collective entity that is most appropriate given

their needs, instead of forcing them to form co-operatives in order to get access to the grants.

Effective functioning collective entities also have an important role to play in stimulating farmer-to-farmer skills transfer. Farmer-to-farmer skills transfer has major scope to contribute towards improving the skills of the farmers to use their inputs efficiently.

The results from the analysis of the social embeddedness of the farmers at the three case studies show that cultural activities may have a detrimental impact on the performance of emerging farmers. The third key success factor is to identify all of the cultural activities in the region that may have a negative impact on the performance of the farmers under consideration.

Strategies then have to be formulated to minimise the potential negative impact of such activities on the performance of the farm businesses. It is important to note that the significance of cultural activities is not questioned in this study. The idea is to find solutions that will allow the farmers to participate in cultural activities without negatively affecting their farm businesses.

The next two success factors relate to the provision of an enabling environment for emerging farmers. Firstly, secure tenure for the farmers provides the basic incentive to invest in their farm businesses. Secure tenure also has some spin-offs that contribute towards overcoming some of the other stumbling blocks that typically exclude emerging farmers from participating in commercial agri-food chains.

Secure tenure may give farmers access to credit to supplement their cash flow. Consequently, secure tenure may contribute towards allowing emerging farmers to intensify their production activities by applying the recommended input levels.

The results from the cash flow optimisation model show that there are potentially substantial gains in net cash flow if the farmers were to intensify their production.

Secure tenure will also allow prosperous farmers to expand their scale of production by buying or renting additional land from other farmers who do not want to farm anymore. Farmers with little aspirations to farm thus can still earn some income from their land if they are allowed to legally rent or sell their land to other farmers.

Again it is recognised that the transfer of secure tenure to individual farmers is not the sufficient condition for the successful participation of emerging farmers in commercial agri-food chains. Ultimately the success depends on the entrepreneurship of the farmers to exploit opportunities that will be created through the transfer of secure tenure to individual farmers.

Another success factor that relates to the enabling environment is the provision of tailor made financing schemes to give emerging farmers access to credit to supplement their cash flow. The typical characteristics of emerging farmers disqualify them from having access to credit from commercial credit providers.

The difficulty to change the characteristics of emerging farmers to meet the requirements of commercial credit providers suggests that it may be easier to create a tailor made financing product that are accessible given the typical characteristics of emerging farmers. There is, however, no guarantee that the farmers will use the credit to develop their farm businesses.

During the development of such a scheme it is crucial to consider potential incentives and/or sanctions that will maximise the likelihood that the funds will be used for agricultural purposes.

Lastly, the results from this study show that the stumbling blocks that contribute to the exclusion of emerging farmers from participating in commercial agri-food chains are very much integrated. Efforts to overcome one or two stumbling blocks at a time may not have the desired outcome.

A coordinated approach has to be followed to overcome the stumbling blocks. The last key success factor thus is to coordinate the efforts to overcome the stumbling blocks that constrain the performance of emerging farmers.

Especially since the responsibilities to overcoming certain stumbling blocks may reside in different governmental departments, it is crucial to coordinate efforts to ensure sustained benefits from such efforts.

Further reading:
To order the report, *An economic analysis of the contribution of water use to the value chains in agriculture* (**Report No. 1779/1/12)** contact Publications at Tel: (012) 330-0340, Email: orders@wrc.org.za or Visit: www.wrc.org.za to download a free copy.