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# Measuring and tracking smallholder market access in *South Africa*

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## **Abstract**

This paper proposes a methodology for measuring and tracking market access for smallholder farmers in South Africa namely, the Smallholder Market Access Index (SMAT). The rationale for the creation of such an index stems from the general perception and, in some cases, study findings, pertaining to or indicating lack of progress in addressing integration of smallholder farmers in South Africa's mainstream economy, a majority of them black. The Index will be developed with the assistance and advice of experts and public and private stakeholders. It will take the form of a composite index constructed by aggregating a set of indicators relevant in the definition of "market access", and will be tracked on a regular (possibly biannual) basis.

## 1. Introduction

This paper proposes a methodology for measuring and tracking market access for smallholder farmers in South Africa. One of the founding objectives of the NAMC, as stipulated in the Marketing of Agricultural Products Act (Act 47 of 1996), is to increase market access for all participants. The NAMC is leading a project to develop a composite index as a measure of progress towards achievement of “market access for all participants” and in particular, market access for smallholder farmers in South Africa. The rationale for the creation of such an index stems from the general perception and, in some cases, study findings, pertaining to or indicating lack of progress in addressing integration of smallholder farmers in South Africa’s mainstream economy, a majority of them black. This is on the back of very well-articulated policies from as far back 1994 when the Reconstruction and Development Programme (RDP) was published by the ruling African National Congress (ANC). The RDP in this regard states:

“The RDP aims to create a restructured agricultural sector that spreads the ownership base, encourages small-scale agriculture, further develops the commercial sector and increases production and employment” (African National Congress, 1994).

Following on the sentiments of the RDP, the White Paper on Agriculture that was published in 1995, advocated for provision of support services to enable farmers to move into commercial farming if so desired (Makhura, et al., 1996). The then national Department of Agriculture developed the Broadening Access to Agriculture Thrust (BATAT) in 1995 as its RDP project aimed at improving the access of small scale farmers to agricultural services in five areas namely, financing, technology development, transfer systems, human resource development, and marketing. A component of this initiative known as the “BATAT Marketing Drive” sought to “improve small scale farmers’ ability to seize marketing opportunities” (VanRenen, 1997). Over the course of the past two decades, similar policies and programmes have been developed to support development of smallholder farmers. The most prominent and largest of these is the Comprehensive Agricultural Support Programme (CASP), which was introduced in 2004 with the aim of providing support to smallholder farmers and land reform beneficiaries in the following areas (Department of Agriculture, 2004):

- Information and knowledge management
- Technical and advisory assistance, and regulatory services
- Training and capacity building
- Marketing and business development
- On-farm and off-farm Infrastructure and production inputs, and
- Financial assistance

Recent findings suggest that CASP and other farmer support programmes have not been effective in achieving their intended goals. There is a need to measure and track the situation with regards to

market access for smallholders in order to assist with policy debate and the formulation of more effective programmes towards achievement of market access.

## **2. Smallholder market access: the concept and the problem**

### **2.1 Definition of market access**

One of the key factors to the success of smallholder farmers is access to lucrative markets (Machethe, 2004). This requires systems (e.g. market information, market intelligence, effective farmer organization, etc.) that are responsive to the farmer's needs (Jari & Fraser, 2012). However, in most developing economies smallholder farmers find it difficult to participate in markets because of numerous constraints and barriers (Jari & Fraser, 2012).

Market access, in the context of smallholder farmers, can be defined as the ability of these farmers to seize available market opportunities. This may serve as a profit incentive and may encourage farmers to increase production, thus contribute to household income and food security. It is widely understood that smallholder farmers lack access to lucrative markets due to several constraints such as poor infrastructure (road, communication and storage infrastructure), long distance to output and input markets, high transport costs, lack of information (relating to markets, production, finance and environmental issues), lack of technical support (e.g. training on aspects of production and marketing, and regular sources of information in the form of active involvement of extension officers), low involvement in agricultural cooperatives and no record keeping practises, among others (Jari & Fraser, 2012).

Hence, Machethe (2004) suggested that improving market access for smallholder farmers requires a suitable and enabling institutional environment to obtain (required) resources to become a successful farmer. Therefore, there is a common argument that reducing barriers to markets access may accommodate smallholder farmers into the mainstream economy, thus improve household food security, reduce poverty, enhance agricultural development and improve economy-wide growth.

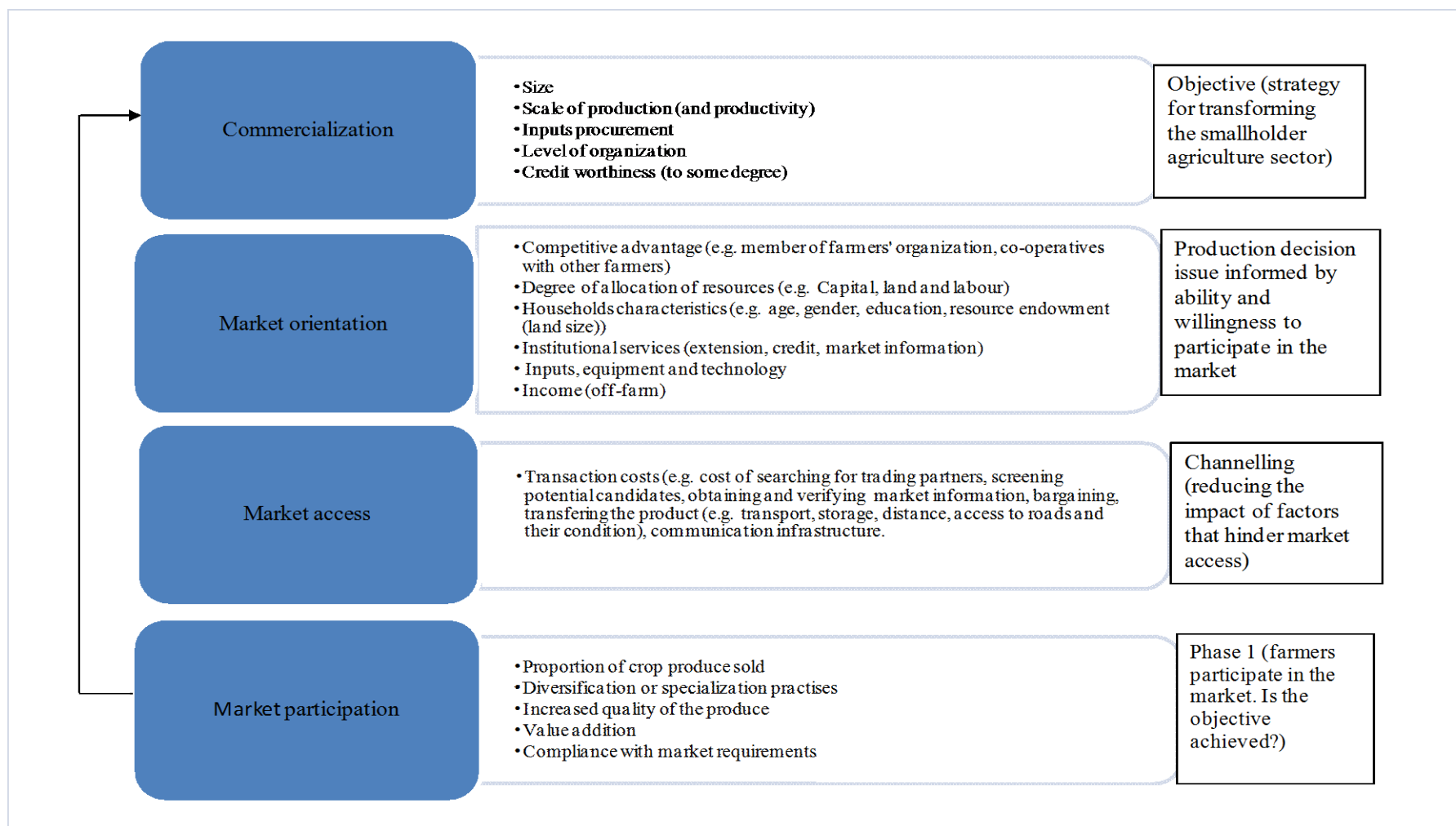
### **2.2 Determinants of market access**

van Renen (1997) noted that smallholder farmers usually consume a larger proportion of their produce and/or sell the surplus to the local communities. He noted that there is potential for these farmers to break through the market opportunities used by commercial farmers. However, the extent to which they could penetrate varies across provinces and depends on the availability of infrastructure and market information. He also alluded that smallholder farmers are excluded from one of the most lucrative channels such as direct sales to supermarkets and exports mainly due to lack of management skills, small quantities produced, low quality of the produce, lack of suitable storage facilities, little value addition to their products, transport constraints and ineffective dissemination of information.



Noteworthy, there are four terms that appear quite often in market access literature, namely commercialization, market participation, market orientation and market access. These terms do not have the same meaning, therefore should not be used interchangeably. Commercialization means the transformation of a smallholder farmer from being an own-consumption producing farmer to a mainstream economy participant through “lucrative” market participation. “Lucrative markets” is emphasized because smallholder farmers have always had access to markets, but the markets they participate in do not produce ideal profit margins for these farmers to grow in the scale of production. Hence, the South African agriculture sector has adopted smallholder farmers’ commercialization as a strategy to integrate these farmers into the mainstream economy and this can be achieved through market access (Randela, *et al.*, 2008).

Therefore, commercialization is a process that entails market access, which in turn entails market orientation and market participation. Market orientation and market participation, as defined by Berhanu & Moti (2010), mean agricultural production destined for market based on market signals, and sale of output and use of purchased inputs, respectively. On the other hand, market access relates to the breakthrough from obstacles that hinder smallholder farmers’ market participation. Therefore, the terms could be put together to say in order to commercialize smallholder farmers the challenges that hinder the farmers to seize lucrative markets must be dealt with so that the farmers could be motivated to become market oriented thus participate in the market, and fit into the mainstream economy. This idea is further presented in Figure 1.



**Figure 1: Market access framework**

**Sources:** Own Concept, adapted from: Demeke & Haji (2014); Randela, *et al.* (2008); Jari & Fraser (2012); Obi, *et al.* (2012); Chamberlin & Jayne (1999); van Renen (1997)

Hence any comprehensive measure of should be modelled as a function of indicators of commercialization, market orientation, market participation and market access. As indicated by Berhanu & Moti (2010), this implies that determinants of these components are not the same, therefore, interventions that seek to enhance smallholder farmers participation into the mainstream economy must address each component separately.

Furthermore, it must be taken into cognisance that South Africa has growing international market linkages through market liberalization (market reform) which smallholder farmers could be capacitated to benefit from. Market liberalization is viewed as a major source of change in South African agriculture as it reduced government interventions and exposed the sector to the dynamics of the international market (van Zyl, *et al.*, 1997; Doyer, *et al.*, 2007). This implies that the agricultural sector is, now, affected by the country's participation in different trade agreements which contribute to the liberalization of the agricultural sector (Chitiga, *et al.*, 2008). The idea behind market reforms was to reduce distortions which exist in the form of subsidies, tariffs, quotas and duties that regulated trade between countries. This is meant to promote the integration of the sector into the world economy in order to encourage greater access to markets (Chitiga, *et al.*, 2008).

According to Chitiga, *et al.* (2008) market reforms in South Africa began after the country subscribed to the Uruguay Round Agreement on Agriculture (in the 1980s), leading to the Marketing of Agricultural Products Act (1996), which reduced state intervention in agricultural marketing and product prices. The main aim of the reform, in the South African context was to remove export subsidies and reduce domestic support in order to provide free market access to all market participants, promote efficiency of agricultural products, improve opportunities for export earnings and enhance the viability of the sector (Chitiga, *et al.*, 2008). Agriculture and other industries have all benefited from the opening of South African trade policies (i.e. trade liberalization). However, there is no evidence of smallholder farmers' participation in the international market.

### **2.3 The smallholder market access problem**

Smallholder farming is well-known throughout the world as the type of farming that is practised by poor farmers (Ha et al., 2015). This scenario is also true in Africa in general and South Africa in particular. In developing countries such as South Africa, the majority of smallholder farmers were established as a result of separate development policies of the then South African government which has resulted in the so called dualistic agricultural sectors (Ortmann and King 2007).

Various researchers have highlighted the adverse impact of the dualistic agricultural sector on market access by smallholder farmers (Jordaan et al., 2014 and Mmbando et al., 2015). This has prompted the current South African government to put programmes such as the comprehensive agricultural support programme in place to transform the dualistic agricultural sector to mainstream smallholder farming in the South African economy. Given the perceived slow progress by the smallholder farming sector in accessing formal markets, various interventions such as agri-parks,

recapitalisation, market linkages and strategic partnerships were /are supported by both South African government and private sector.

According to (Machethe, 1990 and Delgado, 1998), despite the poor financial background of the smallholder farmers, most of the least developed countries perceive smallholder farming as potential drivers of agricultural development. Hence, governments in less-developed countries have often promoted the use of cooperatives as the organisations that could enhance market access in these countries (Chibanda et al., 2009). Machethe (1990) states that smallholder agriculture is important to reduce unemployment of the indigents especially in Sub-Saharan Africa where smallholder agriculture is credited with promotion of political stability and human welfare.

Contemporary research suggests that smallholder farming in developing countries (who are often economically marginalized and with poor educational backgrounds), are faced with numerous challenges to enter into formal markets and also benefit from it (Nandi et al., 2015). Problems such as decreasing incomes during the conversion period and high costs for certification were seen to be the major constraints. Sikhweni & Hassan (2014) also indicated that smallholder farmers are found wanting whenever large quantities of their products are required by the markets. Magingxa & Kamara (2003) also highlighted that most South African smallholder farmers appear to have little understanding of how the formal market operates and its pricing structure. These authors have indicated in a brief summary the challenges regarding the market access of the smallholder farmers in South Africa as quoted below:

*“The problem of market access is linked to the following constraints: price risk and uncertainty, difficulties of contract enforcement, insufficient numbers of middlemen, cost of putting small dispersed quantities of produce together, inability to meet standards. Other compounding problems relate to physical market access like physical infrastructure – roads, market facilities, power and electricity”.*

In nutshell, it may be deduced that the problem of smallholder farming in accessing the market is the farming orientation (that is producing primarily for household food security) and production quantities (that is using the residual products as surplus for trading). The surplus production may not meet formal market standards and requirements and therefore, lead to the lack of market access in formal markets. Part of the standards requirements for the formal markets include food safety, consistency in food supplies and environmental management post production on which South African smallholders may require capacitation.

## **4. Measuring and tracking smallholder market access in South Africa**

### **4.1 Rationale for a measure of smallholder market access**

Market access - and ways to represent its multiple aspects - is under-conceptualised due partly to generalized portrayal of African smallholders challenged by persistently poor access situations (Chamberlin & Jayne, 2011)<sup>1</sup>. There is currently a gap in the understanding and measurement of market access locally and internationally. It is against this background that the NAMC proposes that the Smallholder Market Access Tracker (SMAT) Index be developed as a measure of progress in the achievement of the market access goal for smallholders in South Africa. The proposed methodology to be followed in the development of the SMAT Index is explained below.

### **4.2 Methodology for measuring and tracking smallholder market access**

#### **4.2.1 Construction of the SMAT index**

The proposed SMAT Index will be established along the lines of a composite index. A common objective of composite indices or indicators is “to obtain a synoptic or comprehensive single number, representing a vast array of measurements on the multiple aspects of a ‘conceptual entity’” (Mishra, 2007). The ‘conceptual entity’ in the case of the SMAT Index is smallholder market access in South Africa. Freudenberg (2003) defines an indicator as “a quantitative or qualitative measure derived from a series of observed facts that can reveal relative position in a given area and, when measured over time, can point out the direction of change.”

According to OECD (2008), composite indicators, although they have been used widely, their construction and use have received opposition from some scholars, who are against aggregation of variables. These “non-aggregators” point to methodological problems pertaining to the arbitrary nature of the weighting process by which the variables are combined. One of the primary objectives of the proposed SMAT Index is to call attention of all relevant stakeholders to an important strategic indicator in the context of South Africa namely, market access for smallholder farmers. The SMAT Index will be constructed through a joint effort by experts in the field and with the use of recognised methodologies. It will be designed as a measure to promote policy debate and to facilitate communication among stakeholders on an important topic.

In order to achieve an acceptable level of methodological robustness, a few basic steps will be followed in the construction of the SMAT Index as follows:

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<sup>1</sup> These authors, however, caution against “bundling of assumptions about market access into simple indicators” – something which the SMAT is attempting to do. The SMAT indicator will attempt to deal with the authors’ concerns through a careful methodological approach.

- 1) Development of a theoretical framework
- 2) Data selection
- 3) Imputation of missing data
- 4) Multivariate analysis
- 5) Normalisation of indicators
- 6) Weighting and aggregation of the indicators
- 7) Robustness and sensitivity analysis<sup>2</sup>
- 8) Decomposition into the underlying indicators
- 9) Links to other variables
- 10) Presentation and visualisation

The above steps are based on the Handbook on Constructing Composite Indicators: Methodology and User Guide (OECD, 2008). Although the OECD handbook focuses on inter-country composite indicators of performance in areas such as industrial competitiveness, sustainable development, globalization and innovation, the principles it advocates are applicable in the construction of composite indicators in general. A similar list of steps appears in Salzman (2003) and Nardo *et al.* (2005). Table 1 below summarises a proposed methodological approach to the construction of the SMAT Index.

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<sup>2</sup> This step may not be necessary in the case of SMAT, which is not an inter-country index.



**Table 1: Methodological approach to the construction of the SMAT Index**

	<b>Construction steps</b>	<b>Methodological choice for the SMAT Index</b>
1	Theoretical framework	<p>“Market access”: participation in both in (agricultural) input and output markets as influenced by farm/farmer characteristics, prevailing physical and institutional infrastructure, and macro and sectoral policies (Amrouk, et al., 2013). In line with South Africa’s BATAT marketing drive (VanRenen, 1997), market access will comprise the following six components:</p> <ul style="list-style-type: none"> <li>• Production and factor endowment</li> <li>• Input and output market channels</li> <li>• Value addition</li> <li>• Physical infrastructure (market facilities, roads, storage, telecommunication)</li> <li>• Market information</li> <li>• Training and advisory services</li> </ul>
2	Data selection	Variables to be included in the SMAT Index will be categorized under the seven components specified above. The proposed list appears in Table 2 below. The final list will be established following expert and stakeholder consultation. A draft survey instrument to be used in the collection of data will be developed.
3	Imputation of missing data	The choice of method to deal with missing data will be motivated by the desire to minimize standard errors. Possible methods will include case deletion, single, or multiple imputation.
4	Multivariate analysis	This will be a preliminary step designed to assess the suitability of the data and to prepare for further data weighting and aggregation. Principal component analysis (PCA), as the most used method (Mishra, 2007), is proposed for the analysis of the structure of the data. The final choice of PCA will be made following expert consultation.
5	Normalisation of indicators	Normalisation method will be chosen following expert consultation
6	Weighting and aggregation of the indicators	The “equal weighting” method is proposed pending expert advice and stakeholder consultation. Geometric aggregation is proposed as opposed to linear aggregation since the latter is useful in cases where all individual variables have the same measurement unit (OECD, 2008).
7	Robustness and sensitivity analysis	This step may not be applicable since SMAT is not an inter-country index
8	Decomposition into the underlying indicators	SMAT will be decomposed to analyse the contribution of its subcomponents
9	Links to other variables	Further analysis will be undertaken to link SMAT with other relevant indicators in order to test its explanatory power
10	Presentation and visualisation	Various methods of presentation will be used to report on SMAT (tabular, graphical, etc)

#### 4.2.2 Proposed indicators for the SMAT index

Table 2 below lists the proposed indicators for the construction of the SMAT Index.

**Table 2: Proposed first draft list of SMAT indicators**

Sub-groups	Indicators
Production	<ul style="list-style-type: none"><li>• Crop tons/ha</li><li>• Livestock tons/ha</li><li>• Livestock product tons/ha</li><li>• Gross margin/ha</li></ul>
Factor endowment	<ul style="list-style-type: none"><li>• Land (ha)</li><li>• Capital formation (Rands)</li><li>• Labour (man-days)</li></ul>
Input and output market channels	<ul style="list-style-type: none"><li>• Distance to nearest input market (km)</li><li>• Distance to nearest output market (km)</li><li>• Access to guaranteed output market (have/not have contract)</li><li>• Proximity to town (km)</li></ul>
Value addition	<ul style="list-style-type: none"><li>• Value addition (add value/does not add value)</li></ul>
Physical infrastructure	<ul style="list-style-type: none"><li>• State of road to nearest market (ranking: 1-5)</li><li>• Storage facility (have/not have on-farm facility)</li><li>• Cell phone (have/not have cell phone)</li></ul>
Market information	<ul style="list-style-type: none"><li>• Market information (have/not have access)</li></ul>
Training and advisory services	<ul style="list-style-type: none"><li>• Extension service (have/not have access)</li></ul>

Data will be collected from industry partners using existing NAMC survey instruments, which will be revised accordingly to fit the purpose of the SMAT Index.

## 5. Conclusions

This paper advocates for creation of a quantitative indicator, the SMAT Index, to measure and track market access for smallholder farmers in South Africa. The importance of this indicator cannot be overemphasized. It is desirable for increasing knowledge of all stakeholders about the progress towards achievement of development for the new South Africa, as specified in the RDP and other subsequent policy and programme documents. The NAMC, as the entity responsible for overseeing market access for all participants, is well suited to lead the development of the proposed SMAT Index. The Index will be developed with the assistance and advice of experts and public and private stakeholders.

This paper also proposes some methodological steps for the development of the SMAT Index. Relevant literature was reviewed in an effort to identify factors and steps that must be considered in the construction of the SMAT Index. The SMAT will take the form of a composite index constructed by aggregating a set of indicators relevant in the definition of “market access”. The Index will be tracked on a regular (possibly biannual) basis.

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