

## **A Conceptual Analysis of Relational Contracts in Agribusiness Supply Chains: The Case of the Sugar Industry in Swaziland**

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### **Abstract**

*This study examines the nature of the relationship between cane growers and millers and how it affects cane growers' perceptions of the value added in the sugar supply chain. Drawing from relational exchange theory, the study utilised the perceptions of 124 smallholder cane growers in the Swaziland sugar industry. Factors measured in terms of a likert type scale were used to measure each relational construct within the miller-grower contract relationship. The study unpacks the trust relationship between large agribusiness companies and smallholder out growers, and shows that relationships characterised by social factors like trust, commitment, and cooperation enhance mutual benefit and quality relationships between parties. This study found that farmers perceive an element of opportunistic behaviour and a lack of cooperation by millers and therefore have limited trust in the millers. Consequently it was also found that satisfaction by cane growers on their relationship with millers has a positive relationship with their level of trust, level of commitment, relative dependence, perception of opportunistic behaviour by millers and perceived cooperation between themselves and the millers. The results point to a number of aspects both growers and millers need to attend to which could contribute to improved relationship and in turn efficiency and returns in the sugar industry in Swaziland.*

### **1. Introduction**

In Swaziland, smallholder sugarcane farmers are contracted to the sugar mills to supply them with sugarcane. However, this exchange relationship seems to be clouded with problems as farmers perceive unfair distribution of the industry's proceeds by the millers. This is further complicated by the cane growers' misunderstanding of the industry rules and their enforcement. The misunderstanding of the rules is manifested when the mills start re-enforcing the rules. For example some farmers fail to control diseases because of the high costs involved and when the mill rejects their sugarcane, they regard that as

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unfair treatment. In this typical monopsonistic relationship where a particular sugar mill is the only buyer in a region and also determines the proceeds of farmers, several potential situations of opportunistic behaviour and mistrust can occur.

Despite the importance of the cane growers/millers relationship to the overall success of the sugar industry, research on this relationship and how it may affect cane growers' perception of the value of the relationship is limited. The purpose of this paper therefore, is to assess the role of relational factors in enhancing the perception of cane growers on their relationship with millers.

The remainder of the paper is organised as follows; Section 2 presents an overview of the sugar supply chain in Swaziland, while Section 3 presents the theoretical and conceptual framework. The conceptualisation of the grower-miller relationships is presented in Section 4. Section 5 presents the data collection and methods. The results of the study are discussed in Section 6. Lastly, Section 7 provides some conclusions.

## **2. An overview of the sugar industry supply chain in Swaziland**

### **2.1 The Sugar Industry**

The sugar industry, which includes the growing of cane, its processing into sugar and its by-products, is of great importance to the Swaziland economy. It comprises more than half of the country's agricultural output, contributes 18% of the national output, 16% of private sector wage employment and 11% of the national wage employment (Thompson, 2005). Sugar production increased by 7.8 percent to register 628 191 tonnes during 2003/2004 cropping season compared to 583 014 tonnes produced the previous season. This increase was partly a result of favourable climatic conditions, high sucrose content and expansion of area planted to the crop. Export volumes increased slightly by 1.6 percent to 284 652 tonnes from 280 174 tonnes exported the previous year. After meeting its preferential quota to the European Union, United States of America, and sales to the South African Customs Union (SACU) market, the industry sold an additional 74 480 and 46 200 tonnes of sugar to the regional and the world markets, respectively (Thompson, 2005).

There are three sugar mills in the country, all located in the eastern lowveld, and each with a capacity to produce around 160 000 tonnes of sugar per year. About 64 percent of the sugar cane is grown by the millers on their own land (estates), which is in close proximity to the mills. More than 50 percent of the two mills and 40 percent of the third mill are owned by the Government or by

Tibiyo, the national development fund. Three different operating companies manage the mills.

The Swaziland Sugar Association (SSA), which was created by the Sugar Act of 1967, is an industry organization, which includes all growers and millers. The Sugar Act, together with the Sugar Industry Agreement and the constitution of the SSA, regulates all aspects of the industry from the right to grow cane to how the sugar is marketed. The Act delegates considerable authority to the SSA with respect to the implementation of these matters (UNCTAD, 2000). The SSA is an association of the cane growers and sugar millers which regulates the industry, promotes its interests, and is responsible for all processing, conditioning, bagging and marketing beyond the point at which raw sugar is produced in the mills. The SSA is controlled by its Council, which consists of 12 representatives of growers and 12 representatives of millers.

## **2.2 Legal and institutional arrangements for growing, processing and marketing**

### **2.2.1 Cane-growing**

A quota or licence is required to grow sugar cane. The aim of the quota system is to ensure that the miller can handle the crop, that the grower has the water to grow a disease-free crop, that the grower has the land or right to use the land, and that the grower is conversant with the rules of growing cane and the relevant legal obligations. It is therefore not a quota to restrict production but is basically an agreement between the miller and the grower that the miller will take the cane produced and harvested by a grower in a specific harvesting window. This is done to optimise the capacity of the sugar mill and to avoid the farmers' product to lose value due to the fact that it is not processed in time.

A miller requires a licence to mill cane. This licence is issued by the Minister of Enterprise and Employment on the recommendation of the SSA and is intended to ensure the long-term viability of the industry and that a sound investment study is done before a new mill is licensed. It is worth noting that there is no spot market in the industry. Therefore, all the sugarcane from farmers is delivered to millers through a contract arrangement in the form of a quota as explained earlier. The SSA determines the price paid to both millers (for sugar) and the farmers (for cane).

### **2.2.2 Processing**

All three mills can produce Very High Pol (VHP) sugar at 99.4° pol and raw sugar at 98.5° pol. Ubombo and Mhlume mills can also produce refined sugar. Simunye has a distillery that produced 12 million litres of alcohol from 48,000 tonnes of molasses. All sugar processed by the millers remain the property of the SSA, and any refining is undertaken on behalf of the SSA for a fee. Based on projected demand, the association instructs each mill as to what percentage of each type of sugar to produce. All growers are responsible for, and bear the costs of delivering their cane to the mill. Once delivered, the cane becomes the property and responsibility of the mill.

### **2.2.3 Marketing**

The SSA markets all Swaziland sugar and by-products, other than by-products used by the sugar companies, such as bagasse for firing boilers. The three main market areas that are served by the SSA include; □SACU (Swaziland, Botswana, Lesotho, Namibia and South Africa); preferential markets (EU and United States); and the □world market. The proceeds from all sales by the SSA are pooled. For the purpose of payment to the mills, each mill's actual output is converted to a notional tonnage of 96° pol sugar. Payments to millers and growers are based on budget projections of export realisations less SSA costs. These projections are revised quarterly and the risk of price fluctuations is controlled with borrowings against shipment taken in the currency in which the shipment will be paid for. The SSA finances all payments from borrowings and does not build up a reserve to finance purchases. Since the 1996/1997 season the prices paid to millers and growers respectively are based on an agreed split. In 2001/2002 season this split was 32.5 percent to the miller and 67.5 percent to the grower. The amount each farmer is paid depends on the amount of sucrose in the cane. The SSA pays the millers weekly for sugar produced in the prior week and millers in turn pay the growers for the sucrose content of the cane delivered during the previous week (UNCTAD, 2000).

## **3. Conceptual framework**

In order to analyse the relationships between cane growers and millers several important concepts are relevant and are discussed below.

### **3.1 Relative dependence and cooperation**

Dependence and cooperation are two extremes of the same continuum, going from a desired bilateral investment in the relationship to a constrained maintenance of the relationship from one of the two parties regarding the difficulty to replace his partner (Emerson, 1962). Total interdependence is

defined as the sum of both parties' dependencies on each other, while interdependence asymmetry refers to the difference between each party's dependence on the other. This difference in the level of dependence is referred to as relative dependence, which implies the difference in the dependence of the farmers on the millers relative to the miller's dependence on the farmers. Emerson (1962) argues that exchange relationships characterised by low levels of total interdependence do not require high levels of trust and commitment for their functioning since total dependence increases each party's stake in ensuring successful relationship outcomes rises. Relative dependence may result from several factors, including lack of alternatives (for the cane growers and millers), importance of the sugarcane crop and its availability as well as high switching costs.

Cooperation between millers and cane growers is based on balance, harmony, equity and mutual support (Oliver, 1990). Cooperation is a bilateral management where the two parties involve common investments and "coordinated actions" (Anderson and Narus, 1990), voluntarily (Morgan and Hunt, 1994) with the objective of making a profit (Smith, *et al.*, 1995). Hence, lack of cooperation, can actually cause a problem and create conflict between the cane growers and millers. Therefore, perception of cooperation by growers is vital in assessing their relationship with millers. It is hypothesised that high perception of dependence by both parties will result in high levels of cooperation.

### **3.2 Trust and opportunism**

Trust is defined as the willingness to rely on an exchange partner whom one has confidence (Moorman *et al.* 1992). Trust is considered to exist if one party believes that the other party is honest or benevolent (Doney and Cannon, 1997). It is the expectation that attenuates the suspicion that one party in the transaction will behave opportunistically (Gulati, 1995). Therefore, if trust exists between millers and the cane growers they would be both convinced that they will not be victims of behaviour, such as adverse selection, moral risk, hold up or any other type of contractual hazard. Therefore the presence of trust between exchange partners would reduce the level of uncertainty and enable members to be more certain about the future of their relationship. Opportunistic behaviour on the other hand refers to lack of honesty in transactions. It includes self-seeking with guile. Opportunistic behaviour is manifested by one party not delivering promised actions and resources, and failing to do it in a fairly systematic way.

Since trust in a relationship is built up overtime, close continuing relationships are vital in generating trust and characteristics such as predictability of behaviour in terms of repetitiveness, reliability, competence and credibility are also considered important in generating trust in relationships (Wilkinson and Young, 1989). Therefore, these characteristics are essential in measuring trust, and also help in assessing the degree of trust and the existence of legal agreements and the extent to which these are used within the relationship. The measurement of trust and its effects on the relationship characteristics and development are mostly based on some supposed aggregate value of repeated exposure to the exchange, as opposed to potentially differing perception of trust the parties may have in their relationship. It is posited therefore, that perception of the presence of opportunistic behaviour in the cane growers and millers' relationship will result in reduced level of trust in each other.

### **3.3 Trust and commitment**

Many studies on industrial buying patterns emphasise the crucial role of trust and commitment (see for example, Anderson and Narus, 1990; Anderson and Weitz, 1989; Morgan and Hunt, 1994). These two variables are often studied together and there is considerable agreement about their combined impact on organisational buying behaviour (Morgan and Hunt, 1994). Morgan and Hunt (1994) argue that the presence of commitment and trust is central to the success of relationship marketing, since they encourage suppliers to (1) work at preserving relationship investments by cooperating with exchange partners, (2) resist attractive short-term alternatives in favour of the expected long-term benefits of staying with existing partners, and (3) view potentially high-risk actions as being prudent because of the belief that their partners will not act opportunistically. Therefore, it is predicted that high levels of trust by both millers and cane growers in their relationship will result in commitment by both parties.

### **3.4 Influence by partner**

The influence of one partner over the other in a relationship occurs when one partner hierarchically determines and applies rules that will govern interaction between partners. Jarratt and Morrison (2001) argue that controlling behaviour implied through contractual agreements can be mitigated through the introduction of relational practises such as collaboration, constructive conflict resolution, and restraint from opportunism. Collaborative practises would involve data exchanges, information flows (Mohr *et al.*, 1996) and other measures of relational norms (flexibility and solidarity). Where controlling behaviour exists, there is likelihood that the

controlled partner would perceive an inequitable distribution of relationship outcomes, which negatively influence the perception of the relationship. Hence, control by a partner may be negatively related to the influenced partner's satisfaction.

### **3.5 Certainty**

Certainty in decision-making refers to the extent to which a partner (1) has enough information to make key decisions, (2) can predict the consequences of those decisions, and (3) has confidence in those decisions (Achrol and Stern, 1988). Certainty is defined as the ability to predict changes in relevant factors surrounding the exchange between a buyer and a seller. Walker and Weber (1984) argue that environmental uncertainty increases different expectations and goals about future supply requirements. Consequently, the buyer and the seller would likely desire a different contract term. For instance, if a farmer is unable to accurately forecast the price of his product inputs, he would be reluctant to enter into a contract that would lock him into a fixed price for an extended period of time. Instead, he would prefer negotiation of the agreements that address this price uncertainty and allow for periodic price adjustments. Similarly, the inability of the miller to predict the demand of his end products (sugar) would make him hesitant to commit to purchase a specified quantity of sugarcane. Therefore, the presence of uncertainty would make it difficult for the miller and the farmer to negotiate their contract. It is therefore expected that trust and cooperation reduce decision-making uncertainty but promotes certainty, and certainty in turn increases their relationship satisfaction.

### **3.6 Trust, commitment, cooperation and satisfaction**

The relationship between trust, commitment, cooperation and satisfaction in relational contracts has been described in different ways in the literature. Although the existence of a link between the four variables seems obvious in the vast majority of the studies, there is limited agreement about which variable is an antecedent or a consequence of the others.

It has been demonstrated that there is a link between cooperation and trust. Trust is an antecedent of cooperation in industrial relationships (Ring and Van de Ven, 1994). Therefore, the greater the level of trust between exchange partners, the more likely the cooperation. As a bilateral investment in the relationship, cooperation seems to exist in most regular and stable relationships and this leads to satisfaction. After a period when satisfaction, trust and commitment have developed, the two parties begin to engage in activities such as co-development of products, co-investments, and technical

advice. Morgan and Hunt (1994) give details of the direct influence of commitment on cooperation. To achieve cooperation, a degree of trust is, therefore, an essential ingredient. Thus cooperative behaviour reinforces the relationship, stability, and regularity of purchases. In this paper satisfaction is used as a proxy for performance because it is a sought behavioural outcome that measures effectiveness of a relationship and its potential to predict the future actions of the millers and cane growers. Therefore, it is posited that cane growers' trust in millers will positively influence their satisfaction in their relationship with the millers.

#### **4. Conceptualisation of grower-miller relationship**

According to the preceding discussion it is evident that social factors can interact in a relational contract and give rise to the structure of the relationship between cane growers and millers. Our hypotheses are tested using a structural equation model. The model shows satisfaction (by growers and millers) as a qualitative measure of performance and is expected to be directly influenced by cooperation, influence by partner and certainty, and indirectly by opportunistic behaviour, commitment, trust, and relative dependence. Cooperation is affected by relative dependence between growers and millers as well as opportunistic behaviour by either party, and the level of trust and commitment. The argument is that if commitment in the relationship is high on both sides, cooperation should be good, and will ensure satisfactory performance of the supply chain. The same argument holds for the level of trust (which also has influence on commitment), which will strengthen good cooperation. Opportunistic behaviour on the other hand will negatively impact on the future cooperation and it is hypothesised that it will carry a negative coefficient. It is also hypothesised that commitment to the success and sustainability of the contractual relationship will be negatively influenced by opportunistic behaviour by either millers or growers and positively influenced by trust in each other by both players. The level of certainty between the millers and cane growers is positively influenced by the level of cooperation and the level of trust. When the relationship of millers and cane growers is characterised by high levels of cooperation and trust on both sides, the level of risks are expected to be reduced, hence both players will be certain since they will share valuable information. Since literature has shown that the level of trust in a relationship decrease with an increase in manifestation of opportunistic behaviour, it is argued therefore, that the presence of opportunistic behaviour by millers and cane growers would have a negative impact on the level of trust in each other. Finally, when one partner is more

dependent on the other, the less dependent partner is likely to influence the more dependent partner in the relationship.

The performance of supply chains may be explained by various factors and the inter-relationship of these factors are varied, hence such relationship may not be tested in a single study. However, control variables are proposed and these include a covariation between trust and cooperation as well as a direct relationship between trust and satisfaction. These relationships are summarised in the following equations:

$$1. \text{COOP} = b_1\text{RDEP} - b_2\text{OPP} + b_3\text{TRUST} + b_4\text{COMIT} + e_1$$

$$2. \text{COMIT} = b_1\text{OPP} - b_2\text{TRUST} + e_2$$

$$3. \text{CERT} = b_1\text{TRUST} + b_2\text{COOP} + e_3$$

$$4. \text{SAT} = b_1\text{CERT} + b_2\text{COOP} + b_3\text{INF} + e_4$$

$$5. \text{TRUST} = b_1\text{OPP} + e_5$$

$$6. \text{INF} = b_1\text{RDEP} + e_6$$

Where:

COOP = Growers' perceived cooperation (F4); RDEP = Relative dependence (F1); TRUST = Growers' trust in the millers (F3); COMIT = Growers' commitment in their exchange relationship with millers (F8); CERT = Growers' certainty about their relationship with millers (F7); SAT = Growers' satisfaction in their relationship with millers (F5); INF = Growers' perception of influence by millers (F2); and OPP = Opportunistic behaviour (F6)

## 5. Data and methods

The empirical analysis was based on data gathered from 124 smallholder cane growers in the sugar industry in Swaziland. A purposive sampling method was utilised to gather the sample of farmers. Personal interviews were conducted during the period of May to December 2001 using a questionnaire (Appendix 1) with a standardised 4 point likert scale, ranging from strongly disagree to strongly agree and very much dissatisfied to very much satisfied for items measuring satisfaction.

Data were checked to verify that the assumptions of multivariate normality were not violated and the internal consistence was measured using Cronbach's alpha. Construct validity was assessed by analysing convergent and discriminant validity. Due to the limited sample size and the requirement of at least 5 observations per estimate parameter, partial aggregation of indicator variables was used. This was done by aggregation of items with the highest reliabilities with those with lowest reliabilities.

In this study structural equation modelling was used because of the advantages it has over other types of multivariate techniques namely; (1) it provides a straightforward method of dealing with multiple relationships simultaneously, whilst providing statistical efficiency, and (2) it has an ability to assess the relationships comprehensively and provides a transition from exploratory to confirmatory analysis (Bollen, 1989; Hair *et al.*, 1998).

## **6. Results and discussion**

### **6.1 Construct Measurement**

The measurement model describes the relationships between the latent (unobserved) factors and their indicator variables. Confirmatory Factor Analysis (CFA) was used to test the adequacy of the measurement model as a prerequisite in structural models. CFA enables the researcher to test if conjectured relationship structures are supported by the observed data. Table 1 presents the measurement properties for aggregated indicator variables. The results suggest that the hypothesised relationship is supported by the data.

The overall model consists of eight factors: opportunistic behaviour, relative dependence, commitment, trust, cooperation, influence by partner, certainty and satisfaction. Each of these constructs was measured by indicator variables, which were later aggregated into two or three manifest indicator variables. Table 1 shows the standardised pattern of coefficients, the t-statistics and the constructs reliabilities useful in assessing the quality of the measurement model. All the indicator variables loaded significantly at the 5% level to their respective constructs with the exception of those indicator variables measuring certainty and commitment, which were significant at the 10% level.

The results also indicate that cane growers are certain about, and are committed to their relationship with millers. However, they perceive poor cooperation between themselves and the millers. This is further evidenced by their perception of the practice of opportunistic behaviour by millers. For example, some farmers claim sugar mills charge them money to cover costs of making white sugar from brown sugar, while such deductions are not done for all the farmers. Further, farmers argue that they are being cheated by millers because they are paying them only on the basis of sucrose extracted from the sugarcane they had delivered, instead of incorporating payment for molasses and baggasse, which the millers use as a source of fuel. Despite the farmers' perception of opportunistic behaviour by millers and their perceived dependence on the millers, cane growers are satisfied with their relationship and still trust the millers to a limited extent. Cane growers feel they are

dependent on the millers and this dependence is caused by the fact that farmers are locked into the mill that is nearer to them because it would be uneconomic for them to change to another mill as they would incur high transport costs because of long distances.

**Table 1: Measurement properties for constructs**

Aggregate Indicator variable	Measurement item	Factor loading ( $\lambda$ )	t-statistic	Reliability*	Composite Reliability	Mean	Std dev
Tag1 (V6)	Trust	0.7383	8.7313	0.5451	0.71407	2.531	0.350
Tag2 (V7)		0.4716	5.0810	0.2224			
Tag3 (V8)		0.8084	9.7587	0.6535			
Oag1 (V14)	Opportunistic behaviour	0.7058	8.3590	0.4981	0.69361	2.792	0.538
Oag2 (V15)		0.6739	7.8806	0.4541			
Oag3 (V16)		0.7237	8.6324	0.5238			
Cag1 (V17)	Certainty	0.3063	1.6515	0.0938	0.50468	3.382	0.391
Cag2 (V18)		1.4725	1.8774	2.1682			
Iag1 (V3)	Influence by partner	0.8324	9.8963	0.6929	0.67083	2.914	0.476
Iag2 (V4)		0.7289	8.4349	0.5313			
Iag3 (V5)		0.5832	6.4462	0.3401			
Mag1 (V19)	Commitment	0.3769	1.6579	2.2964	0.58028	3.315	0.376
Mag2 (V20)		0.2872	1.6760	0.0876			
Pag1 (V9)	Cooperation	0.7356	8.6791	0.541	0.69081	2.267	0.461
Pag2 (V10)		0.5699	6.4387	0.3248			
Pag3 (V11)		0.5832	6.6133	0.3401			
Dag1 (V1)	Relative dependence	0.6225	6.1815	0.3875	0.52253	2.703	0.526
Dag2 (V2)		0.5543	5.6205	0.3072			
Sag1 (V12)	Satisfaction	0.5993	5.9184	0.3591	0.52617	2.853	0.585
Sag2 (V13)		0.5869	5.8209	0.3444			

Note: \* refers to squared multiple correlation

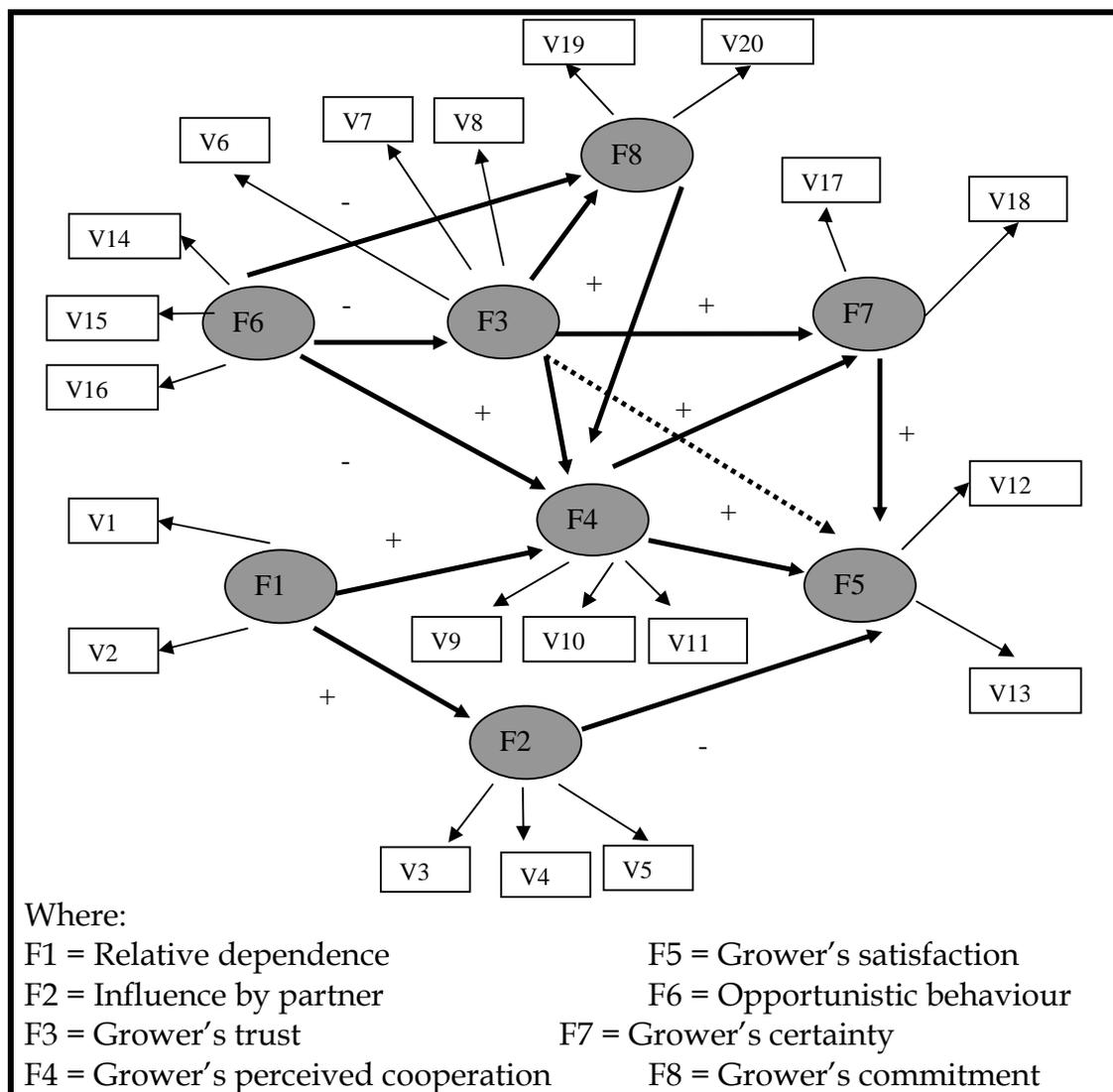
Scale: 1 = Strongly Disagree; 2 = Disagree; 3 = Agree; 4 = Strongly Disagree

Note: V1-V20 refers to aggregated indicator variables that measure the different constructs in the model.

Table 2 presents the fit indices for the confirmatory factor analysis of the aggregated manifest variables. The  $\chi^2$  fit statistics is 324.49 with degrees of freedom of 142 ( $p < 0.001$ ), while the root mean squared error of approximation (RMSEA) is 0.10. The root mean squared residual (RMSR) represents the average discrepancy between the observed sample and proposed variance-covariance matrices and is an indicator of a well fitting model. The results show a RMSR of 0.09, which is slightly greater than the recommended upper cutting point of 0.08 for a good model. The goodness of fit index (GFI) is 0.806 and the ratio of  $\chi^2/df$  is 2.29. Generally, GFI and AGFI scores ranging from 0.80 to 0.89 are interpreted as representing reasonable fit while scores of 0.90 and above represent a good fit model (Doll, *et al.*, 1995). The ratio of the  $\chi^2/df$  should not be more than 3. Based on these indices the model is moderately acceptable. This suggests that the proposed model of the relationship between smallholder cane growers and millers fits the data.

### 6.2 Structural equation modelling

Figure 1 presents the theoretical structural model and the measurement model that was tested. The figure shows that “relative dependence” (F1), is measured by manifest variables V1 and V2, while the “influence by partner” (F2) is measured by V3 through V5, and so forth.

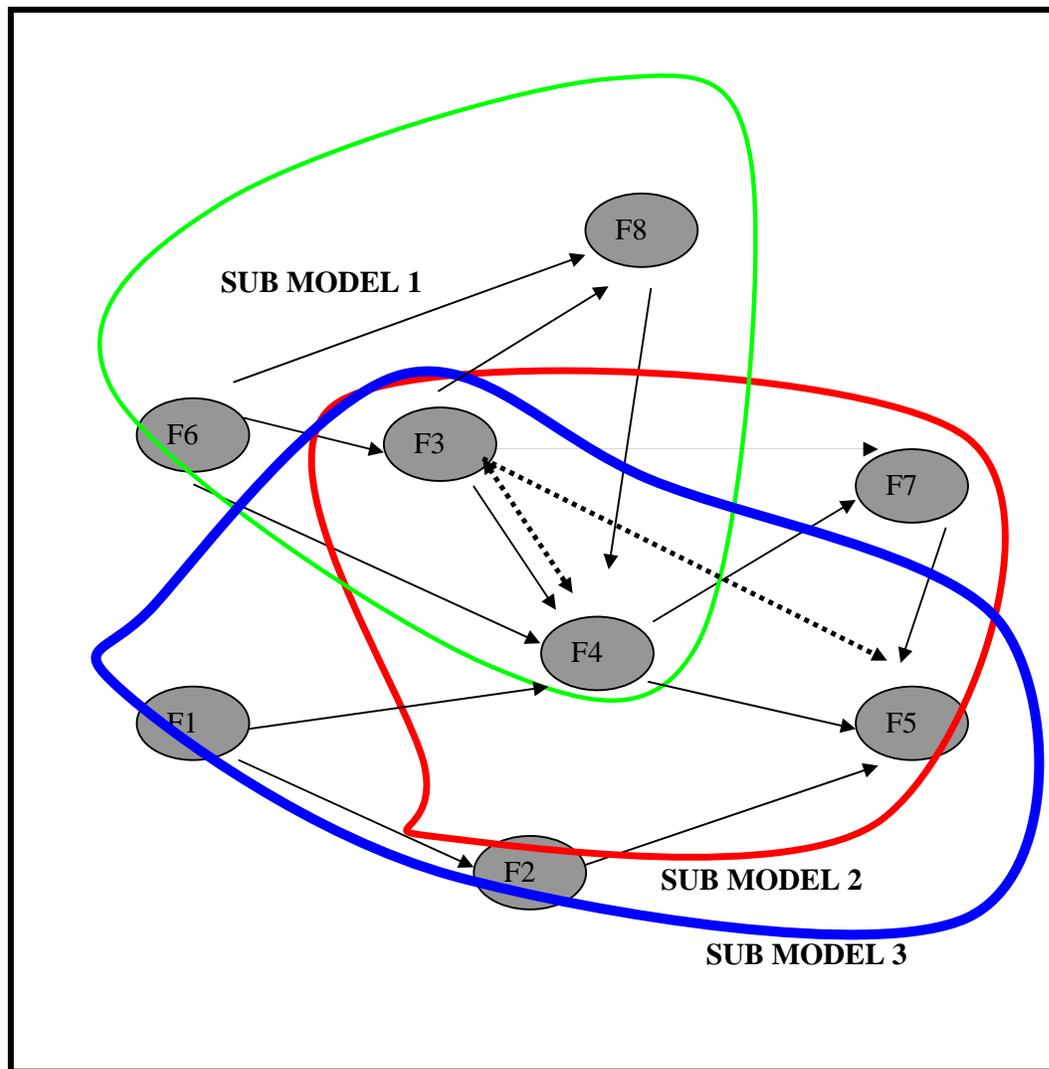


Note: V1 to V20 refers to aggregated indicator variables that measure the different constructs in the model.

**Figure 1: Proposed theoretical model of cane growers and the millers’ relationship**

The overall model was inspected for “offending estimates”, which could be in the form of estimates that exceed acceptable limits in the measurement and structural models and further examined if the latter is adequately represented by the data. The squared multiple correlations ( $r^2$ ) were used as the reliability of the indicator variables. Examination of the squared multiple correlations as

shown in Table 1 indicate that the indicator variables are moderately strong. Due to sensitivity of structural equation models (SEM) in terms of sample size and the number of observations per parameter to be estimated, the proposed model was then reduced by splitting it into three sub models since the sample size was not large enough to cater for all the variables in the model. Figure 2 shows the split of the three sub-models. Splitting the model into sub-models facilitated the analysis of the complete model without being constrained by the data.



**Figure 2: Sub-models 1, 2, and 3 of proposed model of cane growers and millers' relationship**

The results of the three sub-models are shown in Table 2. The results show that all three sub-models had an average fit. The RMSEA is about 0.1, which meets the acceptable level for an average model fit to the data. Although the overall model fit is less than 0.90, it also indicates an average fit for all three

sub-models. The GFI is above 0.80. The ratio of chi-square to degrees of freedom is also relatively acceptable, though for sub-model one it is slightly more than the recommended ratio of 3:1.

**Table 2a: Absolute goodness of fit indices for the various models**

Model	$\chi^2$	Df	$\chi^2/Df$	P	GFI	RMSR	RMSEA
Null Model:	388.98	15	2,45	0.0001			
Full model.	144.87	9	3.71	0.0001			
1.	175.92	39	2.84	0.0001			
2.	197.49	62	3.19	0.0001			
3.		62					
Model:							
Full model.					0.7668	0.1386	0.1084
1.					0.8296	0.1647	0.1486
2.					0.8255	0.1913	0.1222
3.					0.8345	0.1554	0.1333

Note: N = 124. GFI = Goodness of fit index; RMSR= Root Mean Square Residual; RMSEA = Root Mean Square of Approximation

**Table 2b: Incremental goodness of fit indices for the various models**

Model	AGFI	CFI	NFI	NNFI
Null Model:				
1.				
2.				
3.				
Model:				
Full model.	0.692	0.728	0.624	0.675
1.	0.712	0.7673	0.716	0.672
2.	0.744	0.759	0.681	0.697
3.	0.757	0.744	0.675	0.678

Note: N = 124. AGFI = Adjusted Goodness of Fit Index; CFI = Comparative Fit index; NFI = Normed Fit Index; NNFI = Nonnormed Fit Index.

Table 3 shows only the results with significant relationship. The results for sub-model one indicate that cane growers’ perception of opportunistic behaviour by millers is negatively related to cane growers’ trust and commitment to their relationship with millers. A significant positive relationship was found between commitment and cooperation. The results also show that for sub model 2 there is a positive significant relationship between cane growers’ trust in millers and perceived cooperation. The relationship between trust and cooperation suggest that trust lead to

cooperation and cooperation may further promote trust between millers and the cane growers.

As expected, cane growers’ perception of cooperation is positive and significantly related to the cane growers’ certainty in their relationship with millers as well as the cane growers’ satisfaction with the relationship. The results suggest that when the cane growers perceive good cooperation between themselves and the millers, they are likely to perceive satisfaction with the relationship.

The results for sub-model 3 indicate that cane growers’ relative dependence on millers has a significant positive relationship to their perception of cooperation. Unexpectedly the results show a significant negative relationship between the cane growers’ relative dependence and influence by millers. This could be due to the fact that, cane growers are locked into the relationship by high switching costs (mainly related to large distances they have to travel to deliver cane to an alternative miller). Hence they do not consider the millers’ influence as important. Cane growers’ trust in millers has a positive and significant relationship with their perception of cooperation by millers.

**Table 3: Structural parameters**

Sub-model 1	Parameter	Estimate	Std Error	t-stat
	F3-F8	0.5834	0.4281	1.3628
	F6-F8	-0.8031	0.3443	-2.3326
	F6-F3	-0.7121	0.0845	-8.4278
	F3-F4	0.3820	0.2842	1.3441
	F6-F4	-0.3290	0.2280	-1.4430
	F8-F4	0.0004	0.0003	1.6838
Sub-model 2				
	F3-F7	-0.2677	0.1840	-1.1830
	F3-F5	0.4201	0.0810	5.0290
	F4-F7	0.0565	0.1906	2.0565
	F2-F5	0.0362	0.0682	0.5313
	F4-F5	0.6717	0.0878	7.6473
	F7-F5	-0.0108	0.0830	-0.1303
	Cov: F3F4	0.7776	0.0545	14.27
Sub-model 3				
	F3-F4	0.3984	0.0675	5.9004
	F1-F4	0.6779	0.0817	8.2956
	F1-F2	-0.4883	0.0931	-5.2441
	F2-F5	0.0618	0.0933	0.6619
	F4-F5	0.7513	0.1322	5.6827

Table 4 presents the structural parameters and the squared multiple correlations of the factors in all sub models. The results show that for sub-

model one 78% of the variance in trust is explained by the cane growers' perception of opportunistic behaviour, while 62% of the variation in cooperation is explained by commitment and 0.08% of the variation in commitment is explained by the cane growers' perception of opportunistic behaviour by millers. Cane growers expressed a concern about the practice of opportunistic behaviour by millers, for example; during the interview discussions, some farmers stated that they want to be paid for all the products derived from sugarcane, including bagasse, molasses and compost. Others revealed that millers have a tendency to test the sucrose content of their cane whilst it is still in the field and if the sucrose content is low, they postpone harvesting until the sucrose content is high. In contrast the sucrose content for cane growers' cane is tested at the mill and if low, the farmers loose out financially since payment is based on sucrose content in the cane.

The results reveal that 81% of the variation in the cane growers' satisfaction with their relationship with millers is explained by their perception on cooperation between themselves and the millers and the trust farmers have in the millers. The results further show that perceived cooperation explains about 0.8% of the variations in certainty. The results further show that 94% of the variation in the cane growers' perception of influence by partner is explained by the cane growers' perception of relative dependence on the millers, whereas 30% of the cane growers' perception of cooperation between themselves and the millers is explained by the cane growers' trust in millers and their relative dependence on millers.

**Table 4: Squared Multiple Correlations**

Sub-model 1	Variables	Error Variance	Total Variance	R-squared
	Growers' trust (F3)	0.1449	0.6519	0.7777
	Cooperation (F4)	0.2353	0.6178	0.6191
	Growers' commitment (F8)	236.0768	236.2765	0.0008
Sub-model 2				
	Satisfaction (F5)	0.1078	0.5586	0.8069
	Certainty (F7)	8.0175	8.0797	0.0077
Sub-model 3				
	Influence by partner (F2)	0.0373	0.6556	0.9431
	F4	0.5515	0.7899	0.3018
	F5	0.0728	0.4152	0.8246

### 6.3 Total and indirect effects of exogenous variables on endogenous variables

Empirical analysis of links between constructs can be examined in two ways, the direct and total effects. The direct effects are the influences of one variable on another that are not mediated by any other variable. The test of the direct effects provides a more straightforward way of assessing whether the data

supports the proposed relationships between two constructs. Indirect effects are those that are mediated by at least one other variable. Total effects are the sum of the direct and indirect effects. It is a more comprehensive indication of the influence of one construct on another. Table 5 presents the direct, indirect and total effects of each construct.

**Table 5: Indirect, direct and total effects for SEM in sub-model 1, 2 and 3**

	Influence by partner (F2)	Growers' trust (F3)	Cooperation (F4)	Satisfaction (F5)	Certainty (F7)	Growers' commitment (F8)
Relative Dependence (F1): IDE				0.5093		
DE	-0.4883		0.6779			
TE	<b>-0.4883</b>		<b>0.6779</b>	<b>0.5093</b>		
Influence by partner (F3): IDE				0.2993		
DE			0.7776*	0.4201		
DE			0.3984**			
TE			<b>0.5880***</b>	<b>0.7194</b>		
Cooperation (F4): IDE						
DE				0.6717*		
DE		0.7776		0.7513**	0.0565	
TE		<b>0.7776</b>		<b>0.7115 ***</b>	<b>0.0565</b>	
Opportunistic behaviour (F6): IDE						
DE		-0.7121				-0.8031
TE			-0.0003			<b>-0.8031</b>
Grower' commitment (F8): IDE						
DE				0.0003		
TE			0.0004	<b>0.0003</b>		

\* = direct effect from sub model 2

\*\* = direct effect from sub model 3

\*\*\* = Total effect (average of the sub model 2 and 3 direct effects)

Although relative dependence has no direct effect on satisfaction, the results in Table 5 indicate that it has a significant positive indirect influence on cane growers' perception of cooperation, but a negative impact on influence by partner. Therefore, relative dependence has a positive significant relationship with cane growers' satisfaction both direct and indirect via cooperation. Trust is regarded as an important element influencing cooperation and satisfaction in relationships and as indispensable asset in successful relationships. The results show that trust is important in the smallholder cane growers' satisfaction in their relationship with millers. Direct and indirectly

cooperation, trust has a positive significant influence on cane growers' satisfaction with their relationship with millers. The results also show that cane growers' perception of opportunistic behaviour by millers have significant negative impact on the cane growers' satisfaction via trust and their perception of cooperation.

The results also indicate that commitment is important in exchange relationship since it has a significant positive impact on cooperation and through cooperation it also positively influences the cane growers' satisfaction in their relationship with millers.

## **8. CONCLUSION**

The organisational literature has always posited that relational factors, such as trust, cooperation, commitment and absence of opportunistic behaviour play a key role in economic exchange, particularly when one or another party is subjected to the risk of opportunistic behaviour and incomplete monitoring, or when moral hazard problems arise. The results of this study confirm that the perception of cooperation has a direct influence on satisfaction, while trust, commitment, relative dependence, and perceived opportunistic behaviour have an indirect influence on satisfaction through cooperation.

This study has found that, farmers perceive some elements of manifestation of opportunistic behaviour and lack of cooperation by millers and therefore have limited trust in the millers. Based on the findings of this study, therefore there is a need by the SSA to consider new ways of explaining its functions and activities to the public and the smallholder farmers. For example the advertisement referring to sugar "the real Swazi Gold" seems to have caused a lot of misunderstanding and may have given the impression that the industry is extremely lucrative. Hence, the perception by smallholder farmers that they are being cheated by millers. The Swaziland Government also needs to strengthen its extension service provided to the cane growers in terms of skills and number since there are currently only two Government extension officers responsible for all the smallholder farmers. This will enable the officers to be effective and efficient providing advise to the farmers and explaining how the industry operates, since farmers regard them as neutral persons compared to those provided by the SSA. This will improve the relationship between cane growers and the millers and avoid future conflict, which could hamper the efficient functioning of the supply chain.

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**Appendix 1**  
**Questionnaire for Smallholder cane growers**

<b>Items measuring satisfaction</b>	<b>Items measuring commitment</b>
<ol style="list-style-type: none"> <li>1. Price paid for sugarcane (satis1)</li> <li>2. Procedures for testing sucrose content (satis2)</li> <li>3. Time taken to pay after sugarcane has been delivered to the mill (satis3)</li> <li>4. Technical assistance provided by the sugar association (satis4)</li> </ol>	<ol style="list-style-type: none"> <li>1. Given a chance you would change to and supply another mill (comit1) (R)</li> <li>2. You have invested a lot of capital in the sugarcane business (comit2)</li> <li>3. You honour your quota as required by the mill (comit3).</li> <li>4. You always try to satisfy your quota (comit4)</li> <li>5. You do not care whether you meet your quota, as long as you make profit (comit5) (R)</li> </ol>
<b>Items measuring influence by partner</b>	<b>Items measuring certainty</b>
<ol style="list-style-type: none"> <li>1. The mill tries to control farmers (influby1)</li> <li>2. Farmers can make farming decisions independently of the mill (influby2) (R)</li> <li>3. Farmers take whatever the mill says because they do not have any bargaining power (influby3)</li> <li>4. The mill has more bargaining power than farmers (influby4)</li> <li>5. Farmers manage to have their concerns considered by the mill (Rinflow1) (R)</li> <li>6. Farmers can influence the price of sugarcane offered in the industry (Rinflow2) (R)</li> <li>7. Farmers and the mill have equal bargaining power (Rinflow3) (R)</li> <li>8. Farmers have more bargaining power than the mill (Rinflow4) (R)</li> </ol>	<ol style="list-style-type: none"> <li>1. Farmers are assured of a market (cert1)</li> <li>2. Farmers know in advance the price at which the sugarcane will be bought (cert2)</li> <li>3. Farmers have all the technical know how on growing sugarcane (cert3)</li> <li>4. Farmers can always get technical information from the SSA Extension department (cert4)</li> <li>5. Now farmers know how to grow sugarcane (cert5)</li> </ol>

<b>Items measuring opportunistic behaviour</b>	<b>Items measuring relative dependence</b>
<ol style="list-style-type: none"> <li>1. The mill takes advantage of the farmers ignorance (opp1)</li> <li>2. The miller is concerned with maximizing its own profits (opp2)</li> <li>3. The mill cheats when testing cane growers' sugarcane (opp3)</li> <li>4. The difference in opinion between the mill and farmers is what strengthen the relationship between the two parties (Rconf1) (R).</li> <li>5. The differences in opinions between the mill and farmers is an effort by the mill to cheat farmers (conf2)</li> <li>6. Farmers regard conflict of opinion between the mill and farmers as way of doing business (Rconf3) (R)</li> </ol>	<ol style="list-style-type: none"> <li>1. If you want you can switch from growing sugarcane to another enterprise (dep1)</li> <li>2. If this mill could close down, you would be forced to go out of business (dep2)</li> <li>3. The mill makes an effort to assist farmers during emergencies (e.g. providing transport) (dep3)</li> <li>4. <i>Farmers can sell their sugarcane only to this mill (dep11)</i></li> <li>5. The mill's output can be lowered without the cane growers' involvement in sugarcane production (dep22R) R</li> <li>6. Farmers can still do better by engaging in other business than sugarcane production (dep33R) R</li> <li>7. Farmers are visited by the industry's extension agents on frequent basis (dep7)</li> <li>8. Farmers are invited to workshops by the SSA (dep8)</li> </ol>

R= reversed coding

<b>Items measuring trust</b>	<b>Items measuring cooperation</b>
<ol style="list-style-type: none"> <li>1. The mill's decisions are meant to benefit both growers and the mill (trust1)</li> <li>2. The mill treats cane growers with care (trust2)</li> <li>3. There is a mutual understanding between the mill and the cane growers (trust3)</li> <li>4. The mill can be relied upon for its technical ability (trust4)</li> <li>5. The mill sometimes withhold some information that may be useful to us cane growers (trust5R) (R)</li> <li>6. The miller cheats on farmers (trust6R) (R)</li> <li>7. One has to monitor and double check whatever information the miller gives (R)</li> <li>8. You sometimes think of quitting sugarcane farming (Rpleave1) (R)</li> <li>9. The way farmers are treated by the mill one thinks of changing the mill (Rpleave2) (R)</li> </ol>	<ol style="list-style-type: none"> <li>1. Your activities with the mill are well coordinated (coop1)</li> <li>2. Together with the mill you plan productions and delivery schedules (coop2)</li> <li>3. The mill seriously take into consideration farmers concerns (coop3)</li> <li>4. The mill seeks cane growers' opinions whenever it considers implementing changes that will affect farmers as well (coop4)</li> <li>5. The mill is very much cooperative (coop5)</li> <li>6. There are no hassles looking for a market (Benefit 2)</li> <li>7. Subsidized transport by the mill (Benefit 3)</li> <li>8. Loans provided by the mill to farmers (Benefit 4)</li> <li>9. Use of mill equipment by farmers (Benefit 5)</li> </ol>

R= reversed coding

