Future uptake of BCA by tomato growers in Kenya to control nematodes

Technical Report for Project (R8296/ZA0568) Promotion of Sustainable Approaches for the Management of Root-Knot Nematodes on Vegetables in Kenya

April 2005

By

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Executive Summary

This report addresses one of the objectives of the DFID Crop Protection Prograsmme funded project (R8296/ZA0568) looking at sustainable management of root knot nematodes on vegetables in Kenya. The following addresses the objective 4.1:

"Using participatory evaluation with farmer groups in NGO training schemes, devise a profile of the characteristics of those farmers most likely to adopt technologies"

The Theory of Reasoned Action provided the conceptual framework for addressing this issue. According to the Theory of Reasoned Action, the intention to adopt a particular behaviour is a function of attitudes towards the behaviour and the subjective norm – the extent to which one is influenced by the views of other people regarding the behaviour. Attitudes are a product of the extent to which one expects the behaviour to result in specified outcomes and the perceived importance attributed to those outcomes. The subjective norm is a function of the perceived support of important referents toward the performance of the behaviour and the motivation to comply with those referents. The theory, claims that the intention to undertake a particular behaviour is a reliable indicator of future behaviour, if the expressed attitude toward this behaviour and or the perceived social pressure to do so correlate closely with the stated intent.

The research process involved a two-staged interdependent data gathering process. Initially the outcome beliefs and social referent common to the target population regarding BCA application were identified through focus group discussions with tomato farmers in the different trial areas in Kenya. (A participative process.) The second stage was to incorporate the identified salient outcome beliefs and pertinent referents in a structured questionnaire, which was then applied to farmers that had either participated in or observed trials of the BCA for nematode control. The sampling process was restricted to those that had some degree of exposure to the BCA trials as the agent is not available as yet in the market place, nor known of amongst tomato farmers in general. In all 61, useable responses were acquired -a relatively small sample. The survey was conducted by face to face interviews. The surveys were carried out by CABI-Africa.

Therefore, the method adopted to address the research objective both identifies the types of farmer likely to adopt and or reject the BCA and also identifies the attitudinal and normative factors influencing the farmers' decisions.

Although, the sample of farmers was relatively small, the findings indicate the categories of farmer likely to apply the BCA agent to both seedbeds and field, if it is made available. The research also indicates what expectations are influencing their decisions to apply the agent. Social referents are identified that have influence on the decision making process with the different categories of farmer more open to social persuasion. The findings can therefore be used to inform the future promotion of the BCA application, indicating key messages and appropriate channels of communications.

Overall the finding suggests that farmers are very likely to apply the BCA to both seedbed and field if made available, although seedbed application is more likely.

- The categories of farmer that appear most likely to apply the BCA to the seedbed are those that feel able to manage the risk, have the greatest dependency on farm income, that are using furrow irrigation systems and that have a serious current problem with nematodes.
- In contrast those categories that registered the weaker intent to apply the BCA to seedbeds are those that do not have a current problem with nematodes, that perceive the risk as low and those that depend on rain-fed systems.

When the issue of applying the BCA to the field directly is considered, the categories of farmer most and least likely to apply the agent change, i.e.

- Those mostly likely to apply the agent to the field are those that are not members of agricultural organisations, those using furrow irrigation and those receiving a higher proportion of the farm income from tomato sales.
- Those registering the weaker intent were those with overhead irrigation systems, that do not have a current problem with nematodes and those deriving a lower proportion of their farm income from tomatoes.

In general the decision to apply the BCA will be governed by the farmers' own experience and knowledge (attitudes). However, in the case of those using overhead irrigation, perceived social pressure may have the greater influence on their decision process.

Those expectations that appear to be driving the decision to apply the agent to the seedbed were in order of influence:

1. *Vigorous seedling growth*
2. *Improved yields*
3. *BCA influence will be long lasting*
4. *Non toxic agent complimenting organic production*
5. *Ability to continue cropping invested fields*
6. *Will protect the seedlings after transplanting*
7. *Increased profit*
8. *Effective control of nematodes*

- The final outcome attitude re nematode control is implicit in all the other ranked expectations.

With respect to the application of the BCA directly to the field, the expectations that appear to have the positive influence in rank order are

1. *Improved yields*
2. *Ability to continue cropping worm infested fields*
3. *e toxic -compatible with organic systems*
4. *Field application will provide protection to directly sown crops*
5. *The effect of the BCA will last -for several seasons*
6. *Increased profit*

The issue that is distinct to field application intent is the protection provided to directly sown crops.

The issue of seedling vigour is a key expectation regarding seedbed application. This may reflect a belief that a vigorous seedling will be able to withstand attacks once transplanted, rather than depending on the transfer of the BCA agent from seedbed to field.

In general these expectations will need to be reinforced in any promotional strategy. However, some of these current expectations may be beyond the capability of the BCA. For example that the agent once applied will have a residual impact over several seasons, the ability to continue cropping infested fields and that if applied to the seedbed the agent will continue to provide effective protection once the plant has been transplanted. Also the BCA does not necessarily encourage seedling vigour. These are key influential outcome expectations that are driving the current positive response. However, if any of these are proved wrong, it will lead to a weakening of the current positive intent. If some of these are false expectations then they need to be addressed before the farmers find out through trial and error. These 'possible' errors in perception should be challenged but at the same time those expectations that are correct should be reinforced so as to counter-balance any negative response.

In the case of seedling vigour it may be appropriate to add a fertiliser to the BCA so as to help insure a more vigorous seedling response as well as providing protection against nematodes. This would have the effect of meeting the farmers' expectation and thus help to ensure continued use of the BCA.

With those not facing a current nematode problem the expectation of having to change the method of transplanting to ensure effective transfer of the agent to the field was acting as a cognitive barrier to the future application of the BCA to the seedbed. This was the only expectation that was acting as a deterrent and was only relevant to those not confronting a nematode problem. However, the issue of insuring the effective transfer of the agent from seedbed to field during transplanting is a key underlying issue.

The most influential social referents regarding the application of the BCA are other farmers, local radio, and promotional publications and materials as well as workshops/seminars. This indicates the

importance of identifying the influential local farmers and enlisting their support and the use of local radio in any promotional strategy when addressing farmers in general.

- However, those most dependent on the farm income are also influenced by the agricultural research stations. Therefore the research institutions need to target this category of farmer when promoting the BCA application.
- Preventative strategies that focus on encouraging those not currently experiencing a nematode problem should consider enlisting the support of the agro-chemical suppliers. These suppliers appear to have influence on those not currently exposed to nematode infestation.
- Care should be taken regarding enlisting Government agricultural extension officers, as they appear to have a negative influence on the farmers' decision to apply the BCA agent.

In general the majority of farmers is very aware of the nematode problem and appears keen to apply anything that will prove effective. Cost was not the most influential factor. The prospects for an initial uptake of the BCA agent appear very positive. However, this positive intent may be based on some false assumptions and these should be identified and addressed prior to the release of the product. In doing so it will be important to reinforce those correct influential expectations.

Table of Content

Glossary

B	*behaviour*
BCA	*Biological Control Agent*
BI	*behavioural intent(ion)*
CA	*calculated attitude*
CLI	consequential loss insurance
CSN	*calculated subjective norm*
IQR	inter-quartile range
OA	*outcome attitude*
RSN	*referent subjective norm*
SA	*stated attitude*
SN	*subjective norm*
SSN	*stated subjective norm*
TORA	Theory of Reasoned Action

Note: terms in italics are elements of the TORA model

Acknowledgements

The author wishes to acknowledge the support of Dr Daniel Karanja and Mr Peter Karanja of CABI - Africa for conducting the initial focus groups and the formal survey.

Also to express thanks to Dr. Ram B. Rana of the University of Reading UK for helping prepare the data for analysis.

Disclaimer

This report is an output from research project R8296/ZA0568, funded by the DFID Renewable Natural Resources Knowledge Strategy, Crop Protection Programme. The views expressed are not necessarily those of DFID.

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Introduction

This report addresses one of the objectives of of the DFID Crop Protection Programme funded project (R8296/ZA0568) looking at sustainable management of root knot nematodes on vegetables in Kenya. The following addresses the objective 4.1:

"Using participatory evaluation with farmer groups in NGO training schemes, devise a profile of the characteristics of those farmers most likely to adopt technologies"

The Theory of Reasoned Action (TORA) (Ajzen and Fishbein 1980) provided the conceptual framework for addressing this issue. According to TORA, the intention to adopt a particular behaviour is a function of attitudes towards the behaviour and the subjective norm – the extent to which one is influenced by the views of other people regarding the behaviour. Attitudes are a product of the extent to which one expects the behaviour to result in specified outcomes and the perceived importance attributed to those outcomes. The subjective norm is a function of the perceived support of important referents toward the performance of the behaviour and the motivation to comply with those referents. The TORA, claims that the intention to undertake a particular behaviour is a reliable indicator of future behaviour, if the expressed attitude toward this behaviour and or the perceived social pressure to do so correlate closely with the stated intent. A comparison of the strength of correlation of the attitude[1] and subjective norm[2] with the stated intent[3] to apply the BCA, indicates which of the two components has greater influence on the subjects' decision to apply the BCA to either seedbed or field to control nematodes.

By looking at the associations of salient outcome attitudes (OAs)[4] with intent (I) it is also possible to isolate those issues that are acting as cognitive barriers and or drivers to the uptake of the behaviour in question. Likewise, specific social referent norms (RSNs)[5] that are found to correlate closely with the stated intent to apply the BCA indicates which referents are likely to have greatest influence on the subjects' decision regarding BCA application. The statistical approach adopted is a non-parametric one, utilising Mann Whitney U Tests to identify significant differences and the Spearman Rank Order Correlation.

The research process involved a two-staged interdependent data gathering process. Initially the outcome beliefs and social referent common to the target population regarding BCA application were identified through focus group discussions with tomato farmers in the different trial areas near Mwea in Kenya. (A participative process.) The second stage was to incorporate the identified salient outcome beliefs and pertinent referents in a structured questionnaire, which was then applied to farmers that had either participated in or observed trials of the BCA for nematode control. The sampling process was

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[1] Two measures of attitude are taken. The stated attitude (SA) measures the general emotive reaction to the behaviour on a 5 point scale from very good to very bad (range = +2 to _2). The reasoned or calculated attitude (CA) is arrived at by taking the sum of the outcome attitudes. In this study 21 OA's were considered giving the CA a possible range of -84 to +84.

[2] Two measures of the subjective norm are considered. The stated subjective norm (SN) is a measure of how supportive other respected farmers would be of the subject's decision to apply the BCA. The SN is measured on a 5 point bi-polar sale giving a possible range of -2 to +2. The Calculated subjective norm is the sum of the individual referent subjective norms (RSNs). In this study 9 social referents are considered giving a possible CSN range of -36 to +36.

[3] The strength of the intent (I) to, in this case, apply the BCA agent if made available is measured on a 5 point bi-polar scale giving a possible score ranging from -2 to +2

[4] An outcome attitude (OA) is the product of the strength of belief (b) in the outcome and the importance attributed to the outcome, both measured on a 5 point bi- polar scale, giving a possible OA score range of -4 to +4.

[5] A referent subjective norm (RSN) is the product of the motivation to comply (m) with the referent and the subjective belief that the referent would support the proposed action (sb), both measured on bi polar 5 point scales, giving a possible RSN score range of -4 to +4

restricted to those that had some degree of exposure to the BCA trials as the agent is not available as yet in the market place, nor known of amongst tomato farmers in general. In all, 61 useable responses were acquired -a relatively small sample. The survey was conducted by face to face interviews.

Therefore, the method adopted to address the research objective both identifies the types of farmer likely to adopt and or reject the BCA and also identifies the attitudinal and normative factors influencing the farmers' decisions. The BCA is a combination of *Pasteuria penetrans* and *Pochonia chlamydosporia.*

Description of the sample

(A copy of the questionnaire is attached within the appendices)

The whole sample consisted of 61 usable responses of which 26% were female farmers. Approximately half of the respondents were aged 50 years or over. Only 5% (10) of the respondents claimed to have acquired a tertiary level of education. Of all respondents 68% (40) claimed to be a member of a farming organisation. The most frequently mentioned type of group was related to organic farming, followed by self-help groups.

The majority (69%) of the farmers own the land they farm. Only 2% claimed to be tenants only. However, 28% claimed to both own and rent additional land.

Size and type of farming operation

The average size of farm was relatively small, a median farm size of 1.62 hectares as demonstrated in (Table 1). Approximately half of the land held was dedicated to vegetable production. All the farmers were growing tomatoes. The majority of the farmers were growing tomatoes under irrigation 87% (53), with 8 farmers claiming to be rain dependent producers. However, 19 farmers also claimed to be producing rain dependent tomatoes, indicating that some are cropping under both regimes. The average area of tomato grown under irrigation was larger than the rain-fed area (means = 0.65 and 0.32 hectares respectively).

Table 1: Mean, median and IQR for areas of farm under different crops / uses

Area farmed	Mean	Median	IQR
Cereals	0.63	0.43	(0.2 to 0.81)
Forage crops	0.21	0.10	(0.1 to 0.35)
Vegetables	0.94	0.81	(0.2 to 1.42)
Grass/pastures	0.61	0.30	(0.1 to 1.19)
Other crops	0.40	0.20	(0.1 to 0.63)
Total farmed area	1.94	1.62	(0.8 to 2.43)

It was indicated during the focus groups that the type of irrigation applied might influence the farmer's attitude toward BCA use. Two main types of irrigation were identified, furrow and overhead systems. 54% (33) of the farmers were using furrow systems, while 33% (20) claimed to have overhead irrigation. The implication drawn from the focus groups was that furrow and flooding systems would tend to wash the BCA out of the soil. This concept is therefore tested in the following analysis to establish if the method of irrigation is influencing the decision to adopt the BCA for nematodes.

The majority (61%) of the respondents claim that more than 50% of their household income is derived from the farm (Table 2). However, this also indicates that a significant proportion of the farmers are dependent on off-farm sources of income. The average proportion of the total farm income earned from tomatoes was reported to be 43%.

Table 2: Proportion of household income from the farm business

Proportion	Frequency	Percent
All (100%)	4	6.6
About 75%	33	54.1
About 50%	20	32.8
About 25%	3	4.9

Less than 25%	1	1.6
Total	61	100

Overall the sample represents very small operators that are mainly dependent on a fairly intensive system of tomato production. The size of unit farmed and the area under tomatoes indicates that there is little scope for long-term rotation systems, unless additional 'rested' land is rented.

Organic verses non-organic

Of the whole sample only 21% (13) described themselves as organic farmers (not using chemicals). However, when the farmers were asked if they had used chemicals to control nematode in the past 3 years, 59% (36) claimed they had. When these two responses are crosstabulated, only one of the organic farmers claimed to have used chemical to control nematodes (Table 3).

Table 3: Farming system - organic vs. not-organic * Applied chemicals to control nematodes in the past 3 years (not BCA) Crosstabulation

		Applied chemicals to control nematodes in the past 3 years (not BCA)		
		No	Yes	Total
Farming system - organic vs not-organic	Organic (no chemicals used)	12	1	13
	Not organic (use chemicals)	12	36	48
Total		24	37	61

Perception of nematode problem

The perception of the nematode problem measures the 'current' problem as opposed to the risk which takes into account possible future damage.

The majority (66%) of the respondents perceives nematodes to be a very serious problem to the crops. (Table 4). However, there is a significant difference ($p = <0.05$) in this perception between the organic and non organic farmers. The organic farmers perceive nematodes as a less serious problem than the non-organic farmers. Only 13% to 15% respectively across the two groups do not view nematodes as a serious problem.

Table 4: Problem of nematodes to crops * Farming system - organic vs. non-organic Crosstabulation

		Farming system - organic vs not-organic		
		Organic (no chemicals used)	Not organic (use chemicals)	Total
Problem of nematodes to crops	Not serious	2	6	8
	Serious	6	7	13
	Very serious	5	35	40
Total		13	48	61

However, no significant difference was noted regarding the perceived seriousness expressed between those that had or had not applied chemicals to control nematodes in the non-organic group. This

suggests that there are other factors influencing the nematode control behaviour of those that have not applied chemicals, even though they are not organic producers. However, no significant difference was noted regarding application of chemical to control nematodes by non-organic producers, and the size of farm, economic dependence on farm income or proportion of income derived from tomatoes.

Perception of risk posed by nematodes and ability to manage the problem

A distinct set of questions was also posed to capture the farmers' perception of the [future] risk posed by nematodes and ability to manage this threat. Both responses were measured on a 5 point bi-polar scale measuring risk and ability.

The perception of risk

The perception of risk mirrors the perceived seriousness of the problem mentioned above. When the sample as a whole is considered the respondents felt the risk was high to very high (mean 1.44, median 2). As shown in Table 5 only 4 farmers felt that the risk was low, while 5 expressed a neutral view.

There is no significant difference between organic and non-organic farmers regarding perception of risk. The only significant differences in risk perception are noted regarding irrigation and the type of irrigation used. The respondents that are are not irrigating expressed a significantly lower level of risk compared to those that are (p 0.012). Those irrigating by furrow also expressed a significantly higher perceived risk than those using overhead irrigation (p 0.021).

Table 5: Perception of risk posed by nematodes

Perceived Risk Mean = 1.44 (-2 to +2)	Frequency	Percent
Very Low (-2)	0	0.0
Low	4	6.6
Neither high nor low	5	8.2
High	12	19.7
Very high (+2)	40	65.6
Total	61	100

Ability to manage risk

When the ability to manage the risk posed by nematodes is considered, the respondents in general do not feel very able (mean = -0.77, median = -1). Only 15% (9) of the respondents felt able to manage the risk posed. Interestingly none expressed a neutral view (Table 6).

A significant difference is noted between the organic and non-organic respondents regarding the perceived ability to manage the problem (p 0.017). The organic farmers interviewed were more likely to feel that they were able to manage the risk posed. I.e. 62% (8) of the organic farmers felt able to manage the problem compared to only 9% of their non-organic counter-parts.

It should be noted that the majority (54%) of those respondents claiming to be organic producers does not use irrigation. Irrigation and its of application is therefore an influential factor regarding nematode management.

Table 6: Perceived ability to manage nematode problem

	Frequency	Percent
Unable	5	8.2
Not very able	47	77.0
Don't know	0	0.0
Able	8	13.1
Very able	1	1.6

Total	61	100

Methods of controlling nematodes, perceived effectiveness and current practice

The respondents were asked to indicate which methods of controlling nematodes they felt most effective. This was an open question and posed before the issue of BCA was addressed. Table 7 demonstrates the number of methods mentioned. These are ranked by frequency of mention to indicate the effectiveness attributed to each by the sample as a whole.

Table 7: Most effective ways of reducing the damage of nematodes to your farm

Different ways	No of responses*	Percentage of valid cases
2. Crop rotation	56	93
1. Chemical control	32	53
10. Trash burning	24	40
8. Solarisation	16	27
5. Biological control	9	15
11. Double digging	9	15
12. Application of wood ash	9	15
13. Antagonistic plants	8	13
9. Resistant/tolerant varieties	5	8
4. Rouging	4	7
3. Others	2	3
6. Hot water treatment	2	3
7. Fallow	1	2
Total number of respondent	**60**	**100**

* Multiple responses from the respondent

- As can be observed, *crop rotation* is the most mentioned method of reducing nematode damage mentioned by 93% of the respondents, with 56% ranking this as the most effective. This is clearly the most respected of the methods mentioned by some margin.
  - Of the methods actually applied to control nematodes crop rotation was used by 95% of the respondents in the past 3 years. (Crops may also have been rotated for other reasons apart from the control of nematodes)
- *Chemical control* is the second most frequently mentioned (53%). Of those mentioning this method, only 13% considered it the most effective, the largest proportion of those mentioning chemical control ranking this second (48%).
  - 61% of the respondents applied chemicals to control nematodes in the past 3 years.
- *Trash burning* was mentioned by 40% of the respondents the third most frequently mentioned method. Of those mentioning this method the majority ranked this either 2nd or 3rd (42% and 32% respectively).
  - Trash burning was reported to have been practiced as a method of control by 10% of the respondents
- *Solarisation* was considered an effective method by 27% of the respondents. Of those mentioning this method the majority ranked this 3rd to 4th in effectiveness (25% and 38% respectively).

  - However, solarisation is reported as the third most practised method of control over the past three years being utilised by 12% of the respondents.

- *Biological control* was mentioned by 15% of the respondents. However, of these the majority (67%) ranked it as the most effective with 22% ranking its second. Clearly those that mentioned this method believe in its effectiveness. It is unfortunate that the extent of exposure to the BCA trials was not captured in the survey instrument.
- *Double digging* was also mentioned as an effective method by 15% of the sample. In this case, of those that mentioned double digging 40% ranked it as the second most effective method followed by 20% that considered it the most effective.
  - Double digging was practised by 10% of the respondents over the past three years. This was the fifth most commonly used method of nematode control.

Current practice

The respondents were asked to indicate if they had practised each of the three options in the past three years. A score of -1 was given for a negative response and +1 for a positive response to each option. The sum of these responses gave an measure of nematode control behaviour with a possible score of -3 to +3. Therefore, a score of +1> indicates that multiple methods of control have been applied over the past three years.

The nematode control current behaviour / mean for the whole sample is 0.90 (Figure 1 and Table 12). Significant differences in the behaviour score are noted regarding, method of irrigation, organic farming status, ability to manage risk, age of respondent and farming organisation membership.

- *Method of irrigation:* Those using furrow irrigation registered the 3rd highest behaviour scores (1.43). In contrast those using overhead irrigation registered one of the weaker, though positive scores (0.10) (Table 15).
- *Organic status:* The organic farmers registered lowest/ most negative behaviour score (-0.85) in contrast to the 4th most positive score of the non-organic producers (1.38). It is interesting that the non-organic farmers scored so low as the 3 options tend to favour the non chemical controls (Table 15).
- *Ability to manage risk:* Interestingly, those that feel they were able to manage the risk posed by nematodes to their crops scored the second lowest behaviour score (-0.33), significantly different to those that feel they are not able (1.12) (Table 24).
- *Age:* Those age under 50 registered the 2nd highest score (1.38), compared to weaker score of the over 50s (Table 27). It is interesting to note that all but one of the organic farmers were also aged 50 or over.
- *Membership of farming organisations:* Those that are 'not' members of farming organisations registered the most positive of all the descriptive, comparative categories of farmer considered (1.57). It is difficult to explain why members of farming organisations should register a significantly lower score (0.55) as this seems to be counter intuitive (Table 30). It would be expected that farmer organisation membership would result in greater awareness and improved practice. However, all the organic farmers are members of farming organisations, a far larger proportion of the over 50s are also members than their younger counterparts and all those bar two that are rain dependent producers are also members.

Likely uptake of proposed BCA control

Intention to adopt BCA if made available in the next year

Two measures of the strength of intent (I) were taken both on a 5 point bi-polar scale. The first measures the intention to apply the BCA to the seedbed. The second measures the intent to apply the BCA directly to the field. The means of both these measurers of intent (I) for the whole sample are presented in Figures 1 and 2 and Table 12).

The intentions to apply BCA to the seedbed and field were very strong (means = 1.90 and 1.75) respectively). Both measures correlate closely ($p < 0.01$). Although, the intention of all the descriptive

categories was strongly positive, intention to apply BCA in both contexts appears to be sensitive to whether or not the crop is irrigated and if nematodes are a current problem. With regard to applying the BCA directly to the field, the intent (I) is also sensitive to the type of irrigation system, age of farmer and group membership.

- *Irrigation:* A significant difference in the intent to apply BCA is noted between those that irrigate and those that do not (Table 12). The irrigators registering the stronger intent regarding both seedbed and field applications.
- *Current serious problem with nematodes:* As might be expected those that reported a serious problem with nematodes expressed significantly stronger intentions to apply the BCA to both seedbeds and field.
- *The type of irrigation system:* With regard to the intention to apply the BCA to the field, those using furrow irrigation, expressed a significantly stronger intent than those with overhead irrigation.
- *Age and group membership:* Those under 50 years of age and also those that are not members of an agricultural organisation also expressed significantly stronger intents to apply the BCA to the field.

The types of farmer most likely to apply the BCA if made available

The intention to undertake a particular behaviour is considered a reliable indicator of future behaviour if the intent correlates closely with the attitude expressed toward the behaviour and or the subjective norm. Fig 1 and Fig 2 present these correlations for the responses of the sample as a whole regarding seedbed and field application respectively.

When the sample is considered as a whole, it is very likely that the BCA will be applied to both seedbed and field -if made available. Although the intention to apply the product to the seedbed is stronger, only the I vs. CA is significant (Fig 1). While in the case of field application both I vs. SA and CA correlations are significant (Fig 2). Neither subjective norm measures correlate significantly with the intention to apply the product to either the seedbed or field.

- This suggests that although the farmers are slightly more likely to apply the BCA to the seedbed than the field, both forms of application are likely to occur. Although the subjects' emotive response favours the field application, the more reasoned attitude (CA) tends to dominate in the case of seedbed application and heavily influence the field application also. When the respondents are considered as a whole, the decision to apply the BCA will tend not to be influenced by perceived social pressure.

Seedbed application

The intention to apply BCA to seedbeds vs. attitude and subjective norm correlations regarding the different descriptive categories are presented in Table 33, Table 36, Table 39, Table 42 and Table 45.

- The categories observed most likely to apply the BCA to the seedbed are those:
  - that feel *able to manage the risk* posed by nematodes (2.00),
  - with the *highest reliance on farm income* (1.96),
  - *using irrigation*, particularly *furrow irrigation* (1.95)
  - that perceive *the current problem as serious* (1.94).

  In each case the I vs.CA correlation is significant and dominant indicating that it is the farmers' outcome attitudes in these categories that are governing the decision. However, in the case of those using irrigation and that have a higher dependency on farm income the I vs. CSN is also significant indicating that respected social referents also have an influence on these two categories' decisions re BCA application to seedbeds.

  Those that are '*not' members of agricultural organisations* also expressed a strong intent to apply the BCA to seedbeds, however, their intent only correlated significantly with the more emotive staed attitude (I vs. SA). This suggests that the resolve of this group may weaken as they begin to evaluate the outcomes.

- The categories less likely[6] to apply the BCA to seedbeds are those:
  - That do *not have a serious problem* with nematodes (1.63)
  - That perceive the *risk as low* (1.75)
  - *Not irrigating* (1.76)

  In each case the I vs. CA correlation is dominant. However, in the case of those that consider the risk of posed by nematodes to be low, the I vs. CSN is also significant, suggesting this group's decision is also sensitive to their respected social referents.

Field application

The intention to apply BCA to the field vs. attitude and subjective norm correlations regarding the different descriptive categories are presented in Table 48, Table 51, Table 54, Table 57 and Table 60.

- The categories most likely to apply the BCA to the field are those:
  - *Not members* of farmer organisations (1.95)
  - Using *furrow irrigation* (1.94)
  - *Higher proportion of farm income derived from tomatoes* (1.90)

  Apart from the non-members, all categories present significant I vs. CA correlations. In the case of non-members the only significant correlations is with the more emotive stated attitude measure, indicating that their intention may be unstable.
- The categories less likely to apply the BCA to the field directly are those:
  - With overhead irrigation (1.45)
  - That do 'not' have a serious nematode problem (1.50)
  - Those with a lower proportion of the farm income derived from tomato sales (1.60)

  With regard to those with overhead irrigation, the I vs.CSN correlation is significant while the I vs. CA is not. In this case it appears that the respected social referents have greater influence over their decision process. Those with a lower dependency on tomato sales re farm income, the only significant correlation with the intent to apply the product to the field is with the stated attitude (SA), again indicating that intention may be less stable.

Summary of future application

Overall the finding suggests that farmers are very likely to apply the BCA to both seedbed and field if made available. The issues that appear to be the more influential characteristics are the existence a serious nematode problem, the perception of risk and the type of irrigation used. However, the proportion of the farm income derived from tomatoes is also influential with regard to the field application. In contrast the level of household dependency on the farm is the more influential economic factor with respect to seedbed application.

In general the decision to apply the BCA will be governed by the farmers own experience and knowledge (attitudes). However, in the case of those using overhead irrigation perceived social pressure may have the greater influence on their decision process.

Cognitive barriers and drivers influencing the decision to apply BCA

According to the TORA (e.g. Carr & Tait 1991), those outcome attitudes that correlate closely with the expressed intent (I vs. OA) are considered to have influence on the decision to undertake the behaviour in question, e.g. BCA application. The expected outcomes that were salient amongst those farmers

[6] The intention of all categories was strong

exposed to the trial of the BCA were identified through initial focus groups with the target farmers. The 21 salient outcome expectations are presented in Table 8.

The outcome attitude (OA) attributed to each statement is is arrived at by taking the product of the strength of agreement with the statement (b) and the importance attributed to that outcome (e). Both are measured on a bi-polar, 5-point scale. Therefore each OA has a possible score range of -4 to +4. The Reasoned or calculated attitude (CA) is the sum of these OAs (e.g. CA = $\sum$bi*ei) giving a possible CA score range of -84 to +84. When the reliability of the CA scale was tested it produced a Cronbach Alpha coefficient of 0.85, indicating that the scale of 21 OAs is reliable.

Outcome Attitudes

The strength of belief (b) attributed value (e) and resulting OA (b*e) are presented in Table 8. In the case of those statements that imply negative outcomes, the sign of the belief (b) has been changed when calculating the OA toward the application of the BCA. This is to insure that the OAs are not counter-intuitive. In all five statements have been adjusted when calculating the (b*e) products. These are underlined in Table 8. However, the sign in the belief (b) column in Table 8 has not been changed so as to demonstrate the actual strength of agreement or disagreement with the statement.

Table 8: Mean figures for outcome beliefs (b) and value (e) and outcome attitudes (b*e) for whole sample

n=61 **Outcome attitudes (b*e)**	Beliefs (b) Mean	Value (e) Mean	Attitudes (b*e) Mean
CA44 - BCA is a non toxic substance that compliments an organic farming system	1.89	1.90	3.62
CA53 - Applying BCA to the field will provide protection to directly sown crops such as French beans	1.80	1.87	3.45
CA47- If BCA is applied to the seedbed you will get more vigorous seedling growth	1.70	1.83	3.38
CA37 - BCA application will increase the amount of marketable fruit (improved quality)	1.70	1.80	3.21
CA35 - The use of BCA on the farm will lead to improved yields	1.70	1.72	3.02
CA51 - Applying BCA to fields will give greater protection to 'transplanted' crop than seedbed only appl.	1.49	1.79	2.90
CA41 - Will be able to continue cropping currently worm infested fields if BCA is applied	1.46	1.75	2.72
CA38 - BCA application will reduce the general level of disease in the treated crops	1.46	1.66	2.57
CA52 - Once applied the influence of the BCA will last for several seasons	1.44	1.67	2.53
CA40 - Increased profit resulting from the use of BCA in the seedbed only	1.26	1.62	2.41
CA46 - If BCA is applied to the seedbed only it will result in lower labour costs	1.23	1.43	2.39
CA43 - BCA will not be washed out of the soil by overhead irrigation	1.30	1.51	2.38
CA54 - Increased profit resulting from the application of BCA to the field only	1.30	1.62	2.35
CA39 - BCA application will reduce the wasted costs of irrigating and treating worm infested crops	1.30	1.48	2.33
CA48 - If BCA is applied in the seedbed it will also protect seedlings after transplanting	1.31	1.57	2.25
CA49 - Seedbed application only of BCA will provide an effective control of nematodes	0.87	1.28	1.74
CA36 - BCA will cost too much	-0.33	1.28	0.41
CA45 - The correct application of BCA will be very difficult to achieve	-0.38	0.95	0.26
CA50 - BCA is a product that will not be commercially accessible for the smaller/poorer farmer	-0.13	1.13	-0.05
CA42 - The BCA will be washed away by furrow irrigation	0.61	0.98	-0.66
CA55 - Need method of transplanting to insure that the BCA applied to seedbed will be transferred to field	1.57	1.72	-3.00
Calculated attitude CA ($\sum b_i * e_i$)			40.17
Cronbach's alpha coefficient of scale reliability (0.85)			

- The beliefs (b) of the underlined statements had the signs changed when calculating the OA (b*e), although the the signs in the belief (b)column represent the actual response.

The six most strongly expressed OAs with mean scores of 3 or more are all, bar one, supportive of BCA application.

- The most strongly expressed attitude relates to the lack of *toxicity* and its ability to compliment the organic farming system.
- The following two most positive attitudes relate to the method of application. The benefit of the BCA to directly sown crops if *applied directly to the field* is both believed and highly valued. The greater protection offered by field application is also one of the most highly valued, although not as strongly believed.
- More vigorous seedling growth achieved by *applying the BCA to the seedbed* is both one of the most strongly believed outcomes as well as being highly valued. The seedbed application is also associated with improved profits and reduced labour costs. However, the achievement of effective nematode control via seedbed application only received weak agreement (b).

  One of the most strongly expressed OAs was negative toward BCA application. This related to the strongly held belief that an appropriate *method of transplanting* will be needed to insure that the BCA will be transferred from the seedbed to the field. This issue was also felt to be one of the most important. This response indicates the perceived difficulty of achieving the needed level of control once the crop is transplanted, if the BCA is applied to the seedbed only. Alternative methods of transplanting may need to be introduced to insure more effective transfer of the agent from seedbed to field.
- The resulting *improved quality of fruit and yield* are also strongly believed and valued. However, it is interesting that the greater value is attributed to improved quality over improved yield.
- Interestingly, the issues of *increased profit and reduced cost* are not in the most highly ranked OAs. Although weakly expressed the respondents reject the concept that the BCA will cost too much and do not attribute as high a value to this issue as might have been expected. As the actual cost of the product is not known the expressed OA is only slightly negative regarding its future accessibility to the smaller/poorer farmers. This indicates the lack of knowledge re this issue.
- The respondents do not feel that overhead *irrigation* will wash the BCA agent out of the soil. However, they do feel that furrow irrigation will wash it out, this later issue resulting in a negative, although weakly held expressed, OA toward BCA application.

Influence of specific outcome attitudes (OAs)

Although some attitudes are strongly expressed, they do not necessarily have the greatest influence on the decision making process. The degree of association / influence is arrived at by comparing the significant I vs. OA correlation coefficients. Figure 1 and Figure 2 present these in rank order for the whole sample regarding seedbed and field application of the BCA respectively.

Seedbed application (Figure 1)

When the whole sample is considered, none of the influential OAs is acting as a barrier, countering the decision to apply the BCA to the seedbed.

In all ten OAs are considered influential. Two of these CA53 and CA54 are considered to be field application specific and not considered here. The influential issues in rank order from the most influential are:

1. *Vigorous seedling growth*
2. *Improved yields*
3. *BCA influence will be long lasting*
4. *Non toxic of agent complimenting organic production*
5. *Ability to continue cropping invested fields*
6. *Will protect the seedlings after transplanting*
7. *Increased profit*
8. *Effective control of nematodes*

The final outcome attitude re nematode control is implicit in all the other ranked OAs.

Comparison of sensitive descriptive categories

The descriptive categories to which the intent to apply the BCA to the seedbed was sensitive were the serious nature of current infestation and if irrigation was being used. Table 9 presents the comparative I vs. OA correlations.

Table 9: Intention re Seedbed application vs. OAs re problem and irrigation

Outcome attitudes	Serious problem?		Irrigating?	
	No	Yes	Yes	No
n	8	53	44	17
Spearman correlations	r_s	r_s	r_s	r_s
CA35 - The use of BCA on the farm will lead to improved yields	.894(**)	.383(**)	.410(**)	.608(**)
CA38 - BCA application will reduce the general level of disease in the treated crops	.852(**)			
CA39 - Will reduce the wasted costs of irrigating and treating worm infested crops	.894(**)			.610(**)
CA41 - Will be able to continue cropping worm infested fields if BCA is applied		.292(*)	.336(*)	
CA44 - BCA is a non toxic substance that compliments an organic farming system	.745(*)			.511(*)
CA47- If applied to the seedbed you will get more vigorous seedling growth	1.0(**)	.452(**)	.459(**)	.786(**)
CA48 - If applied in the seedbed it will also protect seedlings after transplanting	.755(*)			.513(*)
CA52 - Once applied the influence of the BCA will last for several seasons	.760(*)	.281(*)		.574(*)
CA55 - Need method of transplanting to insure that the BCA will be transferred to field	-.775(*)			

- The I vs. OA correlations re seedbed application for all the descriptive categories can be observed in Table 34, Table 37, Table 40, Table 43 and Table 46.

Current infestation:

When the serious nature of current nematode infestation is considered differences in the OAs and the ranking of the influence is noted.

The issues influencing those that do *not have a current problem* are:

1. *Vigorous seedling growth*
2. *Improved yields*
3. *Reduced waste of investing in infested fields*
4. *Reduce the general level of crop disease*
5. *Need method of transplanting to insure BCA is transferred to field*
6. *Application to seedbed will provide protection after transplanting*
7. *Non toxic nature of product*

Note: It should be noted that with this group of farmers the issue of the need for method of transplanting to insure transfer of the BCA to the field is acting as a cognitive barrier. This implies that if the application of the BCA to seedbeds is to be encouraged as a preventative measure, the issue of transplanting will need to be addressed.

In contrast those issues influencing the decision of those with a *serious nematode problem* in rank order are:

1. *Vigorous seedling growth*
2. *Improved yields*
3. *Ability to continue cropping worm infested fields*
4. *The protracted protection of the BCA over time*

Note: The difference with those suffering from nematodes is the influence of the expectation to be able to continue cropping invested fields and long-term protection. The producers of the

agent will need to verify if these expectations are correct and if not to address these two expectations.

Irrigated verses non irrigated systems

Those currently irrigating are influence in rank order by the following expectations:

1. *Vigorous seedling growth*
2. *Improved yields*
3. *Ability to continue cropping invested fields*

Note: The belief that they will be able to continue cropping infested fields will need to be addressed. Has too high an expectation of the product been created regarding this issue?

Those not irrigating their crops are positively influenced in rank order by the following expectations:

1. *Vigorous seedling growth*
2. *Reduced wasted cost of treating infested fields*
3. *Improved yields*
4. *The effect of the BCA will last*
5. *Will provide protection after transplanting*
6. *Non toxic -suitable for organic production*

Note: The issue of the BCA's transferability from seedbed to field and its effective life in the soil will need to be checked as these is an influential expectation with this group of farmers.

Direct application to the field (Figure 2**)**

When the whole sample is considered, none of the influential OAs is acting as a barrier, countering the decision to apply the BCA directly to the field.

In all ten OAs are considered influential. Five of these CA40, CA46, CA47, CA49 and CA49 are considered to be seedbed application specific and therefore not considered here. The influential issues in rank order from the most influential are:

1. *Improved yields*
2. *Ability to continue cropping worm infested fields*
3. *Non toxic -compatible with organic systems*
4. *Field application will provide protection to directly sown crops*
5. *The effect of the BCA will last -for several seasons*
6. *Increased profit*

The two issues that are distinct to those influencing the seedbed application intent are the protection provided to directly sown crops and the lasting effectiveness of the agent in the soil over several seasons.

Comparison of sensitive descriptive categories re field application

The descriptive categories to which the intent to apply the BCA to the field was sensitive were type of irrigation system and proportion of farm income derived from tomato sales. Table 10 presents the comparative I vs. OA correlations.

Type of Irrigation system

Those using furrow irrigation are positively influence in rank order by the following expectations:

1. *Improved yields*
2. *Provide protection to directly sown crops*
3. *Non toxic -compatible with organic systems*

4. *Ability to continue cropping infested fields*

Those using overhead irrigation systems are influenced by:

1. *Ability to continue cropping infested fields*
2. *Improved yields*

It is interesting that the issue of irrigation washing out the BCA does not appear to be influential.

Proportion of farm income derived from tomato sales

Those that are *receiving above the median percentage of farm income* from tomato sales are influenced in rank order by the following expectations:

1. *Improved yields*
2. *Ability to continue cropping infested fields*
3. *Provide protection to directly sown crops*
4. *Non toxic -compatible with organic systems*
5. *Increased profit*
6. *The effect of the BCA will last -for several seasons*

Those that are *receiving below the median percentage of farm income* from tomato sales are influenced in rank order by the following:

1. *It will be easy to apply*
2. *Non toxic -compatible with organic systems*

Note: This group rejected the concept that the BCA would be difficult to apply correctly, hence the corresponding positive OA is presented as ease of application.

Table 10: Intention re Field application vs. OAs re type of irrigation and income from tomatoes

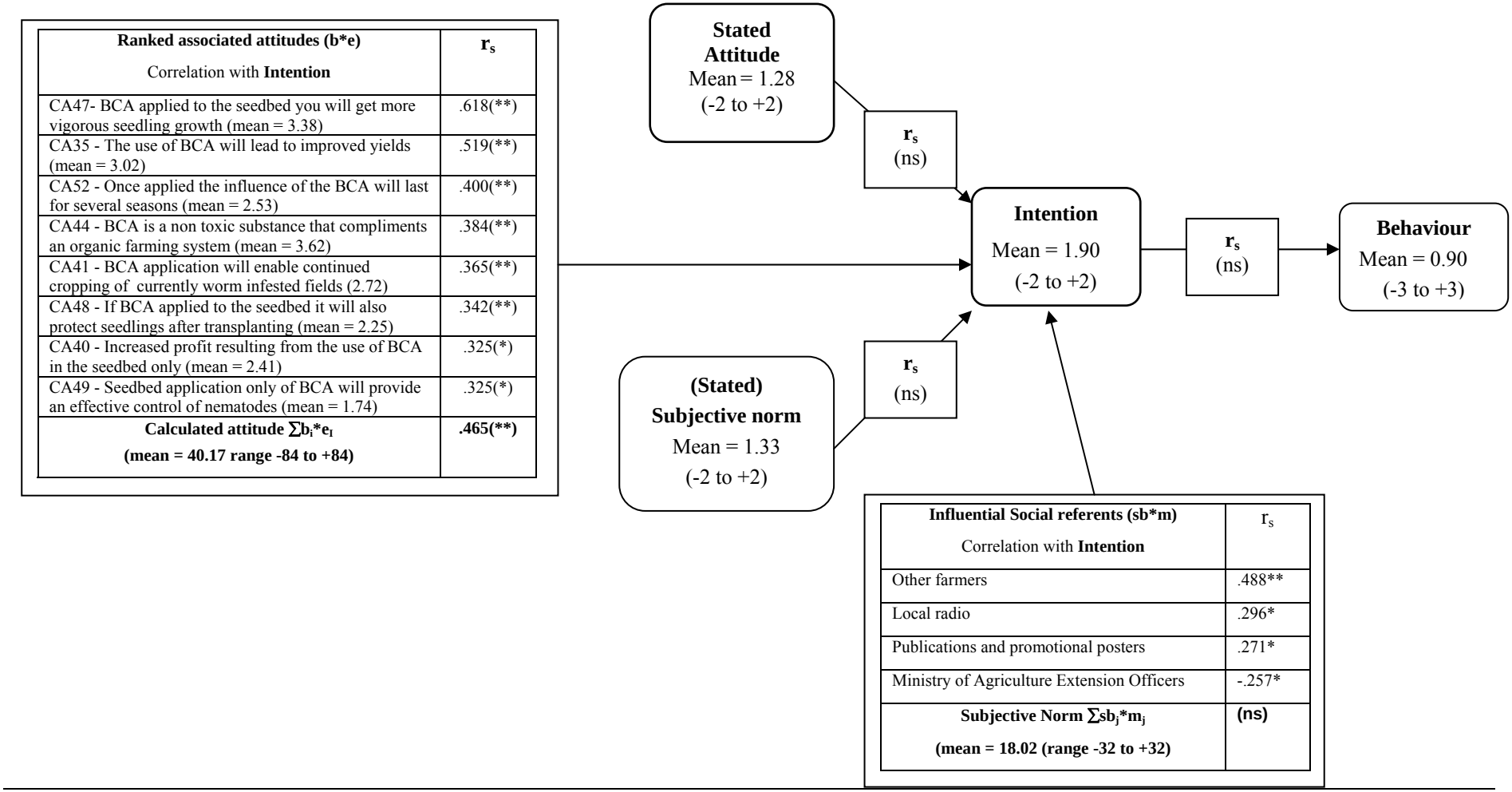
Outcome attitudes	Type of irrigation?		Tomato income	
	furrow	overhead	high	low
n	33	20	37	24
Spearman correlations	r_s	r_s	r_s	r_s
CA35 - The use of BCA on the farm will lead to improved yields	.580(**)	.453(*)	.636(**)	
CA41 - Will be able to continue cropping worm infested fields if BCA is applied	.432(*)	.529(*)	.591(**)	.431(*)
CA44 - BCA is a non toxic substance that compliments an organic farming system	.451(**)		.410(*)	.
CA45 - The correct application of BCA will be very difficult to achieve				.461(*)
CA52 - Once applied the influence of the BCA will last for several seasons			.325(*)	
CA53 - Applying to the field will provide protection to directly sown crops	.556(**)		.432(**)	
CA54 - Increased profit resulting from the application of BCA to the field only			.337(*)	

* = p <0.05: ** = p<0.01

Figures presenting the barriers and drivers influencing the intention to apply BCA

Figure 1: Barriers and Drivers and influential referents re BCA application to seedbeds (n = 62)

- Shaded attitudes are acting as barriers
- $\mathbf{r_s}$ Spearman Rank Order Correlation Coefficients
- Degree of significance (* p<0.05; ** p<0.01)

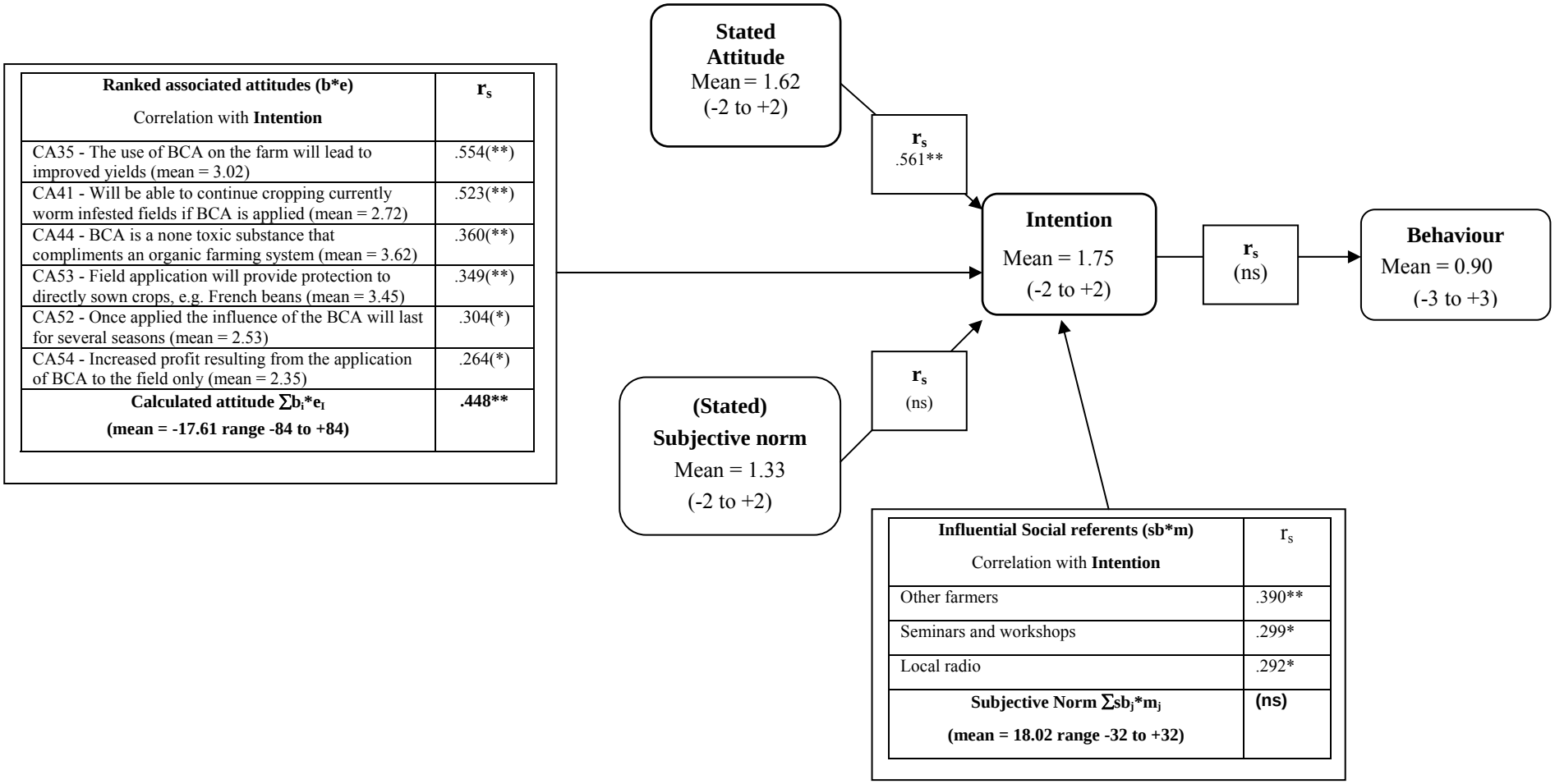


Ranked associated attitudes (b*e) Correlation with **Intention**	$\mathbf{r_s}$
CA47- BCA applied to the seedbed you will get more vigorous seedling growth (mean = 3.38)	.618(**)
CA35 - The use of BCA will lead to improved yields (mean = 3.02)	.519(**)
CA52 - Once applied the influence of the BCA will last for several seasons (mean = 2.53)	.400(**)
CA44 - BCA is a non toxic substance that compliments an organic farming system (mean = 3.62)	.384(**)
CA41 - BCA application will enable continued cropping of currently worm infested fields (2.72)	.365(**)
CA48 - If BCA applied to the seedbed it will also protect seedlings after transplanting (mean = 2.25)	.342(**)
CA40 - Increased profit resulting from the use of BCA in the seedbed only (mean = 2.41)	.325(*)
CA49 - Seedbed application only of BCA will provide an effective control of nematodes (mean = 1.74)	.325(*)
Calculated attitude $\sum b_i*e_i$ (mean = 40.17 range -84 to +84)	**.465(**)**

Influential Social referents (sb*m) Correlation with **Intention**	r_s
Other farmers	.488**
Local radio	.296*
Publications and promotional posters	.271*
Ministry of Agriculture Extension Officers	-.257*
Subjective Norm $\sum sb_j*m_j$ (mean = 18.02 (range -32 to +32)	**(ns)**

Figure 2: Barriers and Drivers and influential referents re direct BCA application to the field (n = 62)

- Shaded attitudes are acting as barriers
- $\mathbf{r_s}$ Spearman Rank Order Correlation Coefficients
- Degree of significance (* p<0.05; ** p<0.01)



Ranked associated attitudes (b*e) Correlation with **Intention**	$\mathbf{r_s}$
CA35 - The use of BCA on the farm will lead to improved yields (mean = 3.02)	.554(**)
CA41 - Will be able to continue cropping currently worm infested fields if BCA is applied (mean = 2.72)	.523(**)
CA44 - BCA is a none toxic substance that compliments an organic farming system (mean = 3.62)	.360(**)
CA53 - Field application will provide protection to directly sown crops, e.g. French beans (mean = 3.45)	.349(**)
CA52 - Once applied the influence of the BCA will last for several seasons (mean = 2.53)	.304(*)
CA54 - Increased profit resulting from the application of BCA to the field only (mean = 2.35)	.264(*)
Calculated attitude $\sum b_i*e_i$ (mean = -17.61 range -84 to +84)	**.448****

Influential Social referents (sb*m) Correlation with **Intention**	r_s
Other farmers	.390**
Seminars and workshops	.299*
Local radio	.292*
Subjective Norm $\sum sb_j*m_j$ (mean = 18.02 range -32 to +32)	**(ns)**

Influential social referents

Table 11 presents the mean subjective belief (sb), motivation (m) and referent subjective norm (RSN) (sb*m) for each of the salient referents -those most frequently mentioned during the initial focus groups. The CSN is the sum of these 8 referents, i.e. ($\sum sb_j * m_j$).

As can be observed, the most highly ranked RSNs related to agricultural research organisations and other farmers. Interestingly the following two most highly ranked relate to seminars/workshops and promotional literature. Even the local radio is ranked more highly than Government extension officers. Although they believe the Government extension officers may encourage the application of the BCA, the motivation to comply with this referent was very weak. The motivation to comply with both producers and suppliers of agro-chemicals was negative and in the case of the suppliers the subjective belief was also negative.

Table 11: Mean figures for subjective belief (sb), motivation (m) and referent subjective norm (RSN) (sb*m) for whole sample

Social referents (sb*m) = range (-4 to +4) n=61	Subjective belief (sb)	Motivation (m)	Subjective norm (sb*m)
	Mean	Mean	Mean
CSN57e - Agricultural research organisations	1.93	1.98	3.85
CSN57i - Own experience/knowledge	1.87	1.85	3.62
CSN57c - Other farmers	1.77	1.77	3.23
CSN57g - Seminars and workshops	1.75	1.67	3.08
CSN57h - Publications and promotional posters	1.66	1.61	2.95
CSN57d - Local radio	1.16	1.08	1.67
CSN57f - Manufacturer of agro chemicals	0.03	-0.26	1.20
CSN57a - Ministry of Agriculture extension officers	0.79	0.38	1.15
CSN57b - Stockists of agricultural chemicals	-0.21	-0.72	0.89
CSN ($\sum sb_j * m_j$) Range = -32 to +32			18.02
Cronbach Alpha Coefficient	0.62		

- The line 'own experience and knowledge' is not treated as a referent but included to compare their self-reliance with other social referents. It is not included in the CSN.

Influence of individual referents on the application of the BCA

As in the case of the OAs, the (I vs. RSN) correlations determine the influence of the individual referents. Although, the (I vs. CSN) for both seedbed application (Figure 1) and field application (Figure 2) are not significant, some of the individual RSNs do correlate closely.

Seedbed application (Figure 1)

When the sample is considered as a whole, the following referents considered influential in rank order:

1. *Other farmers*
2. *Local radio*
3. *Publications and promotional posters*
4. *Government agricultural extension officers*

Note: This implies that if attempting to persuade farmers to apply the BCA to seedbeds, the most appropriate channels for that communication are other farmers and the local radio. For example radio messages endorsed by respected local farmers. The farmers also appear to be open to promotional literacy.

However, the Government extension agents appear to have a negative influence and any promotional strategy regarding BCA application to seedbeds should avoid using this referent as a channel.

Those categories of farmer most susceptible to social pressure seedbed application

The farmers most susceptible to social pressure are those using irrigation, those most dependent on the farm income and those that do not have a serious problem with nematodes.

In the case of those *using irrigation*, the referents considered most influential are *other farmers* and *promotional literature*, particularly other farmers (Table 35).

Note: This emphasises the importance of identifying the most respected local farmers in an area and using them to promote /endorse the application of the BCA to seedbeds.

For those *most dependent on the farm*, the referents considered most influential are *other farmers, agricultural research organisations* and *local radio* (Table 41).

Note: With this category of farmer that are very dependent on the farm's income apart from other farmers and local radio, the research institution is an influential agent. This suggests that when promoting seedbed application, the research institutions need to focus their attention on the more dependent farmers.

In the case of those that *do not feel they have a serious problem with nematodes*, the influential referents in rank order are *other farmers, suppliers of agro-chemicals* and *Government agricultural extension officers*. In the case of the extension officers' the influence appears to be negative (Table 38).
Note: This category of farmer registered significantly weaker intent compared to those with a current nematode problem. It is interesting to note that this is the only category of farmer to register a significant I vs. RSN correlation regarding the agro-chemical supplier. Therefore, consideration should be taken to enlist the support of these suppliers if an attempt is to be made to encourage the application of the BCA agent prior to the problem becoming serious. This is probably one of the more important findings / recommendations as the most effective strategy should be a pre-emptive one.

Field application (Figure 2)

In the case of applying the BCA agent to the field, when the whole sample is considered the following referents are influential:

1. *Other farmers*
2. *Seminars and workshops*
3. *Local radio*

Note: This suggests that, as in the case of seedbed application, both local farmers and local radio are important channels that should be utilised to promote the application of the BCA to the field. The distinction regarding field application is the probable influence of seminars and workshops.

Those categories of farmer most susceptible to social pressure re seedbed application

The *farmers with overhead irrigation* appear to be most sensitive to social persuasion regarding field application. They are also a category of farmer that expressed one of the weaker intentions to apply the BCA agent to the field. With respect to this category, the only referent to register a significant (I vs. RSN) correlation was the *local radio* (Table 50).

Note: If the TORA implication is followed, then the radio is an appropriate channel through which to encourage this category of farmer to apply the BCA agent to the field. However, this group also registered significantly higher RSN scores regarding extension officers, agro-chemical suppliers and the manufactures of agro-chemicals when compared to others that expressed stronger intent such as those using a furrow irrigation system. However, agricultural research institutions and other farmers registered the highest RSNs indicating a respect for these institutions though they do not appear to have influence over the decision to apply the BCA to the field (Table 17).

Conclusion

Although the sample of farmers was relatively small, the findings indicate the categories of farmer likely to apply the BCA agent to both seedbeds and field, if it is made available. The research also

indicates what expectations are influencing their decisions to apply the agent. Social referents are identified that have influence on the decision making process with the different categories of farmer more open to social persuasion. The findings can therefore be used to inform the future promotion of the BCA application, indicating key messages and appropriate channels of communications.

Overall the finding suggests that farmers are very likely to apply the BCA to both seedbed and field if made available, although seedbed application is more likely.

- The categories of farmer that appear most likely to apply the BCA to the seedbed are those that feel able to manage the risk, have the greatest dependency on farm income, that are using furrow irrigation systems and that have a serious current problem with nematodes.
- In contrast those categories that registered the weaker intent to apply the BCA to seedbeds are those that do not have a current problem with nematodes, that perceive the risk as low and those that depend on rain-fed systems.

When the issue of applying the BCA to the field directly is considered, the categories of farmer most and least likely to apply the agent change, i.e.

- Those mostly likely to apply the agent to the field are those that are not members of agricultural organisations, those using furrow irrigation and those receiving a higher proportion of the farm income from tomato sales.
- Those registering the weaker intent were those with overhead irrigation systems, that do not have a current problem with nematodes and those deriving a lower proportion of their farm income from tomatoes.

In general the decision to apply the BCA will be governed by the farmers' own experience and knowledge (attitudes). However, in the case of those using overhead irrigation, perceived social pressure may have the greater influence on their decision process.

Those expectations that appear to be driving the decision to apply the agent to the seedbed were in order of influence:

1. *Vigorous seedling growth*
2. *Improved yields*
3. *BCA influence will be long lasting*
4. *Non toxic agent complimenting organic production*
5. *Ability to continue cropping invested fields*
6. *Will protect the seedlings after transplanting*
7. *Increased profit*
8. *Effective control of nematodes*

- The final outcome attitude re nematode control is implicit in all the other ranked expectations.

With respect to the application of the BCA directly to the field, the expectations that appear to have the positive influence in rank order are

1. *Improved yields*
2. *Ability to continue cropping worm infested fields*
3. *Non toxic -compatible with organic systems*
4. *Field application will provide protection to directly sown crops*
5. *The effect of the BCA will last -for several seasons*
6. *Increased profit*

The issue that is distinct to field application intent is the protection provided to directly sown crops.

The issue of seedling vigour is a key expectation regarding seedbed application. This may reflect a belief that a vigorous seedling will be able to withstand attacks once transplanted, rather than depending on the transfer of the BCA agent from seedbed to field.

In general these expectations will need to be reinforced in any promotional strategy. However, some of these current expectations may be beyond the capability of the BCA. For example that the agent once applied will have a residual impact over several seasons, the ability to continue cropping infested fields and that if applied to the seedbed the agent will continue to provide effective protection once the plant has been transplanted. Also the BCA does not necessarily encourage seedling vigour. These are key influential outcome expectations that are driving the current positive response. However, if any of these are proved wrong, it will lead to a weakening of the current positive intent. If some of these are false expectations then they need to be addressed before the farmers find out through trial and error. These 'possible' errors in perception should be challenged but at the same time those expectations that are correct should be reinforced so as to counter-balance any negative response.

In the case of seedling vigour it may be appropriate to add a fertiliser to the BCA so as to help insure a more vigorous seedling response as well as providing protection against nematodes. This would have the effect of meeting the farmers' expectation and thus help to ensure continued use of the BCA.

With those not facing a current nematode problem the expectation of having to change the method of transplanting to ensure effective transfer of the agent to the field was acting as a cognitive barrier to the future application of the BCA to the seedbed. This was the only expectation that was acting as a deterrent and was only relevant to those not confronting a nematode problem. However, the issue of insuring the effective transfer of the agent from seedbed to field during transplanting is a key underlying issue.

The most influential social referents regarding the application of the BCA are other farmers, local radio, and promotional publications and materials as well as workshops/seminars. This indicates the importance of identifying the influential local farmers and enlisting their support and the use of local radio in any promotional strategy when addressing farmers in general.

- However, those most dependent on the farm income are also influenced by the agricultural research stations. Therefore the research institutions need to target this category of farmer when promoting the BCA application.
- Preventative strategies that focus on encouraging those not currently experiencing a nematode problem should consider enlisting the support of the agro-chemical suppliers. These suppliers appear to have influence on those not currently exposed to nematode infestation.
- Care should be taken regarding enlisting Government agricultural extension officers, as they appear to have a negative influence on the farmers' decision to apply the BCA agent.

In general the majority of farmers is very aware of the nematode problem and appears keen to apply anything that will prove effective. Cost was not the most influential factor. The prospects for an initial uptake of the BCA agent appear very positive. However, this positive intent may be based on some false assumptions and these should be identified and addressed prior to the release of the product. In doing so it will be important to reinforce those correct influential expectations.

Appendices

- References:
- Comparative Tables re TORA variables
- Seedbed correlation tables
- Field application Tables
- General summary tables
- Nematode BCA Questionnaire

References

Ajzen, I., & Fishbein, M. (1980). Understanding Attitudes and Predicting Social Behaviour. Englewood Cliffs, New Jersey: Prentice Hall.

Carr, S., & Tait, J. (1991). Differences in the Attitudes of Farmers and Conservationists and their Implications. Journal of Environmental Management, 32, 281-294.

Comparison Tables re TORA variables

Table 12: Comparative means of whole sample, size of holding and access to irrigation (Significant differences indicated by M-W U test)

	Whole sample	≤ 1.61 ha	> 1.61 ha		Irrigation oriented	Not irri-oriented	
	Mean	Mean	Mean		Mean	Mean	
n	**61**	**29**	**32**	**MW Sig.**	**44**	**17**	**MW Sig.**
Main TORA variables							
Current behavioural index (-3 to +3)	0.90	0.66	1.13		1.09	0.41	
Intention to apply BCA to seedbeds (-2 to +2)	1.90	1.86	1.94		**1.95**	**1.76**	**0.027**
Intention to apply BCA to fields (-2 to +2)	1.75	1.62	1.88		**1.80**	**1.65**	**0.044**
Intention to apply a chemical (-2 to +2)	-1.00	-1.07	-0.94		-1.09	-0.76	
Stated attitude - applying BCA to seedbeds (-2 to +2)	1.28	1.28	1.28		1.36	1.06	
Stated attitude - applying BCA to fields (-2 to +2)	1.62	1.52	1.72		**1.70**	**1.41**	**0.018**
Stated attitude - applying chemical to seedbeds or fields (-2 to +2)	-0.31	**-0.62**	**-0.03**	**0.035**	-0.32	-0.29	
Ca - Calculated attitude (-84 to +84)	40.17	36.82	43.30		**42.90**	**33.00**	**0.019**
Stated subjective norm - applying BCA to control nematodes (-2 to +2)	1.33	1.24	1.41		1.39	1.18	
Stated subjective norm - applying chemical to control nematodes (-2 to +2)	-0.62	-0.41	-0.81		-0.64	-0.59	
CSN - Calculated subjective norm (-32 to + 32)	18.02	19.38	16.78		18.14	17.71	
Perception of risk - product factor (-4 to +4)	-1.16	**-0.76**	**-1.53**	**0.017**	-1.25	-0.94	
Perception of risk - sum factor (-2 to +2)	0.34	0.22	0.44		**0.48**	**-0.03**	**0.004**
Perceived control (-4 to +4)	2.11	2.38	1.88		2.07	2.24	

Table 13: Comparative means of whole sample, size of holding and access to irrigation (Significant differences indicated by M-W U test)

Outcome attitude (b*e)	Whole sample	≤ 1.61 ha	> 1.61 ha		Irrigation oriented	Not irri-oriented	
	Mean	Mean	Mean		Mean	Mean	
n	**61**	**29**	**32**	**MW Sig.**	**44**	**17**	**MW Sig.**
CA35 - The use of BCA on the farm will lead to improved yields (-4 to +4)	**3.02**	**2.59**	**3.41**	**0.008**	3.16	2.65	
CA36 - BCA will cost too much	0.41	0.31	0.50		0.41	0.41	
CA37 - BCA application will increase the amount of marketable fruit (improved quality)	3.21	2.93	3.47		**3.55**	**2.35**	**0.001**
CA38 - BCA application will reduce the general level of disease in the treated crops	2.57	2.83	2.34		2.45	2.88	
CA39 - BCA application will reduce the wasted costs of irrigating and treating worm infested crops	2.33	2.24	2.41		2.32	2.35	
CA40 - Increased profit resulting from the use of BCA in the seedbed only	2.41	2.28	2.53		2.64	1.82	
CA41 - Will be able to continue cropping currently worm infested fields if BCA is applied	2.72	2.83	2.63		**2.93**	**2.18**	**0.058**
CA42 - The BCA will be washed away by furrow irrigation	-0.66	-0.72	-0.59		-0.55	-0.94	
CA43 - BCA will not be washed out of the soil by overhead irrigation	2.38	2.41	2.34		2.30	2.59	
CA44 - BCA is a non toxic substance that compliments an organic farming system	3.62	3.52	3.72		3.66	3.53	
CA45 - The correct application of BCA will be very difficult to achieve	0.26	0.17	0.34		0.20	0.41	
CA46 - If BCA is applied to the seedbed only it will result in lower labour costs	2.39	**1.93**	**2.81**	**0.055**	**2.68**	**1.65**	**0.031**
CA47- If BCA is applied to the seedbed you will get more vigorous seedling growth	3.38	**3.07**	**3.66**	**0.034**	**3.55**	**2.94**	**0.056**
CA48 - If BCA is applied in the seedbed it will also protect seedlings after transplanting	2.25	1.97	2.50		2.32	2.06	
CA49 - Seedbed application only of BCA will provide an effective control of nematodes	1.74	**0.97**	**2.44**	**0.004**	**2.30**	**0.29**	**0.001**
CA50 - BCA is a product that will not be commercially accessible for the smaller/poorer farmer	-0.05	0.00	-0.09		-0.16	0.24	
CA51 - Applying BCA to fields will give greater protection to 'transplanted' crop than seedbed only appl.	2.9	2.72	3.06		3.00	2.65	
CA52 - Once applied the influence of the BCA will last for several seasons	2.53	2.34	2.71		2.72	2.06	
CA53 - Applying BCA to the field will provide protection to directly sown crops such as French beans	3.45	3.48	3.42		**3.60**	**3.06**	**0.045**
CA54 - Increased profit resulting from the application of BCA to the field only	2.35	1.90	2.77		**3.00**	**0.71**	**0.000**
CA55 - Need method of transplanting to insure that the BCA applied to seedbed will be transferred to field	-3.0	-3.07	-2.94		-3.05	-2.88	

Table 14: Comparative means of whole sample, size of holding and access to irrigation (Significant differences indicated by M-W U test)

	Whole sample	≤ 1.61 ha	> 1.61 ha		Irrigation oriented	Not irri-oriented	
	Mean	Mean	Mean		Mean	Mean	
n	**61**	**29**	**32**	**MW Sig.**	**44**	**17**	**MW Sig.**
Subjective norm (m*sb)							
CSN57a - Ministry of Agriculture extension officers (-4 to +4)	1.15	**1.79**	**0.56**	**0.004**	**0.89**	**1.82**	**0.024**
CSN57b - Stockists of agricultural chemicals	0.89	1.28	0.53		0.75	1.24	
CSN57c - Other farmers	3.23	3.17	3.28		**3.43**	**2.71**	**0.056**
CSN57d - Local radio	1.67	1.86	1.50		1.80	1.35	
CSN57e - Agricultural research organisations	3.85	3.90	3.81		3.86	3.82	
CSN57f - Manufacturer of agro chemicals	1.20	1.34	1.06		1.18	1.24	
CSN57g - Seminars and workshops	3.08	3.03	3.13		3.25	2.65	
CSN57h - Publications and promotional posters	2.95	3.00	2.91		2.98	2.88	
CSN57i - Own experience/knowledge	3.62	3.72	3.53		3.70	3.41	

Table 15: Comparative means of whole sample, type of irrigation and farming system (organic vs. not organic) (Significant differences indicated by M-W U test)

	Whole sample	Furrow irrigated	Overhead irrigated		Organic	Not organic	
	Mean	Mean	Mean		Mean	Mean	
n	**61**	**33**	**20**	**MW Sig.**	**13**	**48**	**MW Sig.**
Main TORA variables							
Current behavioural index (-3 to +3)	0.90	**1.48**	**0.10**	**0.006**	**-0.85**	**1.38**	**0.000**
Intention to apply BCA to seedbeds (-2 to +2)	1.90	1.94	1.85		1.92	1.90	
Intention to apply BCA to fields (-2 to +2)	1.75	**1.94**	**1.45**	**0.006**	1.77	1.75	
Intention to apply a chemical (-2 to +2)	-1.00	-0.91	-1.10		**-1.54**	**-0.85**	**0.004**
Stated attitude - applying BCA to seedbeds (-2 to +2)	1.28	1.27	1.40		1.00	1.35	
Stated attitude - applying BCA to fields (-2 to +2)	1.62	**1.79**	**1.40**	**0.026**	1.46	1.67	
Stated attitude - applying chemical to seedbeds or fields (-2 to +2)	-0.31	-0.09	-0.60		**-1.23**	**-0.06**	**0.001**
CA - Calculated attitude (-84 to +84)	40.17	**45.68**	**32.60**	**0.001**	**27.75**	**43.41**	**0.000**
Stated subjective norm - applying BCA to control nematodes (-2 to +2)	1.33	**1.18**	**1.65**	**0.026**	1.54	1.27	
Stated subjective norm - applying chemical to control nematodes (-2 to +2)	-0.62	-0.73	-0.45		-0.69	-0.60	
CSN - Calculated subjective norm (-32 to + 32)	18.02	**16.06**	**21.25**	**0.009**	**24.23**	**16.33**	**0.000**
Perception of risk - product factor (-4 to +4)	-1.16	**-1.52**	**-0.45**	**0.003**	**0.31**	**-1.56**	**0.000**
Perception of risk - sum factor (-2 to +2)	0.34	0.45	0.23		0.35	0.33	
Perceived control (-4 to +4)	2.11	1.91	2.60		2.38	2.04	

Table 16: Comparative means of whole sample, type of irrigation and farming system (organic vs. not organic) (Significant differences indicated by M-W U test)

	Whole sample	Furrow irrigated	Overhead irrigated		Organic	Not organic	
	Mean	Mean	Mean		Mean	Mean	
n	**61**	**33**	**20**	**MW Sig.**	**13**	**48**	**MW Sig.**
Outcome attitude (b*e)							
CA35 - The use of BCA on the farm will lead to improved yields (-4 to +4)	3.02	**3.52**	**2.35**	**0.000**	2.62	3.13	
CA36 - BCA will cost too much	0.41	0.42	0.20		**-0.08**	**0.54**	**0.034**
CA37 - BCA application will increase the amount of marketable fruit (improved quality)	3.21	3.55	2.95	0.05	**2.69**	**3.35**	**0.032**
CA38 - BCA application will reduce the general level of disease in the treated crops	2.57	2.58	2.45		2.54	2.58	
CA39 - BCA application will reduce the wasted costs of irrigating and treating worm infested crops	2.33	2.58	1.95		**1.54**	**2.54**	**0.037**
CA40 - Increased profit resulting from the use of BCA in the seedbed only	2.41	**2.85**	**1.90**	**0.03**	**1.54**	**2.65**	**0.032**
CA41 - Will be able to continue cropping currently worm infested fields if BCA is applied	2.72	3.09	2.35		2.23	2.85	
CA42 - The BCA will be washed away by furrow irrigation	-0.66	-0.36	-0.75		-0.92	-0.58	
CA43 - BCA will not be washed out of the soil by overhead irrigation	2.38	2.45	2.10		1.69	2.56	
CA44 - BCA is a non toxic substance that compliments an organic farming system	3.62	3.73	3.45		3.85	3.56	
CA45 - The correct application of BCA will be very difficult to achieve	0.26	**0.67**	**-0.30**	**0.028**	**-1.00**	**0.60**	**0.026**
CA46 - If BCA is applied to the seedbed only it will result in lower labour costs	2.39	**2.85**	**1.75**	**0.029**	**1.31**	**2.69**	**0.008**
CA47- If BCA is applied to the seedbed you will get more vigorous seedling growth	3.38	3.61	3.05		3.08	3.46	
CA48 - If BCA is applied in the seedbed it will also protect seedlings after transplanting	2.25	2.27	2.00		2.23	2.25	
CA49 - Seedbed application only of BCA will provide an effective control of nematodes	1.74	**2.61**	**0.60**	**0.000**	**0.23**	**2.15**	**0.002**
CA50 - BCA is a product that will not be commercially accessible for the smaller/poorer farmer	-0.05	-0.39	0.50		0.08	-0.08	
CA51 - Applying BCA to fields will give greater protection to 'transplanted' crop than seedbed only appl.	2.9	**3.52**	**1.90**	**0.001**	**1.23**	**3.35**	**0.000**
CA52 - Once applied the influence of the BCA will last for several seasons	2.53	**3.00**	**1.65**	**0.001**	**1.85**	**2.72**	**0.041**
CA53 - Applying BCA to the field will provide protection to directly sown crops such as French beans	3.45	3.47	3.40		3.23	3.51	
CA54 - Increased profit resulting from the application of BCA to the field only	2.35	2.75	2.05		1.31	2.64	
CA55 - Need method of transplanting to insure that the BCA applied to seedbed will be transferred to field	-3	-3.06	-2.95		-3.08	-2.98	

Table 17: Comparative means of whole sample, type of irrigation and farming system (organic vs. not organic) (Significant differences indicated by M-W U test)

	Whole sample	Furrow irrigated	Overhead irrigated		Organic	Not organic	
	Mean	Mean	Mean		Mean	Mean	
n	**61**	**33**	**20**	**MW Sig.**	**13**	**48**	**MW Sig.**
Subjective norm (m*sb)							
CSN57a - Ministry of Agriculture extension officers (-4 to +4)	1.15	**0.27**	**2.25**	**0.000**	**2.77**	**0.71**	**0.000**
CSN57b - Stockists of agricultural chemicals	0.89	**0.33**	**1.60**	**0.011**	**2.38**	**0.48**	**0.001**
CSN57c - Other farmers	3.23	3.39	3.25		3.62	3.13	
CSN57d - Local radio	1.67	1.52	1.90		**2.62**	**1.42**	**0.030**
CSN57e - Agricultural research organisations	3.85	3.94	3.80		3.85	3.85	
CSN57f - Manufacturer of agro chemicals	1.20	**0.70**	**2.00**	**0.000**	1.85	1.02	
CSN57g - Seminars and workshops	3.08	3.30	3.10		3.31	3.02	
CSN57h - Publications and promotional posters	2.95	2.61	3.35		**3.85**	**2.71**	**0.014**
CSN57i - Own experience/knowledge	3.62	3.64	3.70		3.85	3.56	

Table 18: Comparative means of whole sample, risk from nematode and farm income from tomato (low vs. high) (Significant differences indicated by M-W U test)

	Whole sample	Not serious	Serious		Low income	High income	
	Mean	Mean	Mean		Mean	Mean	
n	**61**	**8**	**53**	**MW Sig.**	**30**	**31**	**MW Sig.**
Main TORA variables							
Current behavioural index (-3 to +3)	0.90	0.50	0.96		0.80	1.00	
Intention to apply BCA to seedbeds (-2 to +2)	1.90	**1.63**	**1.94**	**0.005**	1.87	1.94	
Intention to apply BCA to fields (-2 to +2)	1.75	**1.50**	**1.79**	**0.018**	1.60	1.90	
Intention to apply a chemical (-2 to +2)	-1.00	-0.88	-1.02		-1.07	-0.94	
Stated attitude - applying BCA to seedbeds (-2 to +2)	1.28	1.13	1.30		1.17	1.39	
Stated attitude - applying BCA to fields (-2 to +2)	1.62	1.38	1.66		**1.47**	**1.77**	**0.044**
Stated attitude - applying chemical to seedbeds or fields (-2 to +2)	-0.31	0.13	-0.38		-0.47	-0.16	
CA - Calculated attitude (-84 to +84)	40.17	**28.38**	**42.06**	**0.034**	**36.10**	**44.24**	**0.020**
Stated subjective norm - applying BCA to control nematodes (-2 to +2)	1.33	1.38	1.32		1.33	1.32	
Stated subjective norm - applying chemical to control nematodes (-2 to +2)	-0.62	-0.63	-0.62		-0.57	-0.68	
CSN - Calculated subjective norm (-32 to + 32)	18.02	14.25	18.58		19.23	16.84	
Perception of risk - product factor (-4 to +4)	-1.16	**-0.13**	**-1.32**	**0.006**	**-0.83**	**-1.48**	**0.033**
Perception of risk - sum factor (-2 to +2)	0.34	**-0.38**	**0.44**	**0.001**	0.27	0.40	
Perceived control (-4 to +4)	2.11	1.63	2.19		2.13	2.10	

Table 19: Comparative means of whole sample, risk from nematode and farm income from tomato (low vs. high) (Significant differences indicated by M-W U test)

	Whole sample	Not serious	Serious		Low income	High income	
	Mean	Mean	Mean		Mean	Mean	
n	**61**	**8**	**53**	**MW Sig.**	**30**	**31**	**MW Sig.**
Outcome attitude (b*e)							
CA35 - The use of BCA on the farm will lead to improved yields (-4 to +4)	3.02	2.38	3.11		**2.60**	**3.42**	**0.008**
CA36 - BCA will cost too much	0.41	0.50	0.40		0.53	0.29	
CA37 - BCA application will increase the amount of marketable fruit (improved quality)	3.21	**1.38**	**3.49**	**0.001**	**2.87**	**3.55**	**0.039**
CA38 - BCA application will reduce the general level of disease in the treated crops	2.57	2.75	2.55		2.40	2.74	
CA39 - BCA application will reduce the wasted costs of irrigating and treating worm infested crops	2.33	2.38	2.32		**1.87**	**2.77**	**0.010**
CA40 - Increased profit resulting from the use of BCA in the seedbed only	2.41	**0.50**	**2.70**	**0.001**	**1.93**	**2.87**	**0.020**
CA41 - Will be able to continue cropping currently worm infested fields if BCA is applied	2.72	2.13	2.81		2.47	2.97	
CA42 - The BCA will be washed away by furrow irrigation	-0.66	0.00	-0.75		-0.87	-0.45	
CA43 - BCA will not be washed out of the soil by overhead irrigation	2.38	2.25	2.40		2.13	2.61	
CA44 - BCA is a non toxic substance that compliments an organic farming system	3.62	3.25	3.68		3.60	3.65	
CA45 - The correct application of BCA will be very difficult to achieve	0.26	0.50	0.23		0.07	0.45	
CA46 - If BCA is applied to the seedbed only it will result in lower labour costs	2.39	**0.63**	**2.66**	**0.002**	**1.80**	**2.97**	**0.013**
CA47- If BCA is applied to the seedbed you will get more vigorous seedling growth	3.38	2.88	3.46		3.17	3.58	
CA48 - If BCA is applied in the seedbed it will also protect seedlings after transplanting	2.25	**1.25**	**2.40**	**0.052**	2.13	2.35	
CA49 - Seedbed application only of BCA will provide an effective control of nematodes	1.74	**0.13**	**1.98**	**0.014**	**1.17**	**2.29**	**0.022**
CA50 - BCA is a product that will not be commercially accessible for the smaller/poorer farmer	-0.05	1.00	-0.21		0.30	-0.39	
CA51 - Applying BCA to fields will give greater protection to 'transplanted' crop than seedbed only appl.	2.9	2.50	2.96		2.60	3.19	
CA52 - Once applied the influence of the BCA will last for several seasons	2.53	1.88	2.63		2.43	2.63	
CA53 - Applying BCA to the field will provide protection to directly sown crops such as French beans	3.45	**2.38**	**3.62**	**0.002**	3.47	3.43	
CA54 - Increased profit resulting from the application of BCA to the field only	2.35	**0.25**	**2.67**	**0.001**	2.13	2.57	
CA55 - Need method of transplanting to insure that the BCA applied to seedbed will be transferred to field	-3.0	-2.50	-3.08		-2.80	-3.19	

Table 20: Comparative means of whole sample, risk from nematode and farm income from tomato (low vs. high) (Significant differences indicated by M-W U test)

	Whole sample	Not serious	Serious		Low income	High income	
	Mean	Mean	Mean		Mean	Mean	
n	**61**	**8**	**53**	**MW Sig.**	**30**	**31**	**MW Sig.**
Subjective norm (m*sb)							
CSN57a - Ministry of Agriculture extension officers (-4 to +4)	1.15	1.13	1.15		**1.67**	**0.65**	**0.030**
CSN57b - Stockists of agricultural chemicals	0.89	1.13	0.85		**1.47**	**0.32**	**0.010**
CSN57c - Other farmers	3.23	2.63	3.32		**2.83**	**3.61**	**0.019**
CSN57d - Local radio	1.67	**0.50**	**1.85**	**0.010**	1.90	1.45	
CSN57e - Agricultural research organisations	3.85	3.63	3.89		3.77	3.94	
CSN57f - Manufacturer of agro chemicals	1.20	0.88	1.25		1.50	0.90	
CSN57g - Seminars and workshops	3.08	**2.13**	**3.23**	**0.035**	2.77	3.39	
CSN57h - Publications and promotional posters	2.95	2.25	3.06		3.33	2.58	
CSN57i - Own experience/knowledge	3.62	3.13	3.70		3.60	3.65	

Table 21: Comparative means of whole sample, farm income (high vs. low) and perception of risk from nematode (Significant differences indicated by M-W U test)

	Whole sample	Farm inc - high	Farm inc - low		High risk	Low risk	
	Mean	Mean	Mean		Mean	Mean	
n	**61**	**37**	**24**	**MW Sig.**	**52**	**9**	**MW Sig.**
Main TORA variables							
Current behavioural index (-3 to +3)	0.90	0.68	1.25		1.04	0.11	
Intention to apply BCA to seedbeds (-2 to +2)	1.90	1.86	1.96		1.92	1.78	
Intention to apply BCA to fields (-2 to +2)	1.75	1.68	1.88		1.75	1.78	
Intention to apply a chemical (-2 to +2)	-1.00	-1.05	-0.92		-0.98	-1.11	
Stated attitude - applying BCA to seedbeds (-2 to +2)	1.28	1.24	1.33		1.27	1.33	
Stated attitude - applying BCA to fields (-2 to +2)	1.62	1.57	1.71		1.62	1.67	
Stated attitude - applying chemical to seedbeds or fields (-2 to +2)	-0.31	**-0.51**	**0.00**	**0.059**	-0.33	-0.22	
CA - Calculated attitude (-84 to +84)	40.17	37.51	44.22		40.88	36.33	
Stated subjective norm - applying BCA to control nematodes (-2 to +2)	1.33	1.41	1.21		1.27	1.67	
Stated subjective norm - applying chemical to control nematodes (-2 to +2)	-0.62	-0.54	-0.75		-0.60	-0.78	
CSN - Calculated subjective norm (-32 to + 32)	18.02	**19.16**	**16.25**	**0.052**	18.02	18.00	
Perception of risk - product factor (-4 to +4)	-1.16	**-0.81**	**-1.71**	**0.049**	**-1.40**	**0.22**	**0.000**
Perception of risk - sum factor (-2 to +2)	0.34	0.34	0.33		**0.49**	**-0.56**	**0.000**
Perceived control (-4 to +4)	2.11	**2.49**	**1.54**	**0.003**	2.17	1.78	

Table 22: Comparative means of whole sample, farm income (high vs. low) and risk from nematode (Significant differences indicated by M-W U test)

	Whole sample	Farm inc - high	Farm inc - low		High risk	Low risk	
	Mean	Mean	Mean		Mean	Mean	
n	**61**	**37**	**24**	**MW Sig.**	**52**	**9**	**MW Sig.**
Outcome attitude (b*e)							
CA35 - The use of BCA on the farm will lead to improved yields (-4 to +4)	3.02	2.86	3.25		3.02	3.00	
CA36 - BCA will cost too much	0.41	**0.08**	**0.92**	**0.010**	0.40	0.44	
CA37 - BCA application will increase the amount of marketable fruit (improved quality)	3.21	3.14	3.33		3.37	2.33	
CA38 - BCA application will reduce the general level of disease in the treated crops	2.57	2.70	2.38		**2.40**	**3.56**	**0.016**
CA39 - BCA application will reduce the wasted costs of irrigating and treating worm infested crops	2.33	2.24	2.46		2.25	2.78	
CA40 - Increased profit resulting from the use of BCA in the seedbed only	2.41	2.43	2.38		2.58	1.44	
CA41 - Will be able to continue cropping currently worm infested fields if BCA is applied	2.72	2.84	2.54		2.71	2.78	
CA42 - The BCA will be washed away by furrow irrigation	-0.66	**-0.95**	**-0.21**	**0.047**	-0.62	-0.89	
CA43 - BCA will not be washed out of the soil by overhead irrigation	2.38	2.49	2.21		2.25	3.11	
CA44 - BCA is a non toxic substance that compliments an organic farming system	3.62	**3.38**	**4.00**	**0.016**	3.56	4.00	
CA45 - The correct application of BCA will be very difficult to achieve	0.26	0.14	0.46		0.29	0.11	
CA46 - If BCA is applied to the seedbed only it will result in lower labour costs	2.39	2.32	2.50		2.56	1.44	
CA47- If BCA is applied to the seedbed you will get more vigorous seedling growth	3.38	**3.14**	**3.75**	**0.033**	3.37	3.44	
CA48 - If BCA is applied in the seedbed it will also protect seedlings after transplanting	2.25	2.19	2.33		2.29	2.00	
CA49 - Seedbed application only of BCA will provide an effective control of nematodes	1.74	**1.11**	**2.71**	**0.002**	1.90	0.78	
CA50 - BCA is a product that will not be commercially accessible for the smaller/poorer farmer	-0.05	-0.05	-0.04		**-0.29**	**1.33**	**0.036**
CA51 - Applying BCA to fields will give greater protection to 'transplanted' crop than seedbed only appl.	2.9	2.81	3.04		2.96	2.56	
CA52 - Once applied the influence of the BCA will last for several seasons	2.53	2.27	2.96		2.67	1.78	
CA53 - Applying BCA to the field will provide protection to directly sown crops such as French beans	3.45	3.43	3.48		3.55	2.89	
CA54 - Increased profit resulting from the application of BCA to the field only	2.35	2.08	2.75		**2.65**	**0.67**	**0.007**
CA55 - Need method of transplanting to insure that the BCA applied to seedbed will be transferred to field	-3	-3.03	-2.96		-2.96	-3.22	

Table 23: Comparative means of whole sample, farm income (high vs. low) and risk from nematode (Significant differences indicated by M-W U test)

	Whole sample	Farm inc - high	Farm inc - low		High risk	Low risk	
	Mean	Mean	Mean		Mean	Mean	
n	**61**	**37**	**24**	**MW Sig.**	**52**	**9**	**MW Sig.**
Subjective norm (m*sb)							
CSN57a - Ministry of Agriculture extension officers (-4 to +4)	1.15	**1.70**	**0.29**	**0.001**	1.08	1.56	
CSN57b - Stockists of agricultural chemicals	0.89	**1.30**	**0.25**	**0.025**	0.85	1.11	
CSN57c - Other farmers	3.23	3.11	3.42		3.29	2.89	
CSN57d - Local radio	1.67	1.70	1.63		1.77	1.11	
CSN57e - Agricultural research organisations	3.85	3.92	3.75		3.83	4.00	
CSN57f - Manufacturer of agro chemicals	1.20	1.41	0.88		1.25	0.89	
CSN57g - Seminars and workshops	3.08	3.08	3.08		3.10	3.00	
CSN57h - Publications and promotional posters	2.95	2.95	2.96		2.87	3.44	
CSN57i - Own experience/knowledge	3.62	3.68	3.54		3.63	3.56	

Table 24: Comparative means of whole sample, ability to manage risk and gender of respondent (Significant differences indicated by M-W U test)

	Whole sample	Manage risk	Not manage risk		Male	Female	
	Mean	Mean	Mean		Mean	Mean	
n	**61**	**9**	**52**	**MW Sig.**	**45**	**16**	**MW Sig.**
Main TORA variables							
Current behavioural index (-3 to +3)	0.90	**-0.33**	**1.12**	**0.013**	0.82	1.13	
Intention to apply BCA to seedbeds (-2 to +2)	1.90	2.00	1.88		1.89	1.94	
Intention to apply BCA to fields (-2 to +2)	1.75	1.78	1.75		1.80	1.63	
Intention to apply a chemical (-2 to +2)	-1.00	**-1.44**	**-0.92**	**0.040**	-1.07	-0.81	
Stated attitude - applying BCA to seedbeds (-2 to +2)	1.28	1.11	1.31		1.29	1.25	
Stated attitude - applying BCA to fields (-2 to +2)	1.62	1.78	1.60		1.60	1.69	
Stated attitude - applying chemical to seedbeds or fields (-2 to +2)	-0.31	**-1.11**	**-0.17**	**0.012**	-0.33	-0.25	
CA - Calculated attitude (-84 to +84)	40.17	34.22	41.27		39.95	40.80	
Stated subjective norm - applying BCA to control nematodes (-2 to +2)	1.33	1.56	1.29		1.27	1.50	
Stated subjective norm - applying chemical to control nematodes (-2 to +2)	-0.62	-0.78	-0.60		-0.64	-0.56	
CSN - Calculated subjective norm (-32 to + 32)	18.02	**23.22**	**17.12**	**0.026**	17.78	18.69	
Perception of risk - product factor (-4 to +4)	-1.16	**1.44**	**-1.62**	**0.000**	-1.11	-1.31	
Perception of risk - sum factor (-2 to +2)	0.34	**1.17**	**0.19**	**0.000**	0.27	0.53	
Perceived control (-4 to +4)	2.11	2.11	2.12		2.07	2.25	

Table 25: Comparative means of whole sample, ability to manage risk and gender of respondent (Significant differences indicated by M-W U test)

	Whole sample	Manage risk	Not manage risk		Male	Female	
	Mean	Mean	Mean		Mean	Mean	**MW Sig.**
n	**61**	**9**	**52**	**MW Sig.**	**45**	**16**	
Outcome attitude (b*e)							
CA35 - The use of BCA on the farm will lead to improved yields (-4 to +4)	3.02	2.89	3.04		3.11	2.75	
CA36 - BCA will cost too much	0.41	0.44	0.40		0.27	0.81	
CA37 - BCA application will increase the amount of marketable fruit (improved quality)	3.21	3.00	3.25		3.09	3.56	
CA38 - BCA application will reduce the general level of disease in the treated crops	2.57	2.00	2.67		**2.78**	**2.00**	**0.054**
CA39 - BCA application will reduce the wasted costs of irrigating and treating worm infested crops	2.33	2.00	2.38		2.36	2.25	
CA40 - Increased profit resulting from the use of BCA in the seedbed only	2.41	2.00	2.48		2.36	2.56	
CA41 - Will be able to continue cropping currently worm infested fields if BCA is applied	2.72	3.11	2.65		2.58	3.13	
CA42 - The BCA will be washed away by furrow irrigation	-0.66	-0.89	-0.62		-0.69	-0.56	
CA43 - BCA will not be washed out of the soil by overhead irrigation	2.38	2.22	2.40		2.56	1.88	
CA44 - BCA is a non toxic substance that compliments an organic farming system	3.62	3.78	3.60		3.69	3.44	
CA45 - The correct application of BCA will be very difficult to achieve	0.26	**-2.33**	**0.71**	**0.001**	0.29	0.19	
CA46 - If BCA is applied to the seedbed only it will result in lower labour costs	2.39	2.11	2.44		2.58	1.88	
CA47- If BCA is applied to the seedbed you will get more vigorous seedling growth	3.38	3.22	3.41		3.43	3.25	
CA48 - If BCA is applied in the seedbed it will also protect seedlings after transplanting	2.25	2.67	2.17		2.33	2.00	
CA49 - Seedbed application only of BCA will provide an effective control of nematodes	1.74	1.78	1.73		1.69	1.88	
CA50 - BCA is a product that will not be commercially accessible for the smaller/poorer farmer	-0.05	-0.44	0.02		-0.18	0.31	
CA51 - Applying BCA to fields will give greater protection to 'transplanted' crop than seedbed only appl.	2.9	2.89	2.90		2.87	3.00	
CA52 - Once applied the influence of the BCA will last for several seasons	2.53	2.22	2.59		2.42	2.87	
CA53 - Applying BCA to the field will provide protection to directly sown crops such as French beans	3.45	3.44	3.45		3.38	3.67	
CA54 - Increased profit resulting from the application of BCA to the field only	2.35	1.56	2.49		**2.09**	**3.06**	**0.049**
CA55 - Need method of transplanting to insure that the BCA applied to seedbed will be transferred to field	-3	-3.44	-2.92		-3.04	-2.88	

Table 26: Comparative means of whole sample, ability to manage risk and gender of respondent (Significant differences indicated by M-W U test)

	Whole sample	Manage risk	Not manage risk		Male	Female	
	Mean	Mean	Mean		Mean	Mean	
n	**61**	**9**	**52**	**MW Sig.**	**45**	**16**	**MW Sig.**
Subjective norm (m*sb)							
CSN57a - Ministry of Agriculture extension officers (-4 to +4)	1.15	2.00	1.00		1.13	1.19	
CSN57b - Stockists of agricultural chemicals	0.89	**2.56**	**0.60**	**0.004**	0.96	0.69	
CSN57c - Other farmers	3.23	3.11	3.25		3.20	3.31	
CSN57d - Local radio	1.67	**2.56**	**1.52**	**0.053**	**1.47**	**2.25**	**0.050**
CSN57e - Agricultural research organisations	3.85	4.00	3.83		3.89	3.75	
CSN57f - Manufacturer of agro chemicals	1.20	**2.67**	**0.94**	**0.008**	1.16	1.31	
CSN57g - Seminars and workshops	3.08	2.89	3.12		3.04	3.19	
CSN57h - Publications and promotional posters	2.95	3.44	2.87		2.93	3.00	
CSN57i - Own experience/knowledge	3.62	3.78	3.60		3.60	3.69	

Table 27: Comparative means of whole sample, respondent's age and educational status (Significant differences indicated by M-W U test)

	Whole sample	< 50 years	50 & above		Pri/Sec	Tec/Uni	
	Mean	Mean	Mean		Mean	Mean	
n	**61**	**30**	**31**	**MW Sig.**	**51**	**10**	**MW Sig.**
Main TORA variables							
Current behavioural index (-3 to +3)	0.90	**1.53**	**0.29**	**0.006**	0.96	0.60	
Intention to apply BCA to seedbeds (-2 to +2)	1.90	1.93	1.87		1.90	1.90	
Intention to apply BCA to fields (-2 to +2)	1.75	**1.87**	**1.65**	**0.030**	1.73	1.90	
Intention to apply a chemical (-2 to +2)	-1.00	-0.93	-1.06		-0.94	-1.30	
Stated attitude - applying BCA to seedbeds (-2 to +2)	1.28	1.33	1.23		1.25	1.40	
Stated attitude - applying BCA to fields (-2 to +2)	1.62	**1.80**	**1.45**	**0.001**	1.67	1.40	0.077
Stated attitude - applying chemical to seedbeds or fields (-2 to +2)	-0.31	-0.13	-0.48		-0.24	-0.70	
Ca - Calculated attitude (-84 to +84)	40.17	**43.93**	**36.67**	**0.032**	41.61	32.33	0.080
Stated subjective norm - applying BCA to control nematodes (-2 to +2)	1.33	1.33	1.32		1.31	1.40	
Stated subjective norm - applying chemical to control nematodes (-2 to +2)	-0.62	-0.67	-0.58		-0.61	-0.70	
CSN - Calculated subjective norm (-32 to + 32)	18.02	**16.47**	**19.52**	**0.040**	18.18	17.20	
Perception of risk - product factor (-4 to +4)	-1.16	-1.20	-1.13		-1.29	-0.50	
Perception of risk - sum factor (-2 to +2)	0.34	0.45	0.23		0.34	0.30	
Perceived control (-4 to +4)	2.11	2.10	2.13		2.06	2.40	

Table 28: Comparative means of whole sample, respondent's age and educational status (Significant differences indicated by M-W U test)

	Whole sample	< 50 years	50 & above		Pri/Sec	Tec/Uni	
	Mean	Mean	Mean		Mean	Mean	
n	**61**	**30**	**31**	**MW Sig.**	**51**	**10**	**MW Sig.**
Outcome attitude (b*e)							
CA35 - The use of BCA on the farm will lead to improved yields (-4 to +4)	3.02	**3.40**	**2.65**	**0.015**	3.04	2.90	
CA36 - BCA will cost too much	0.41	0.40	0.42		0.35	0.70	
CA37 - BCA application will increase the amount of marketable fruit (improved quality)	3.21	3.47	2.97		**3.43**	**2.10**	**0.025**
CA38 - BCA application will reduce the general level of disease in the treated crops	2.57	2.27	2.87		2.49	3.00	
CA39 - BCA application will reduce the wasted costs of irrigating and treating worm infested crops	2.33	2.47	2.19		2.31	2.40	
CA40 - Increased profit resulting from the use of BCA in the seedbed only	2.41	2.80	2.03		2.49	2.00	
CA41 - Will be able to continue cropping currently worm infested fields if BCA is applied	2.72	**3.33**	**2.13**	**0.003**	2.75	2.60	
CA42 - The BCA will be washed away by furrow irrigation	-0.66	-0.27	-1.03		**-0.39**	**-2.00**	**0.006**
CA43 - BCA will not be washed out of the soil by overhead irrigation	2.38	2.33	2.42		2.41	2.20	
CA44 - BCA is a non toxic substance that compliments an organic farming system	3.62	3.47	3.77		3.61	3.70	
CA45 - The correct application of BCA will be very difficult to achieve	0.26	0.37	0.16		**0.53**	**-1.10**	**0.059**
CA46 - If BCA is applied to the seedbed only it will result in lower labour costs	2.39	**3.10**	**1.71**	**0.003**	**2.63**	**1.20**	**0.040**
CA47- If BCA is applied to the seedbed you will get more vigorous seedling growth	3.38	3.47	3.30		**3.49**	**2.78**	**0.049**
CA48 - If BCA is applied in the seedbed it will also protect seedlings after transplanting	2.25	1.90	2.58		2.31	1.90	
CA49 - Seedbed application only of BCA will provide an effective control of nematodes	1.74	2.10	1.39		1.94	0.70	
CA50 - BCA is a product that will not be commercially accessible for the smaller/poorer farmer	-0.05	-0.33	0.23		0.02	-0.40	
CA51 - Applying BCA to fields will give greater protection to 'transplanted' crop than seedbed only appl.	2.9	**3.47**	**2.35**	**0.010**	2.86	3.10	
CA52 - Once applied the influence of the BCA will last for several seasons	2.53	2.72	2.35		2.48	2.80	
CA53 - Applying BCA to the field will provide protection to directly sown crops such as French beans	3.45	**3.79**	**3.13**	**0.012**	3.40	3.70	
CA54 - Increased profit resulting from the application of BCA to the field only	2.35	2.62	2.10		**2.68**	**0.70**	**0.004**
CA55 - Need method of transplanting to insure that the BCA applied to seedbed will be transferred to field	-3	-2.83	-3.16		-3.08	-2.60	

Table 29: Comparative means of whole sample, respondent's age and educational status (Significant differences indicated by M-W U test)

	Whole sample	< 50 years	50 & above		Pri/Sec	Tec/Uni	
	Mean	Mean	Mean		Mean	Mean	
n	**61**	**30**	**31**	**MW Sig.**	**51**	**10**	**MW Sig.**
Subjective norm (m*sb)							
CSN57a - Ministry of Agriculture extension officers (-4 to +4)	1.15	**0.53**	**1.74**	**0.004**	1.14	1.20	
CSN57b - Stockists of agricultural chemicals	0.89	**0.33**	**1.42**	**0.004**	0.80	1.30	
CSN57c - Other farmers	3.23	3.23	3.23		3.25	3.10	
CSN57d - Local radio	1.67	1.53	1.81		1.65	1.80	
CSN57e - Agricultural research organisations	3.85	3.93	3.77		3.82	4.00	
CSN57f - Manufacturer of agro chemicals	1.20	0.97	1.42		1.33	0.50	
CSN57g - Seminars and workshops	3.08	3.17	3.00		3.18	2.60	
CSN57h - Publications and promotional posters	2.95	2.77	3.13		3.00	2.70	
CSN57i - Own experience/knowledge	3.62	3.57	3.68		3.63	3.60	

Table 30: Comparative means of whole sample and membership in farmer organisation (Significant differences indicated by M-W U test)

	Whole sample	Farmer org -Yes	Farmer Org - No	
	Mean	Mean	Mean	
n	**61**	**40**	**21**	**MW Sig.**
Main TORA variables				
Current behavioural index (-3 to +3)	0.90	**0.55**	**1.57**	**0.031**
Intention to apply BCA to seedbeds (-2 to +2)	1.90	1.88	1.95	
Intention to apply BCA to fields (-2 to +2)	1.75	**1.65**	**1.95**	**0.051**
Intention to apply a chemical (-2 to +2)	-1.00	**-1.27**	**-0.48**	**0.001**
Stated attitude - applying BCA to seedbeds (-2 to +2)	1.28	1.15	1.52	
Stated attitude - applying BCA to fields (-2 to +2)	1.62	1.53	1.81	
Stated attitude - applying chemical to seedbeds or fields (-2 to +2)	-0.31	**-0.68**	**0.38**	**0.001**
Ca - Calculated attitude (-84 to +84)	40.17	**37.31**	**46.05**	**0.017**
Stated subjective norm - applying BCA to control nematodes (-2 to +2)	1.33	1.30	1.38	
Stated subjective norm - applying chemical to control nematodes (-2 to +2)	-0.62	-0.57	-0.71	
CSN - Calculated subjective norm (-32 to + 32)	18.02	18.77	16.57	
Perception of risk - product factor (-4 to +4)	-1.16	-0.93	-1.62	
Perception of risk - sum factor (-2 to +2)	0.34	0.36	0.29	
Perceived control (-4 to +4)	2.11	2.33	1.71	

Table 31: Comparative means of whole sample and membership in farmer organisation (Significant differences indicated by M-W U test)

	Whole sample	Farmer org -Yes	Farmer Org - No	
	Mean	Mean	Mean	
n	**61**	**40**	**21**	MW Sig.
Outcome attitude (b*e)				
CA35 - The use of BCA on the farm will lead to improved yields (-4 to +4)	3.02	**2.73**	**3.57**	**0.009**
CA36 - BCA will cost too much	0.41	0.23	0.76	
CA37 - BCA application will increase the amount of marketable fruit (improved quality)	3.21	3.18	3.29	
CA38 - BCA application will reduce the general level of disease in the treated crops	2.57	2.58	2.57	
CA39 - BCA application will reduce the wasted costs of irrigating and treating worm infested crops	2.33	2.35	2.29	
CA40 - Increased profit resulting from the use of BCA in the seedbed only	2.41	2.33	2.57	
CA41 - Will be able to continue cropping currently worm infested fields if BCA is applied	2.72	2.58	3.00	
CA42 - The BCA will be washed away by furrow irrigation	-0.66	-0.83	-0.33	
CA43 - BCA will not be washed out of the soil by overhead irrigation	2.38	2.50	2.14	
CA44 - BCA is a non toxic substance that compliments an organic farming system	3.62	3.55	3.76	
CA45 - The correct application of BCA will be very difficult to achieve	0.26	**-0.28**	**1.29**	**0.011**
CA46 - If BCA is applied to the seedbed only it will result in lower labour costs	2.39	**2.08**	**3.00**	**0.038**
CA47- If BCA is applied to the seedbed you will get more vigorous seedling growth	3.38	**3.18**	**3.76**	**0.036**
CA48 - If BCA is applied in the seedbed it will also protect seedlings after transplanting	2.25	2.17	2.38	
CA49 - Seedbed application only of BCA will provide an effective control of nematodes	1.74	1.43	2.33	
CA50 - BCA is a product that will not be commercially accessible for the smaller/poorer farmer	-0.05	-0.18	0.19	
CA51 - Applying BCA to fields will give greater protection to 'transplanted' crop than seedbed only appl.	2.9	2.68	3.33	
CA52 - Once applied the influence of the BCA will last for several seasons	2.53	2.53	2.55	
CA53 - Applying BCA to the field will provide protection to directly sown crops such as French beans	3.45	3.40	3.55	
CA54 - Increased profit resulting from the application of BCA to the field only	2.35	2.17	2.70	
CA55 - Need method of transplanting to insure that the BCA applied to seedbed will be transferred to field	-3	-3.15	-2.71	

Table 32: Comparative means of whole sample and membership in farmer organisation (Significant differences indicated by M-W U test)

	Whole sample	Farmer org -Yes	Farmer Org - No	
	Mean	Mean	Mean	
n	**61**	**40**	**21**	MW Sig.
Subjective norm (m*sb)				
CSN57a - Ministry of Agriculture extension officers (-4 to +4)	1.15	1.43	0.62	
CSN57b - Stockists of agricultural chemicals	0.89	**1.35**	**0.00**	**0.001**
CSN57c - Other farmers	3.23	3.13	3.43	
CSN57d - Local radio	1.67	1.83	1.38	
CSN57e - Agricultural research organisations	3.85	3.78	4.00	
CSN57f - Manufacturer of agro chemicals	1.20	1.38	0.86	
CSN57g - Seminars and workshops	3.08	2.98	3.29	
CSN57h - Publications and promotional posters	2.95	2.93	3.00	
CSN57i - Own experience/knowledge	3.62	3.75	3.38	

Correlation Tables re seedbed application

Table 33: Intention (I) – seedbed vs. behaviour, attitudes and normative component correlations (r_s) for whole sample, size of holding, access and type of irrigation

Main TORA variables	n	Whole sample	≤ 1.61 ha	> 1.61 ha	Irri-oriented	Not irri-oriented	Furrow irrigated	Overhead irrigated
		61	**29**	**32**	**44**	**17**	**33**	**20**
Current behavioural index (-3 to +3)								
Stated attitude - applying BCA to seedbeds (-2 to +2)								
Stated attitude - applying BCA to fields (-2 to +2)		.369(**)		.413(*)	.428(**)		.490(**)	
Stated attitude - applying chemical to seedbeds or fields (-2 to +2)								
Ca - Calculated attitude (-84 to +84)		.465(**)	.532(**)	.386(*)	.332(*)	.564(*)	.411(*)	
Stated subjective norm - applying BCA to control nematodes (-2 to +2)								
Stated subjective norm - applying chemical to control nematodes (-2 to +2)								
CSN - Calculated subjective norm (-32 to + 32)								
Perception of risk - product factor (-4 to +4)								
Perception of risk - sum factor (-4 to +4)		.309(*)			.327(*)			
Perceived control (-4 to +4)			.420(*)					

Table 34: Intention (I) – seedbed vs. OA correlations (r_s) for whole sample, size of holding, access and type of irrigation

	Whole sample	≤ 1.61 ha	> 1.61 ha	Irri-oriented	Not irri-oriented	Furrow irrigated	Overhead irrigated
n	**61**	**29**	**32**	**44**	**17**	**33**	**20**
Outcome attitude (b*e)							
CA35 - The use of BCA on the farm will lead to improved yields (-4 to +4)	.519(**)	.517(**)	.535(**)	.410(**)	.608(**)	.580(**)	.499(*)
CA36 - BCA will cost too much							
CA37 - BCA application will increase the amount of marketable fruit (improved quality)							
CA38 - BCA application will reduce the general level of disease in the treated crops							
CA39 - BCA application will reduce the wasted costs of irrigating and treating worm infested crops					.610(**)		
CA40 - Increased profit resulting from the use of BCA in the seedbed only	.325(*)					.403(*)	
CA41 - Will be able to continue cropping currently worm infested fields if BCA is applied	.365(**)	.397(*)		.336(*)		.432(*)	
CA42 - The BCA will be washed away by furrow irrigation							
CA43 - BCA will not be washed out of the soil by overhead irrigation							
CA44 - BCA is a non toxic substance that compliments an organic farming system	.384(**)		.450(**)		.511(*)	.451(**)	
CA45 - The correct application of BCA will be very difficult to achieve							
CA46 - If BCA is applied to the seedbed only it will result in lower labour costs						.351(*)	
CA47- If BCA is applied to the seedbed you will get more vigorous seedling growth	.618(**)	.617(**)	.632(**)	.459(**)	.786(**)	.577(**)	.596(**)
CA48 - If BCA is applied in the seedbed it will also protect seedlings after transplanting	.342(**)		.374(*)		.513(*)	.344(*)	
CA49 - Seedbed application only of BCA will provide an effective control of nematodes	.325(*)		.363(*)			.378(*)	
CA50 - BCA is a product that will not be commercially accessible for the smaller/poorer farmer							
CA51 - Applying BCA to fields will give greater protection to 'transplanted' crop than seedbed only appl.							
CA52 - Once applied the influence of the BCA will last for several seasons	.400(**)	.503(**)			.574(*)		
CA53 - Applying BCA to the field will provide protection to directly sown crops such as French beans	.475(**)	.449(*)	.536(**)		.628(**)	.556(**)	
CA54 - Increased profit resulting from the application of BCA to the field only	.344(**)			.304(*)			
CA55 - Need method of transplanting to insure that the BCA applied to seedbed will be transferred to field							

Table 35: Intention (I) – seedbed vs. RSN correlations (r_s) for whole sample, size of holding, access to irrigation and type of irrigation

Social referents (sb*m)	n	Whole sample	≤ 1.61 ha	> 1.61 ha	Irri-oriented	Not irri-oriented	Furrow irrigated	Overhead irrigated
		61	**29**	**32**	**44**	**17**	**33**	**20**
CSN57a - Ministry of Agriculture extension officers (-4 to +4)		-.257(*)						
CSN57b - Stockists of agricultural chemicals								
CSN57c - Other farmers		.448(**)	.490(**)	.407(*)	.405(**)	.495(*)	.454(**)	.479(*)
CSN57d - Local radio		.296(*)						
CSN57e - Agricultural research organisations			.472(**)					
CSN57f - Manufacturer of agro chemicals								
CSN57g - Seminars and workshops								
CSN57h - Publications and promotional posters		.271(*)		.436(*)	.326(*)		.382(*)	
CSN57i - Own experience/knowledge								

Table 36: Intention (I) – seedbed vs. behaviour, attitudes and normative component correlations (r_s) for whole sample, farming system, risk from nematode and income from tomato

Main TORA variables	n	Whole sample	Organic	Not organic	Not serious	Serious	Low income	High income
		61	**13**	**48**	**8**	**53**	**30**	**31**
Current behavioural index (-3 to +3)								
Stated attitude - applying BCA to seedbeds (-2 to +2)								
Stated attitude - applying BCA to fields (-2 to +2)		.369(**)		.557(**)				.486(**)
Stated attitude - applying chemical to seedbeds or fields (-2 to +2)								
Ca - Calculated attitude (-84 to +84)		.465(**)		.519(**)	.845(**)	.345(*)	.551(**)	.375(*)
Stated subjective norm - applying BCA to control nematodes (-2 to +2)								
Stated subjective norm - applying chemical to control nematodes (-2 to +2)								
CSN - Calculated subjective norm (-32 to + 32)				.329(*)	.798(*)			
Perception of risk - product factor (-4 to +4)				-.324(*)	.725(*)			
Perception of risk - sum factor (-4 to +4)		.309(*)		.337(*)		.358(**)	.364(*)	
Perceived control (-4 to +4)								

Table 37: Intention (I) – seedbed vs. OA correlations (r_s) for whole sample, farming system, risk from nematode and income from tomato

	Whole sample	Organic	Not organic	Not serious	Serious	Low income	High income
n	**61**	**13**	**48**	**8**	**53**	**30**	**31**
Outcome attitude (b*e)							
CA35 - The use of BCA on the farm will lead to improved yields (-4 to +4)	.519(**)		.580(**)	.894(**)	.383(**)	.484(**)	.557(**)
CA36 - BCA will cost too much							
CA37 - BCA application will increase the amount of marketable fruit (improved quality)			.323(*)				
CA38 - BCA application will reduce the general level of disease in the treated crops			.349(*)	.852(**)			
CA39 - BCA application will reduce the wasted costs of irrigating and treating worm infested crops				.894(**)			
CA40 - Increased profit resulting from the use of BCA in the seedbed only	.325(*)		.434(**)				.421(*)
CA41 - Will be able to continue cropping currently worm infested fields if BCA is applied	.365(**)		.459(**)		.292(*)		.397(*)
CA42 - The BCA will be washed away by furrow irrigation							
CA43 - BCA will not be washed out of the soil by overhead irrigation							
CA44 - BCA is a non toxic substance that compliments an organic farming system	.384(**)		.461(**)	.745(*)		.402(*)	.358(*)
CA45 - The correct application of BCA will be very difficult to achieve							
CA46 - If BCA is applied to the seedbed only it will result in lower labour costs			.302(*)				.390(*)
CA47- If BCA is applied to the seedbed you will get more vigorous seedling growth	.618(**)		.701(**)	1.000(**)	.452(**)	.639(**)	.577(**)
CA48 - If BCA is applied in the seedbed it will also protect seedlings after transplanting	.342(**)		.404(**)	.755(*)			.379(*)
CA49 - Seedbed application only of BCA will provide an effective control of nematodes	.325(*)		.436(**)				
CA50 - BCA is a product that will not be commercially accessible for the smaller/poorer farmer							
CA51 - Applying BCA to fields will give greater protection to 'transplanted' crop than seedbed only appl.							
CA52 - Once applied the influence of the BCA will last for several seasons	.400(**)		.460(**)	.760(*)	.281(*)	.527(**)	
CA53 - Applying BCA to the field will provide protection to directly sown crops such as French beans	.475(**)		.523(**)		.350(*)	.430(*)	.555(**)
CA54 - Increased profit resulting from the application of BCA to the field only	.344(**)		.429(**)		.292(*)		
CA55 - Need method of transplanting to insure that the BCA applied to seedbed will be transferred to field			-.337(*)	-.775(*)			

Table 38: Intention (I) – seedbed vs. RSN correlations (r_s) for whole sample, farming system, risk from nematode and income from tomato

	Whole sample	Organic	Not organic	Not serious	Serious	Low income	High income
Social referents (sb*m) **n**	**61**	**13**	**48**	**8**	**53**	**30**	**31**
CSN57a - Ministry of Agriculture extension officers (-4 to +4)	-.257(*)		-.341(*)	-.716(*)			
CSN57b - Stockists of agricultural chemicals				.720(*)	-.316(*)		
CSN57c - Other farmers	.448(**)		.558(**)	.976(**)		.379(*)	.608(**)
CSN57d - Local radio	.296(*)		.302(*)				
CSN57e - Agricultural research organisations							
CSN57f - Manufacturer of agro chemicals							
CSN57g - Seminars and workshops							
CSN57h - Publications and promotional posters	.271(*)		.326(*)				.389(*)
CSN57I - Own experience/knowledge							

Table 39: Intention (I) – seedbed vs. behaviour, attitudes and normative component correlations (r_s) for whole sample, farm income, perception of risk from nematode and ability to manage risk

Main TORA variables	n	Whole sample	Farm inc - high	Farm inc - low	High risk	Low risk	Manage risk	Not manage risk
		61	**37**	**24**	**52**	**9**	**9**	**52**
Current behavioural index (-3 to +3)							.	
Stated attitude - applying BCA to seedbeds (-2 to +2)							.	
Stated attitude - applying BCA to fields (-2 to +2)		.369(**)	.385(*)		.435(**)		.	.383(**)
Stated attitude - applying chemical to seedbeds or fields (-2 to +2)							.	
Ca - Calculated attitude (-84 to +84)		.465(**)	.543(**)		.441(**)	.725(*)	.	.520(**)
Stated subjective norm - applying BCA to control nematodes (-2 to +2)							.	
Stated subjective norm - applying chemical to control nematodes (-2 to +2)							.	
CSN - Calculated subjective norm (-32 to + 32)			.342(*)		.321(*)		.	
Perception of risk - product factor (-4 to +4)							.	-.369(**)
Perception of risk - sum factor (-4 to +4)		.309(*)			.299(*)		.	.305(*)
Perceived control (-4 to +4)			.420(**)				.	

Table 40: Intention (I) – seedbed vs. OA correlations (r_s) re whole sample, farm income, perception of risk from nematode and ability to manage risk

	Whole sample	Farm inc - high	Farm inc - low	High risk	Low risk	Manage risk	Not manage risk
n	**61**	**37**	**24**	**52**	**9**	**9**	**52**
Outcome attitude (b*e)							
CA35 - The use of BCA on the farm will lead to improved yields (-4 to +4)	.519(**)	.598(**)		.491(**)	.694(*)	.	.559(**)
CA36 - BCA will cost too much						.	
CA37 - BCA application will increase the amount of marketable fruit (improved quality)						.	
CA38 - BCA application will reduce the general level of disease in the treated crops				.277(*)		.	
CA39 - BCA application will reduce the wasted costs of irrigating and treating worm infested crops						.	
CA40 - Increased profit resulting from the use of BCA in the seedbed only	.325(*)	.392(*)		.416(**)		.	.370(**)
CA41 - Will be able to continue cropping currently worm infested fields if BCA is applied	.365(**)	.441(**)		.373(**)		.	.387(**)
CA42 - The BCA will be washed away by furrow irrigation						.	
CA43 - BCA will not be washed out of the soil by overhead irrigation				.283(*)		.	
CA44 - BCA is a non toxic substance that compliments an organic farming system	.384(**)	.412(*)	.	.510(**)	.	.	.406(**)
CA45 - The correct application of BCA will be very difficult to achieve						.	
CA46 - If BCA is applied to the seedbed only it will result in lower labour costs						.	
CA47- If BCA is applied to the seedbed you will get more vigorous seedling growth	.618(**)	.644(**)	.552(**)	.552(**)	.992(**)	.	.695(**)
CA48 - If BCA is applied in the seedbed it will also protect seedlings after transplanting	.342(**)	.377(*)		.333(*)		.	.361(**)
CA49 - Seedbed application only of BCA will provide an effective control of nematodes	.325(*)			.355(**)		.	.347(*)
CA50 - BCA is a product that will not be commercially accessible for the smaller/poorer farmer						.	
CA51 - Applying BCA to fields will give greater protection to 'transplanted' crop than seedbed only appl.						.	
CA52 - Once applied the influence of the BCA will last for several seasons	.400(**)	.469(**)		.348(*)		.	.466(**)
CA53 - Applying BCA to the field will provide protection to directly sown crops such as French beans	.475(**)	.494(**)	.465(*)	.448(**)		.	.521(**)
CA54 - Increased profit resulting from the application of BCA to the field only	.344(**)	.377(*)		.381(**)		.	.402(**)
CA55 - Need method of transplanting to insure that the BCA applied to seedbed will be transferred to field		-.396(*)				.	

Table 41: Intention (I) – seedbed vs. RSN correlations (r_s) for whole sample, farm income, perception of risk from nematode and ability to manage risk

	Whole sample	Farm inc - high	Farm inc - low	High risk	Low risk	Manage risk	Not manage risk
Social referents (sb*m) n	**61**	**37**	**24**	**52**	**9**	**9**	**52**
CSN57a - Ministry of Agriculture extension officers (-4 to +4)	-.257(*)					.	-.322(*)
CSN57b - Stockists of agricultural chemicals						.	
CSN57c - Other farmers	.448(**)	.496(**)		.501(**)		.	.501(**)
CSN57d - Local radio	.296(*)	.350(*)		.274(*)		.	.292(*)
CSN57e - Agricultural research organisations		.422(**)				.	
CSN57f - Manufacturer of agro chemicals						.	
CSN57g - Seminars and workshops				.298(*)		.	
CSN57h - Publications and promotional posters	.271(*)			.439(**)		.	.274(*)
CSN57I - Own experience/knowledge				.300(*)		.	

Table 42: Intention (I) – seedbed vs. behaviour, attitudes and normative component correlations (r_s) for whole sample, gender, age and educational status of respondent

	Whole sample	Male	Female	< 50 years	50 & above	Pri/Sec	Tec/Uni
Main TORA variables **n**	**61**	**45**	**16**	**30**	**31**	**51**	**10**
Current behavioural index (-3 to +3)							
Stated attitude - applying BCA to seedbeds (-2 to +2)							
Stated attitude - applying BCA to fields (-2 to +2)	.369(**)	.366(*)		.706(**)		.396(**)	
Stated attitude - applying chemical to seedbeds or fields (-2 to +2)							
Ca - Calculated attitude (-84 to +84)	.465(**)	.471(**)		.447(*)	.466(**)	.441(**)	
Stated subjective norm - applying BCA to control nematodes (-2 to +2)							
Stated subjective norm - applying chemical to control nematodes (-2 to +2)							
CSN - Calculated subjective norm (-32 to + 32)							
Perception of risk - product factor (-4 to +4)						-.325(*)	
Perception of risk - sum factor (-4 to +4)	.309(*)	.359(*)			.373(*)	.436(**)	
Perceived control (-4 to +4)		.296(*)					

Table 43: Intention (I) – seedbed vs. OA correlations (r_s) for whole sample, gender, age and educational status of respondent

Outcome attitude (b*e)	Whole sample	Male	Female	< 50 years	50 & above	Pri/Sec	Tec/Uni
n	**61**	**45**	**16**	**30**	**31**	**51**	**10**
CA35 - The use of BCA on the farm will lead to improved yields (-4 to +4)	.519(**)	.567(**)		.559(**)	.484(**)	.528(**)	
CA36 - BCA will cost too much							
CA37 - BCA application will increase the amount of marketable fruit (improved quality)			.617(*)				
CA38 - BCA application will reduce the general level of disease in the treated crops				.369(*)			
CA39 - BCA application will reduce the wasted costs of irrigating and treating worm infested crops							
CA40 - Increased profit resulting from the use of BCA in the seedbed only	.325(*)			.433(*)		.311(*)	
CA41 - Will be able to continue cropping currently worm infested fields if BCA is applied	.365(**)	.328(*)		.518(**)		.364(**)	
CA42 - The BCA will be washed away by furrow irrigation							
CA43 - BCA will not be washed out of the soil by overhead irrigation							
CA44 - BCA is a non toxic substance that compliments an organic farming system	.384(**)	.386(**)	.555(*)	.619(**)			1.000(**)
CA45 - The correct application of BCA will be very difficult to achieve							
CA46 - If BCA is applied to the seedbed only it will result in lower labour costs							
CA47- If BCA is applied to the seedbed you will get more vigorous seedling growth	.618(**)	.682(**)		.586(**)	.633(**)	.665(**)	
CA48 - If BCA is applied in the seedbed it will also protect seedlings after transplanting	.342(**)	.355(*)			.428(*)	.325(*)	
CA49 - Seedbed application only of BCA will provide an effective control of nematodes	.325(*)	.340(*)		.394(*)		.343(*)	
CA50 - BCA is a product that will not be commercially accessible for the smaller/poorer farmer							
CA51 - Applying BCA to fields will give greater protection to 'transplanted' crop than seedbed only appl.							
CA52 - Once applied the influence of the BCA will last for several seasons	.400(**)	.411(**)		.408(*)	.374(*)	.385(**)	
CA53 - Applying BCA to the field will provide protection to directly sown crops such as French beans	.475(**)	.406(**)	.732(**)	.463(*)	.450(*)	.396(**)	1.000(**)
CA54 - Increased profit resulting from the application of BCA to the field only	.344(**)			.439(*)		.409(**)	
CA55 - Need method of transplanting to insure that the BCA applied to seedbed will be transferred to field				-.423(*)			

Table 44: Intention (I) – seedbed vs. RSN correlations (r_s) for whole sample, gender, age and educational status of respondent

Social referents (sb*m)	n	Whole sample **61**	Male **45**	Female **16**	< 50 years **30**	50 & above **31**	Pri/Sec **51**	Tec/Uni **10**
CSN57a - Ministry of Agriculture extension officers (-4 to +4)		-.257(*)			-.368(*)			
CSN57b - Stockists of agricultural chemicals								
CSN57c - Other farmers		.448(**)	.437(**)		.478(**)	.438(*)	.428(**)	
CSN57d - Local radio		.296(*)						
CSN57e - Agricultural research organisations								.
CSN57f - Manufacturer of agro chemicals				.512(*)				
CSN57g - Seminars and workshops					.440(*)			
CSN57h - Publications and promotional posters		.271(*)		.512(*)	.422(*)			
CSN57I - Own experience/knowledge				.633(**)				.667(*)

Table 45: Intention (I) – seedbed vs. behaviour, attitudes and normative component correlations (r_s) for whole sample and membership of farmer organisation

Main TORA variables	**n**	Whole sample **61**	Farmer org -Yes **40**	Farmer Org - No **21**
Current behavioural index (-3 to +3)				
Stated attitude - applying BCA to seedbeds (-2 to +2)				
Stated attitude - applying BCA to fields (-2 to +2)		.369(**)	.334(*)	.461(*)
Stated attitude - applying chemical to seedbeds or fields (-2 to +2)				
Ca - Calculated attitude (-84 to +84)		.465(**)	.475(**)	
Stated subjective norm - applying BCA to control nematodes (-2 to +2)				
Stated subjective norm - applying chemical to control nematodes (-2 to +2)				
CSN - Calculated subjective norm (-32 to + 32)				
Perception of risk - product factor (-4 to +4)				
Perception of risk - sum factor (-4 to +4)		.309(*)	.412(**)	
Perceived control (-4 to +4)				

Table 46: Intention (I) – seedbed vs. OA correlations (r_s) for whole sample and membership of farmer organisation

Outcome attitude (b*e)	Whole sample	Farmer org -Yes	Farmer Org - No
n	**61**	**40**	**21**
CA35 - The use of BCA on the farm will lead to improved yields (-4 to +4)	.519(**)	.513(**)	.540(*)
CA36 - BCA will cost too much			
CA37 - BCA application will increase the amount of marketable fruit (improved quality)			.446(*)
CA38 - BCA application will reduce the general level of disease in the treated crops			
CA39 - BCA application will reduce the wasted costs of irrigating and treating worm infested crops			
CA40 - Increased profit resulting from the use of BCA in the seedbed only	.325(*)		
CA41 - Will be able to continue cropping currently worm infested fields if BCA is applied	.365(**)	.329(*)	
CA42 - The BCA will be washed away by furrow irrigation			
CA43 - BCA will not be washed out of the soil by overhead irrigation			
CA44 - BCA is a non toxic substance that compliments an organic farming system	.384(**)		.725(**)
CA45 - The correct application of BCA will be very difficult to achieve			
CA46 - If BCA is applied to the seedbed only it will result in lower labour costs			
CA47- If BCA is applied to the seedbed you will get more vigorous seedling growth	.618(**)	.591(**)	.725(**)
CA48 - If BCA is applied in the seedbed it will also protect seedlings after transplanting	.342(**)		
CA49 - Seedbed application only of BCA will provide an effective control of nematodes	.325(*)		
CA50 - BCA is a product that will not be commercially accessible for the smaller/poorer farmer			
CA51 - Applying BCA to fields will give greater protection to 'transplanted' crop than seedbed only appl.			
CA52 - Once applied the influence of the BCA will last for several seasons	.400(**)	.453(**)	
CA53 - Applying BCA to the field will provide protection to directly sown crops such as French beans	.475(**)	.449(**)	.546(*)
CA54 - Increased profit resulting from the application of BCA to the field only	.344(**)	.314(*)	
CA55 - Need method of transplanting to insure that the BCA applied to seedbed will be transferred to field			

Table 47: Intention (I) – seedbed vs. RSN correlations (r_s) for whole sample and membership of farmer organisation

Social referents (sb*m)	n	Whole sample **61**	Farmer org -Yes **40**	Farmer Org - No **21**
CSN57a - Ministry of Agriculture extension officers (-4 to +4)		-.257(*)		
CSN57b - Stockists of agricultural chemicals				
CSN57c - Other farmers		.448(**)	.439(**)	.471(*)
CSN57d - Local radio		.296(*)		
CSN57e - Agricultural research organisations				.
CSN57f - Manufacturer of agro chemicals				
CSN57g - Seminars and workshops				
CSN57h - Publications and promotional posters		.271(*)		.464(*)
CSN57I - Own experience/knowledge				

Correlation tables re 'Field' Application of BCA

Table 48: Intention (I) – field vs. behaviour, attitudes and normative component correlations (r_s) for whole sample, size of holding, access to irrigation and type of irrigation

Main TORA variables	n	Whole sample	≤ 1.61 ha	> 1.61 ha	Irri-oriented	Not irri-oriented	Furrow irrigated	Overhead irrigated
		61	**29**	**32**	**44**	**17**	**33**	**20**
Current behavioural index (-3 to +3)				.392(*)				
Stated attitude - applying BCA to seedbeds (-2 to +2)		.315(*)	.397(*)					
Stated attitude - applying BCA to fields (-2 to +2)		.561(**)	.516(**)	.604(**)	.470(**)	.618(**)	.490(**)	.521(*)
Stated attitude - applying chemical to seedbeds or fields (-2 to +2)								
Ca - Calculated attitude (-84 to +84)		.448(**)	.374(*)	.437(*)		.575(*)	.411(*)	
Stated subjective norm - applying BCA to control nematodes (-2 to +2)								
Stated subjective norm - applying chemical to control nematodes (-2 to +2)								
CSN - Calculated subjective norm (-32 to + 32)								.483(*)
Perception of risk - product factor (-4 to +4)								
Perception of risk - sum factor (-4 to +4)								
Perceived control (-4 to +4)								

Table 49: Intention (I) – field vs. OA correlations (r_s) for whole sample, size of holding, access to irrigation and type of irrigation

Outcome attitude (b*e)	Whole sample	≤ 1.61 ha	> 1.61 ha	Irri-oriented	Not irri-oriented	Furrow irrigated	Overhead irrigated
n	**61**	**29**	**32**	**44**	**17**	**33**	**20**
CA35 - The use of BCA on the farm will lead to improved yields (-4 to +4)	.554(**)	.527(**)	.534(**)	.559(**)		.580(**)	.453(*)
CA36 - BCA will cost too much							
CA37 - BCA application will increase the amount of marketable fruit (improved quality)							
CA38 - BCA application will reduce the general level of disease in the treated crops			.429(*)				
CA39 - BCA application will reduce the wasted costs of irrigating and treating worm infested crops					.569(*)		
CA40 - Increased profit resulting from the use of BCA in the seedbed only	.415(**)	.369(*)	.464(**)		.660(**)	.403(*)	
CA41 - Will be able to continue cropping currently worm infested fields if BCA is applied	.523(**)	.585(**)	.467(**)	.458(**)	.563(*)	.432(*)	.529(*)
CA42 - The BCA will be washed away by furrow irrigation					-.544(*)		
CA43 - BCA will not be washed out of the soil by overhead irrigation							
CA44 - BCA is a non toxic substance that compliments an organic farming system	.360(**)	.400(*)		.353(*)		.451(**)	
CA45 - The correct application of BCA will be very difficult to achieve							
CA46 - If BCA is applied to the seedbed only it will result in lower labour costs	.310(*)					.351(*)	
CA47- If BCA is applied to the seedbed you will get more vigorous seedling growth	.434(**)		.633(**)	.359(*)		.577(**)	
CA48 - If BCA is applied in the seedbed it will also protect seedlings after transplanting						.344(*)	
CA49 - Seedbed application only of BCA will provide an effective control of nematodes	.256(*)					.378(*)	
CA50 - BCA is a product that will not be commercially accessible for the smaller/poorer farmer							
CA51 - Applying BCA to fields will give greater protection to 'transplanted' crop than seedbed only appl.							
CA52 - Once applied the influence of the BCA will last for several seasons	.304(*)				.588(*)		
CA53 - Applying BCA to the field will provide protection to directly sown crops such as French beans	.349(**)	.396(*)			.672(**)	.556(**)	
CA54 - Increased profit resulting from the application of BCA to the field only	.264(*)						
CA55 - Need method of transplanting to insure that the BCA applied to seedbed will be transferred to field							

Table 50: Intention (I) – field vs. RSN correlations (r_s) for whole sample, size of holding, access to irrigation and type of irrigation

Social referents (sb*m)	n	Whole sample	≤ 1.61 ha	> 1.61 ha	Irri-oriented	Not irri-oriented	Furrow irrigated	Overhead irrigated
		61	**29**	**32**	**44**	**17**	**33**	**20**
CSN57a - Ministry of Agriculture extension officers (-4 to +4)								
CSN57b - Stockists of agricultural chemicals								
CSN57c - Other farmers		.390(**)	.419(*)	.363(*)	.303(*)	.495(*)	.454(**)	
CSN57d - Local radio		.292(*)	.384(*)					.449(*)
CSN57e - Agricultural research organisations								
CSN57f - Manufacturer of agro chemicals								
CSN57g - Seminars and workshops		.299(*)						
CSN57h - Publications and promotional posters					.312(*)		.382(*)	
CSN57i - Own experience/knowledge								

Table 51: Intention (I) – field vs. behaviour, attitudes and normative component correlations (r_s) for whole sample, farming system, risk from nematode and income from tomato

Main TORA variables	n	Whole sample	Organic	Not organic	Not serious	Serious	Low income	High income
		61	**13**	**48**	**8**	**53**	**30**	**31**
Current behavioural index (-3 to +3)								
Stated attitude - applying BCA to seedbeds (-2 to +2)		.315(*)				.371(**)		
Stated attitude - applying BCA to fields (-2 to +2)		.561(**)		.577(**)	.775(*)	.484(**)	.502(**)	.606(**)
Stated attitude - applying chemical to seedbeds or fields (-2 to +2)								
Ca - Calculated attitude (-84 to +84)		.448(**)		.488(**)	.764(*)	.357(*)		.474(**)
Stated subjective norm - applying BCA to control nematodes (-2 to +2)								
Stated subjective norm - applying chemical to control nematodes (-2 to +2)								
CSN - Calculated subjective norm (-32 to + 32)								
Perception of risk - product factor (-4 to +4)								
Perception of risk - sum factor (-4 to +4)								
Perceived control (-4 to +4)								

Table 52: Intention (I) – field vs. OA correlations (r_s) for whole sample, farming system, risk from nematode and income from tomato

Outcome attitude (b*e)	Whole sample	Organic	Not organic	Not serious	Serious	Low income	High income
n	**61**	**13**	**48**	**8**	**53**	**30**	**31**
CA35 - The use of BCA on the farm will lead to improved yields (-4 to +4)	.554(**)		.680(**)	.866(**)	.440(**)	.579(**)	.399(*)
CA36 - BCA will cost too much							
CA37 - BCA application will increase the amount of marketable fruit (improved quality)							.448(*)
CA38 - BCA application will reduce the general level of disease in the treated crops			.314(*)				.404(*)
CA39 - BCA application will reduce the wasted costs of irrigating and treating worm infested crops				.866(**)			
CA40 - Increased profit resulting from the use of BCA in the seedbed only	.415(**)		.398(**)		.340(*)		.507(**)
CA41 - Will be able to continue cropping currently worm infested fields if BCA is applied	.523(**)		.542(**)		.495(**)	.459(*)	.537(**)
CA42 - The BCA will be washed away by furrow irrigation							
CA43 - BCA will not be washed out of the soil by overhead irrigation							.394(*)
CA44 - BCA is a non toxic substance that compliments an organic farming system	.360(**)		.477(**)			.426(*)	
CA45 - The correct application of BCA will be very difficult to achieve							
CA46 - If BCA is applied to the seedbed only it will result in lower labour costs	.310(*)		.366(*)				.486(**)
CA47- If BCA is applied to the seedbed you will get more vigorous seedling growth	.434(**)		.593(**)	.775(*)	.304(*)	.401(*)	.426(*)
CA48 - If BCA is applied in the seedbed it will also protect seedlings after transplanting			.289(*)				
CA49 - Seedbed application only of BCA will provide an effective control of nematodes	.256(*)		.324(*)				.367(*)
CA50 - BCA is a product that will not be commercially accessible for the smaller/poorer farmer							
CA51 - Applying BCA to fields will give greater protection to 'transplanted' crop than seedbed only appl.							
CA52 - Once applied the influence of the BCA will last for several seasons	.304(*)		.313(*)	.906(**)			
CA53 - Applying BCA to the field will provide protection to directly sown crops such as French beans	.349(**)		.322(*)				.406(*)
CA54 - Increased profit resulting from the application of BCA to the field only	.264(*)						
CA55 - Need method of transplanting to insure that the BCA applied to seedbed will be transferred to field							

Table 53: Intention (I) – field vs. RSN correlations (r_s) for whole sample, farming system, risk from nematode and income from tomato

Social referents (sb*m)	n	Whole sample	Organic	Not organic	Not serious	Serious	Low income	High income
		61	**13**	**48**	**8**	**53**	**30**	**31**
CSN57a - Ministry of Agriculture extension officers (-4 to +4)				-.331(*)				
CSN57b - Stockists of agricultural chemicals						-.284(*)		
CSN57c - Other farmers		.390(**)		.430(**)	.756(*)			.458(**)
CSN57d - Local radio		.292(*)		.314(*)			.395(*)	
CSN57e - Agricultural research organisations				.331(*)				
CSN57f - Manufacturer of agro chemicals								
CSN57g - Seminars and workshops		.299(*)				.359(**)		
CSN57h - Publications and promotional posters				.308(*)				
CSN57i - Own experience/knowledge								

Table 54: Intention (I) – field vs. behaviour, attitudes and normative component correlations (r_s) for whole sample, farm income, perception of risk from nematode and ability to manage risk

Main TORA variables	n	Whole sample	Farm inc - high	Farm inc - low	High risk	Low risk	Manage risk	Not manage risk
		61	**37**	**24**	**52**	**9**	**9**	**52**
Current behavioural index (-3 to +3)				.494(*)				
Stated attitude - applying BCA to seedbeds (-2 to +2)		.315(*)			.392(**)			
Stated attitude - applying BCA to fields (-2 to +2)		.561(**)	.543(**)	.589(**)	.529(**)	.756(*)	1.00(**)	.507(**)
Stated attitude - applying chemical to seedbeds or fields (-2 to +2)								
Ca - Calculated attitude (-84 to +84)		.448(**)	.431(**)		.460(**)			.430(**)
Stated subjective norm - applying BCA to control nematodes (-2 to +2)								
Stated subjective norm - applying chemical to control nematodes (-2 to +2)								
CSN - Calculated subjective norm (-32 to + 32)								
Perception of risk - product factor (-4 to +4)								
Perception of risk - sum factor (-4 to +4)								
Perceived control (-4 to +4)								

Table 55: Intention (I) – field vs. OA correlations (r_s) for whole sample, farm income, perception of risk from nematode and ability to manage risk

Outcome attitude (b*e)	Whole sample	Farm inc - high	Farm inc - low	High risk	Low risk	Manage risk	Not manage risk
n	**61**	**37**	**24**	**52**	**9**	**9**	**52**
CA35 - The use of BCA on the farm will lead to improved yields (-4 to +4)	.554(**)	.636(**)		.529(**)	.694(*)		.645(**)
CA36 - BCA will cost too much							
CA37 - BCA application will increase the amount of marketable fruit (improved quality)							
CA38 - BCA application will reduce the general level of disease in the treated crops							
CA39 - BCA application will reduce the wasted costs of irrigating and treating worm infested crops							
CA40 - Increased profit resulting from the use of BCA in the seedbed only	.415(**)	.440(**)		.434(**)			.402(**)
CA41 - Will be able to continue cropping currently worm infested fields if BCA is applied	.523(**)	.591(**)	.431(*)	.542(**)		.992(**)	.448(**)
CA42 - The BCA will be washed away by furrow irrigation							
CA43 - BCA will not be washed out of the soil by overhead irrigation							
CA44 - BCA is a non toxic substance that compliments an organic farming system	.360(**)	.410(*)	.	.405(**)	.		.446(**)
CA45 - The correct application of BCA will be very difficult to achieve			.461(*)				
CA46 - If BCA is applied to the seedbed only it will result in lower labour costs	.310(*)	.396(*)		.324(*)			.287(*)
CA47- If BCA is applied to the seedbed you will get more vigorous seedling growth	.434(**)	.380(*)	.619(**)	.437(**)			.490(**)
CA48 - If BCA is applied in the seedbed it will also protect seedlings after transplanting		.328(*)					
CA49 - Seedbed application only of BCA will provide an effective control of nematodes	.256(*)						.288(*)
CA50 - BCA is a product that will not be commercially accessible for the smaller/poorer farmer							
CA51 - Applying BCA to fields will give greater protection to 'transplanted' crop than seedbed only appl.						.738(*)	
CA52 - Once applied the influence of the BCA will last for several seasons	.304(*)	.325(*)					.314(*)
CA53 - Applying BCA to the field will provide protection to directly sown crops such as French beans	.349(**)	.432(**)		.297(*)			.361(**)
CA54 - Increased profit resulting from the application of BCA to the field only	.264(*)	.337(*)					
CA55 - Need method of transplanting to insure that the BCA applied to seedbed will be transferred to field							

Table 56: Intention (I) – field vs. RSN correlations (r_s) for whole sample, farm income, perception of risk from nematode and ability to manage risk

Social referents (sb*m)	n	Whole sample	Farm inc - high	Farm inc - low	High risk	Low risk	Manage risk	Not manage risk
		61	**37**	**24**	**52**	**9**	**9**	**52**
CSN57a - Ministry of Agriculture extension officers (-4 to +4)								
CSN57b - Stockists of agricultural chemicals				-.406(*)				
CSN57c - Other farmers		.390(**)	.419(**)		.413(**)			.418(**)
CSN57d - Local radio		.292(*)	.378(*)		.300(*)			.307(*)
CSN57e - Agricultural research organisations						.	.	
CSN57f - Manufacturer of agro chemicals								
CSN57g - Seminars and workshops		.299(*)	.363(*)		.430(**)			
CSN57h - Publications and promotional posters					.293(*)			.293(*)
CSN57i - Own experience/knowledge								

Table 57: Intention (I) – field vs. behaviour, attitudes and normative component correlations (r_s) for whole sample, gender, age and educational status of respondent

Main TORA variables	n	Whole sample	Male	Female	< 50 years	50 & above	Pri/Sec	Tec/Uni
		61	**45**	**16**	**30**	**31**	**51**	**10**
Current behavioural index (-3 to +3)								
Stated attitude - applying BCA to seedbeds (-2 to +2)		.315(*)				.395(*)	.308(*)	
Stated attitude - applying BCA to fields (-2 to +2)		.561(**)	.605(**)		.708(**)	.398(*)	.653(**)	
Stated attitude - applying chemical to seedbeds or fields (-2 to +2)								
Ca - Calculated attitude (-84 to +84)		.448(**)	.530(**)		.446(*)		.463(**)	
Stated subjective norm - applying BCA to control nematodes (-2 to +2)								
Stated subjective norm - applying chemical to control nematodes (-2 to +2)								
CSN - Calculated subjective norm (-32 to + 32)								
Perception of risk - product factor (-4 to +4)			-.403(**)				-.305(*)	
Perception of risk - sum factor (-4 to +4)								
Perceived control (-4 to +4)								

Table 58: Intention (I) – field vs. OA correlations (r_s) for whole sample, gender, age and educational status of respondent

Outcome attitude (b*e)	Whole sample	Male	Female	< 50 years	50 & above	Pri/Sec	Tec/Uni
n	**61**	**45**	**16**	**30**	**31**	**51**	**10**
CA35 - The use of BCA on the farm will lead to improved yields (-4 to +4)	.554(**)	.512(**)	.627(**)	.559(**)	.482(**)	.579(**)	
CA36 - BCA will cost too much							
CA37 - BCA application will increase the amount of marketable fruit (improved quality)							
CA38 - BCA application will reduce the general level of disease in the treated crops				.368(*)			
CA39 - BCA application will reduce the wasted costs of irrigating and treating worm infested crops							
CA40 - Increased profit resulting from the use of BCA in the seedbed only	.415(**)	.466(**)		.430(*)		.441(**)	
CA41 - Will be able to continue cropping currently worm infested fields if BCA is applied	.523(**)	.464(**)	.780(**)	.517(**)	.397(*)	.560(**)	
CA42 - The BCA will be washed away by furrow irrigation							
CA43 - BCA will not be washed out of the soil by overhead irrigation							
CA44 - BCA is a non toxic substance that compliments an organic farming system	.360(**)	.320(*)		.618(**)		.279(*)	1.000(**)
CA45 - The correct application of BCA will be very difficult to achieve							
CA46 - If BCA is applied to the seedbed only it will result in lower labour costs	.310(*)	.313(*)				.389(**)	
CA47- If BCA is applied to the seedbed you will get more vigorous seedling growth	.434(**)	.529(**)		.585(**)		.475(**)	
CA48 - If BCA is applied in the seedbed it will also protect seedlings after transplanting							
CA49 - Seedbed application only of BCA will provide an effective control of nematodes	.256(*)	.364(*)		.394(*)		.281(*)	
CA50 - BCA is a product that will not be commercially accessible for the smaller/poorer farmer							
CA51 - Applying BCA to fields will give greater protection to 'transplanted' crop than seedbed only appl.		.346(*)					
CA52 - Once applied the influence of the BCA will last for several seasons	.304(*)	.444(**)		.410(*)			
CA53 - Applying BCA to the field will provide protection to directly sown crops such as French beans	.349(**)	.424(**)		.444(*)			1.000(**)
CA54 - Increased profit resulting from the application of BCA to the field only	.264(*)	.397(**)		.438(*)		.329(*)	
CA55 - Need method of transplanting to insure that the BCA applied to seedbed will be transferred to field				-.422(*)			

Table 59: Intention (I) – field vs. RSN correlations (r_s) for whole sample, gender, age and educational status of respondent

Social referents (sb*m)	n	Whole sample	Male	Female	< 50 years	50 & above	Pri/Sec	Tec/Uni
		61	**45**	**16**	**30**	**31**	**51**	**10**
CSN57a - Ministry of Agriculture extension officers (-4 to +4)					-.367(*)			
CSN57b - Stockists of agricultural chemicals			-.301(*)				-.346(*)	
CSN57c - Other farmers		.390(**)	.455(**)		.478(**)	.379(*)	.380(**)	
CSN57d - Local radio		.292(*)		.680(**)			.277(*)	
CSN57e - Agricultural research organisations								.
CSN57f - Manufacturer of agro chemicals								
CSN57g - Seminars and workshops		.299(*)			.439(*)		.318(*)	
CSN57h - Publications and promotional posters				.509(*)	.419(*)			
CSN57i - Own experience/knowledge				.594(*)				.667(*)

Table 60: Intention (I) – field vs. behaviour, attitudes and normative component correlations (r_s) for whole sample and membership of farmer organisation

	Whole sample	Farmer org -Yes	Farmer Org - No
Main TORA variables **n**	**61**	**40**	**21**
Current behavioural index (-3 to +3)			
Stated attitude - applying BCA to seedbeds (-2 to +2)	.315(*)		
Stated attitude - applying BCA to fields (-2 to +2)	.561(**)	.557(**)	.461(*)
Stated attitude - applying chemical to seedbeds or fields (-2 to +2)			
Ca - Calculated attitude (-84 to +84)	.448(**)	.389(*)	
Stated subjective norm - applying BCA to control nematodes (-2 to +2)			
Stated subjective norm - applying chemical to control nematodes (-2 to +2)			
CSN - Calculated subjective norm (-32 to + 32)			
Perception of risk - product factor (-4 to +4)			
Perception of risk - sum factor (-4 to +4)			
Perceived control (-4 to +4)			

Table 61: Intention (I) – field vs. OA correlations (r_s) for whole sample and membership of farmer organisation

Outcome attitude (b*e)	Whole sample	Farmer org -Yes	Farmer Org - No
n	**61**	**40**	**21**
CA35 - The use of BCA on the farm will lead to improved yields (-4 to +4)	.554(**)	.521(**)	.540(*)
CA36 - BCA will cost too much			
CA37 - BCA application will increase the amount of marketable fruit (improved quality)			.446(*)
CA38 - BCA application will reduce the general level of disease in the treated crops			
CA39 - BCA application will reduce the wasted costs of irrigating and treating worm infested crops			
CA40 - Increased profit resulting from the use of BCA in the seedbed only	.415(**)	.433(**)	
CA41 - Will be able to continue cropping currently worm infested fields if BCA is applied	.523(**)	.530(**)	
CA42 - The BCA will be washed away by furrow irrigation			
CA43 - BCA will not be washed out of the soil by overhead irrigation			
CA44 - BCA is a non toxic substance that compliments an organic farming system	.360(**)		.725(**)
CA45 - The correct application of BCA will be very difficult to achieve			
CA46 - If BCA is applied to the seedbed only it will result in lower labour costs	.310(*)		
CA47- If BCA is applied to the seedbed you will get more vigorous seedling growth	.434(**)	.341(*)	.725(**)
CA48 - If BCA is applied in the seedbed it will also protect seedlings after transplanting			
CA49 - Seedbed application only of BCA will provide an effective control of nematodes	.256(*)		
CA50 - BCA is a product that will not be commercially accessible for the smaller/poorer farmer			
CA51 - Applying BCA to fields will give greater protection to 'transplanted' crop than seedbed only appl.			
CA52 - Once applied the influence of the BCA will last for several seasons	.304(*)	.338(*)	
CA53 - Applying BCA to the field will provide protection to directly sown crops such as French beans	.349(**)		.546(*)
CA54 - Increased profit resulting from the application of BCA to the field only	.264(*)		
CA55 - Need method of transplanting to insure that the BCA applied to seedbed will be transferred to field			

Table 62: Intention (I) – field vs. RSN correlations (r_s) for whole sample and membership of farmer organisation

Social referents (sb*m)	n	Whole sample **61**	Farmer org -Yes **40**	Farmer Org - No **21**
CSN57a - Ministry of Agriculture extension officers (-4 to +4)				
CSN57b - Stockists of agricultural chemicals				
CSN57c - Other farmers		.390(**)	.370(*)	.471(*)
CSN57d - Local radio		.292(*)		
CSN57e - Agricultural research organisations				.
CSN57f - Manufacturer of agro chemicals				
CSN57g - Seminars and workshops		.299(*)		
CSN57h - Publications and promotional posters				.464(*)
CSN57i - Own experience/knowledge				

Summary Tables for whole sample

Table 63: Mean, median, IQR and Correlations (r_s) of Intent (I) for seedbed and for field across main TORA variables (whole sample)

Main TORA variables	Mean	Median	IQR	I (seedbed) vs. Correlation (r_s)	I (field) vs. Correlation (r_s)
Current behavioural index (-3 to +3)	0.90	1.00	(-1 to 3)		
Stated attitude - applying BCA to seedbeds (-2 to +2)	1.28	1.00	(1 to 2)		.315(*)
Stated attitude - applying BCA to fields (-2 to +2)	1.62	2.00	(1 to 2)	.369(**)	.561(**)
Stated attitude - applying chemical to seedbeds or fields (-2 to +2)	-0.31	-1.00	(-1 to 1)		
Ca - Calculated attitude (-84 to +84)	40.17	43.00	(30 to 50.25)	.465(**)	.448(**)
Stated subjective norm - applying BCA to control nematodes (-2 to +2)	1.33	1.00	(1 to 2)		
Stated subjective norm - applying chemical to control nematodes (-2 to +2)	-0.62	-1.00	(-1 to 0)		
CSN - Calculated subjective norm (-32 to + 32)	18.02	18.00	(14 to 21)		
Perception of risk - product factor (-4 to +4)	-1.16	-2.00	(-2 to -0.5)		
Perception of risk - sum factor (-4 to +4)	0.34	0.50	(0 to 0.5)	.309(*)	
Perceived control (-4 to +4)	2.11	2.00	(1 to 2)		

Table 64: Mean, median, IQR and Correlations (r_s) of Intent (I) for seedbed and for field across Outcome attitudes (whole sample)

Outcome attitude (b*e)	Mean	Median	IQR	I (seedbed) vs. Correlation (r_s)	I (field) vs. Correlation (r_s)
CA35 - The use of BCA on the farm will lead to improved yields (-4 to +4)	3.02	4.00	(2 to 4)	.519(**)	.554(**)
CA36 - BCA will cost too much	0.41	0.00	(0 to 2)		
CA37 - BCA application will increase the amount of marketable fruit (improved quality)	3.21	4.00	(2 to 4)		
CA38 - BCA application will reduce the general level of disease in the treated crops	2.57	2.00	(1.5 to 4)		
CA39 - BCA application will reduce the wasted costs of irrigating and treating worm infested crops	2.33	2.00	(1 to 4)		
CA40 - Increased profit resulting from the use of BCA in the seedbed only	2.41	2.00	(1 to 4)	.325(*)	.415(**)
CA41 - Will be able to continue cropping currently worm infested fields if BCA is applied	2.72	4.00	(2 to 4)	.365(**)	.523(**)
CA42 - The BCA will be washed away by furrow irrigation	-0.66	-1.00	(-2 to 0.5)		
CA43 - BCA will not be washed out of the soil by overhead irrigation	2.38	2.00	(1 to 4)		
CA44 - BCA is a non toxic substance that compliments an organic farming system	3.62	4.00	(4 to 4)	.384(**)	.360(**)
CA45 - The correct application of BCA will be very difficult to achieve	0.26	1.00	(-1 to 2)		
CA46 - If BCA is applied to the seedbed only it will result in lower labour costs	2.39	2.00	(1 to 4)		.310(*)
CA47- If BCA is applied to the seedbed you will get more vigorous seedling growth	3.38	4.00	(2 to 4)	.618(**)	.434(**)
CA48 - If BCA is applied in the seedbed it will also protect seedlings after transplanting	2.25	2.00	(1 to 4)	.342(**)	
CA49 - Seedbed application only of BCA will provide an effective control of nematodes	1.74	1.00	(0 to 4)	.325(*)	.256(*)
CA50 - BCA is a product that will not be commercially accessible for the smaller/poorer farmer	-0.05	0.00	(-1.5 to 1.5)		
CA51 - Applying BCA to fields will give greater protection to 'transplanted' crop than seedbed only appl.	2.90	4.00	(2 to 4)		
CA52 - Once applied the influence of the BCA will last for several seasons	2.53	2.00	(1 to 4)	.400(**)	.304(*)
CA53 - Applying BCA to the field will provide protection to directly sown crops such as French beans	3.45	4.00	(4 to 4)	.475(**)	.349(**)
CA54 - Increased profit resulting from the application of BCA to the field only	2.35	4.00	(1 to 4)	.344(**)	.264(*)
CA55 - Need method of transplanting to insure that the BCA applied to seedbed will be transferred to field	-3.00	-4.00	(-4 to -2)		

Table 65: Mean, Median and IQR re referent subjective norms (RSNs) (sb*m) and I vs. RSN re seedbed and field application for whole sample

Social referents (sb*m)	Mean	Median	IQR	I (seedbed) vs. Correlation (r_s)	I (field) vs. Correlation (r_s)
CSN57a - Ministry of Agriculture extension officers (-4 to +4)	1.15	1.00	(0 to 2)	-.257(*)	
CSN57b - Stockists of agricultural chemicals	0.89	1.00	(-0.5 to 1)		
CSN57c - Other farmers	3.23	4.00	(2 to 4)	.448(**)	.390(**)
CSN57d - Local radio	1.67	1.00	(1 to 2)	.296(*)	.292(*)
CSN57e - Agricultural research organisations	3.85	4.00	(4 to 4)		
CSN57f - Manufacturer of agro chemicals	1.20	1.00	(0.5 to 2)		
CSN57g - Seminars and workshops	3.08	4.00	(2 to 4)		.299(*)
CSN57h - Publications and promotional posters	2.95	4.00	(2 to 4)	.271(*)	
CSN57i - Own experience/knowledge	3.62	4.00	(4 to 4)		

Table 66: Mean figures for outcome beliefs (b) and value (e) and outcome attitudes (b*e) for whole sample

n=61 **Outcome attitudes (b*e)**	Beliefs (b) Mean	Value (e) Mean	Attitudes (b*e) Mean
CA44 - BCA is a non toxic substance that compliments an organic farming system	1.89	1.90	3.62
CA53 - Applying BCA to the field will provide protection to directly sown crops such as French beans	1.80	1.87	3.45
CA47- If BCA is applied to the seedbed you will get more vigorous seedling growth	1.70	1.83	3.38
CA37 - BCA application will increase the amount of marketable fruit (improved quality)	1.70	1.80	3.21
CA35 - The use of BCA on the farm will lead to improved yields	1.70	1.72	3.02
CA51 - Applying BCA to fields will give greater protection to 'transplanted' crop than seedbed only appl.	1.49	1.79	2.90
CA41 - Will be able to continue cropping currently worm infested fields if BCA is applied	1.46	1.75	2.72
CA38 - BCA application will reduce the general level of disease in the treated crops	1.46	1.66	2.57
CA52 - Once applied the influence of the BCA will last for several seasons	1.44	1.67	2.53
CA40 - Increased profit resulting from the use of BCA in the seedbed only	1.26	1.62	2.41
CA46 - If BCA is applied to the seedbed only it will result in lower labour costs	1.23	1.43	2.39
CA43 - BCA will not be washed out of the soil by overhead irrigation	1.30	1.51	2.38
CA54 - Increased profit resulting from the application of BCA to the field only	1.30	1.62	2.35
CA39 - BCA application will reduce the wasted costs of irrigating and treating worm infested crops	1.30	1.48	2.33
CA48 - If BCA is applied in the seedbed it will also protect seedlings after transplanting	1.31	1.57	2.25
CA49 - Seedbed application only of BCA will provide an effective control of nematodes	0.87	1.28	1.74
CA36 - BCA will cost too much	-0.33	1.28	0.41
CA45 - The correct application of BCA will be very difficult to achieve	-0.38	0.95	0.26
CA50 - BCA is a product that will not be commercially accessible for the smaller/poorer farmer	-0.13	1.13	-0.05
CA42 - The BCA will be washed away by furrow irrigation	0.61	0.98	-0.66
CA55 - Need method of transplanting to insure that the BCA applied to seedbed will be transferred to field	1.57	1.72	-3.00
Calculated attitude CA ($\sum b_i * e_i$)			40.17
Cronbach's alpha coefficient of scale reliability (0.85)			

- The beliefs (b) of the underlined statements had the signs changed when calculating the OA (b*e), although the the signs in the belief (b)column represent the actual response.

Table 67: Mean figures for subjective belief (sb), motivation (m) and referent subjective norm (RSN) (sb*m) for whole sample

Social referents (sb*m) n=61	Subjective belief (sb) Mean	Motivation (m) Mean	Subjective norm (sb*m) Mean
CSN57e - Agricultural research organisations	1.93	1.98	3.85
CSN57i - Own experience/knowledge	1.87	1.85	3.62
CSN57c - Other farmers	1.77	1.77	3.23
CSN57g - Seminars and workshops	1.75	1.67	3.08
CSN57h - Publications and promotional posters	1.66	1.61	2.95
CSN57d - Local radio	1.16	1.08	1.67
CSN57f - Manufacturer of agro chemicals	0.03	-0.26	1.20
CSN57a - Ministry of Agriculture extension officers (-4 to +4)	0.79	0.38	1.15
CSN57b - Stockists of agricultural chemicals	-0.21	-0.72	0.89

Table 68: Outcome belief (b), value (e) and outcome attitude (b*e) vs. Intent – seedbed (I) correlations (r_s) for whole sample

Outcome attitudes (b*e) **n=61**	I (seedbed) vs. b	I (seedbed) vs. e	I (seedbed) vs. (b*e)
CA35 - The use of BCA on the farm will lead to improved yields (-4 to +4)	.518(**)	.417(**)	.519(**)
CA36 - BCA will cost too much			
CA37 - BCA application will increase the amount of marketable fruit (improved quality)			
CA38 - BCA application will reduce the general level of disease in the treated crops			
CA39 - BCA application will reduce the wasted costs of irrigating and treating worm infested crops			
CA40 - Increased profit resulting from the use of BCA in the seedbed only	.325(*)		.325(*)
CA41 - Will be able to continue cropping currently worm infested fields if BCA is applied	.333(**)	.347(**)	.365(**)
CA42 - The BCA will be washed away by furrow irrigation			
CA43 - BCA will not be washed out of the soil by overhead irrigation			
CA44 - BCA is a non toxic substance that compliments an organic farming system	.399(**)	.568(**)	.384(**)
CA45 - The correct application of BCA will be very difficult to achieve			
CA46 - If BCA is applied to the seedbed only it will result in lower labour costs			
CA47- If BCA is applied to the seedbed you will get more vigorous seedling growth	.607(**)	.533(**)	.618(**)
CA48 - If BCA is applied in the seedbed it will also protect seedlings after transplanting	.347(**)	.330(**)	.342(**)
CA49 - Seedbed application only of BCA will provide an effective control of nematodes	.297(*)	.265(*)	.325(*)
CA50 - BCA is a product that will not be commercially accessible for the smaller/poorer farmer			
CA51 - Applying BCA to fields will give greater protection to 'transplanted' crop than seedbed only appl.			
CA52 - Once applied the influence of the BCA will last for several seasons	.288(*)	.402(**)	.400(**)
CA53 - Applying BCA to the field will provide protection to directly sown crops such as French beans	.528(**)		.475(**)
CA54 - Increased profit resulting from the application of BCA to the field only	.264(*)	.482(**)	.344(**)
CA55 - Need method of transplanting to insure that the BCA applied to seedbed will be transferred to field			

Table 69: Subjective belief (sb), motivation (m) and subjective norm (sb*m) vs. Intent – seedbed (I) correlations (r_s) for whole sample

Social referents (sb*m) **n=61**	I (seedbed) vs. sb	I (seedbed) vs. m	I (seedbed) vs. (sb*m)
CSN57a - Ministry of Agriculture extension officers (-4 to +4)		-.300(*)	-.257(*)
CSN57b - Stockists of agricultural chemicals			
CSN57c - Other farmers	.356(**)	.544(**)	.448(**)
CSN57d - Local radio	.367(**)	.276(*)	.296(*)
CSN57e - Agricultural research organisations		.391(**)	
CSN57f - Manufacturer of agro chemicals	.308(*)	.276(*)	
CSN57g - Seminars and workshops			
CSN57h - Publications and promotional posters	.362(**)	.260(*)	.271(*)
CSN57i - Own experience/knowledge			

Table 70: Outcome belief (b), value (e) and Outcome attitude (b*e) vs. Intent – field (I) correlations (r_s) for whole sample

Outcome attitudes (b*e) **n=61**	I (field) vs. b	I (field) vs. e	I (field) vs. (b*e)
CA35 - The use of BCA on the farm will lead to improved yields (-4 to +4)	.553(**)	.381(**)	.554(**)
CA36 - BCA will cost too much			
CA37 - BCA application will increase the amount of marketable fruit (improved quality)			
CA38 - BCA application will reduce the general level of disease in the treated crops			
CA39 - BCA application will reduce the wasted costs of irrigating and treating worm infested crops			
CA40 - Increased profit resulting from the use of BCA in the seedbed only	.364(**)	.364(**)	.415(**)
CA41 - Will be able to continue cropping currently worm infested fields if BCA is applied	.431(**)	.550(**)	.523(**)
CA42 - The BCA will be washed away by furrow irrigation			
CA43 - BCA will not be washed out of the soil by overhead irrigation			
CA44 - BCA is a non toxic substance that compliments an organic farming system	.396(**)	.397(**)	.360(**)
CA45 - The correct application of BCA will be very difficult to achieve			
CA46 - If BCA is applied to the seedbed only it will result in lower labour costs	.285(*)		.310(*)
CA47- If BCA is applied to the seedbed you will get more vigorous seedling growth	.351(**)	.454(**)	.434(**)
CA48 - If BCA is applied in the seedbed it will also protect seedlings after transplanting		.254(*)	
CA49 - Seedbed application only of BCA will provide an effective control of nematodes			.256(*)
CA50 - BCA is a product that will not be commercially accessible for the smaller/poorer farmer			
CA51 - Applying BCA to fields will give greater protection to 'transplanted' crop than seedbed only appl.		.450(**)	
CA52 - Once applied the influence of the BCA will last for several seasons		.329(*)	.304(*)
CA53 - Applying BCA to the field will provide protection to directly sown crops such as French beans	.386(**)		.349(**)
CA54 - Increased profit resulting from the application of BCA to the field only		.347(**)	.264(*)
CA55 - Need method of transplanting to insure that the BCA applied to seedbed will be transferred to field			

Table 71: Subjective belief (sb), motivation (m) and subjective norm (sb*m) vs. Intent – field (I) correlations (rs) for whole sample

Social referents (sb*m) **n=61**	I (field) vs. sb	I (field) vs. m	I (field) vs. (sb*m)
CSN57a - Ministry of Agriculture extension officers (-4 to +4)		-.309(*)	
CSN57b - Stockists of agricultural chemicals	.346(**)		
CSN57c - Other farmers	.367(**)	.418(**)	.390(**)
CSN57d - Local radio	.358(**)	.347(**)	.292(*)
CSN57e - Agricultural research organisations		.263(*)	
CSN57f - Manufacturer of agro chemicals	.375(**)	.294(*)	
CSN57g - Seminars and workshops		.345(**)	.299(*)
CSN57h - Publications and promotional posters	.252(*)		
CSN57i - Own experience/knowledge			

Nematode BCA Questionnaire

Proposed questions for trial participant farmers

Part 1: So we can get some idea about you and the farm business you run, could you please tell us about your current situation:

1) Total area you farm? *(1 hectare [ha] = 2.47 acres)*

ha of which:

(Complete those that apply)

Cereals, e.g. maize etc	ha
Forage crops, e.g. grown for livestock	ha
Vegetables	ha
Grass / pasture	ha
Other *(specify)*	ha

2) What area do you normally plant in tomatoes?

(Write in areas during last year indicating areas with and without irrigation)

Irrigate	ha
Not irrigated	ha

a. If you are irrigating nematode sensitive crops, what method is used?

(Tick appropriate box)

Furrow irrigation	
Overhead irrigation	
Fallow flood irrigation	

3) Which of the following best describes the tenure of the land you farm?

(Tick appropriate box)

Owner-occupied		
Tenant		
Both (Owner and tenant)		
Other		Specify:

4) Of the following which describes your farming system:

(Tick appropriate box)

Organic (no chemicals used)	☐
Not organic (use chemicals)	☐

5) What is your role on the farm?

(Please indicate type of role)

Owner	☐
Manager	☐
Partner	☐
Other *(specify)*	☐

6) How serious a problem are nematodes to your crops?

(Tick appropriate box)

Don't know	☐
Not serious	☐
Serious	☐
Very serious	☐

7) What proportion of your farm income comes from the sale of tomatoes?

(Write in the approximate percentage)

☐ %

8) Approximately what proportion of your household income comes from the farm business?

(Tick the box which most closely represents the proportion)

100%	☐
About 75%	☐
About 50%	☐
About 25%	☐
Less than 25%	☐

Part 3: Information regarding your perception of risk from nematodes and the management of that risk

9) In your opinion what is the level of risk to your farm business posed by nematodes?

(Tick box indicating level of risk)

Very high	High	Neither high or low	Low	Very low
☐	☐	☐	☐	☐

10) How able are you to manage the level of risk to your farm business posed by nematodes?

(Tick box indicating level of ability)

Very able	Able	Don't know	Not very able	Unable
☐	☐	☐	☐	☐

11) What are the most effective ways of reducing the damage of nematodes to your farm?

(List the methods or strategies and rank them by their effectiveness, 1 = most effective)

	Ranking

Part 4: Information regarding attitudes and intentions toward use BCA to control nematodes

12) Could you answer the following questions regarding your participation in the trials of BCA?

(Tick appropriate box for each question)

	Yes	No
a) Have you applied chemicals to control nematodes in the past 3 years (not BCA)?	☐	☐
b) Have you rotated your crops to reduce the threat of nematodes?	☐	☐

c) Have you taken any other action to reduce the nematode problem? ☐ ☐

If yes what actions?

Other action:

13) If available in the next year, how strong would your intention be to apply BCA to your seedbeds in the next year to control nematodes?

(Tick appropriate box)

Very strong	Strong	Uncertain	Little intention	No intention
☐	☐	☐	☐	☐

14) If available in the next year, how strong would your intention be to apply BCA to your fields in the next year to control nematodes?

(Tick appropriate box)

Very strong	Strong	Uncertain	Little intention	No intention
☐	☐	☐	☐	☐

15) How strong would your intention be to apply a chemical to your land in the next year to control nematodes?

(Tick appropriate box)

Very strong	Strong	Uncertain	Little intention	No intention
☐	☐	☐	☐	☐

16) In your opinion how good or bad would it be to apply BCA, to your seedbeds in the next year to control nematodes?

(Tick appropriate box)

Very good	Good	No opinion	Bad	Very bad
☐	☐	☐	☐	☐

17) In your opinion how good or bad would it be to apply BCA, to your fields in the next year to control nematodes?

(Tick appropriate box)

Very good	Good	No opinion	Bad	Very bad
☐	☐	☐	☐	☐

18) In your opinion how good or bad would it be to apply a chemical pesticide, to your seedbed and or fields in the next year to control nematodes?

(Tick appropriate box)

Very good	Good	No opinion	Bad	Very bad
☐	☐	☐	☐	☐

19) How supportive would 'other farmers you respect' be to you applying BCA , if available, to control nematodes your farm in the next year?

(Tick appropriate box)

Very supportive	Supportive	Don't know	Opposed	Very opposed
☐	☐	☐	☐	☐

20) How supportive would 'other farmers you respect' be of you applying a chemical pesticide to your land to control nematodes in the next year?

(Tick appropriate box)

Very supportive	Supportive	Don't know	Opposed	Very opposed
☐	☐	☐	☐	☐

21) How difficult would it be to apply BCA, if available, to your land next year to control nematodes?

(Tick appropriate box)

Very easy	Relatively easy	Don't know	Relatively difficult	Very difficult
☐	☐	☐	☐	☐

22) How confident do you feel of being able to apply BCA if it is available to your land next year to control nematodes?

(Tick appropriate box)

Very confident	Relatively confident	Don't know	Relatively unsure	Very unsure
☐	☐	☐	☐	☐

Part 5: Outcome beliefs related to the application of BCA

The following are statements made by other farmers involved in the trials of BCA. Could you indicate:

- Whether you agree or disagree with each statement and
- How important each of the issues raised is.

(Tick appropriate box on both scales relating to each statement)

35) The use of BCA on the farm will lead to improved yields

a) *Do you agree with the statement*

Strongly agree	Agree	Don't know	Disagree	Strongly disagree
☐	☐	☐	☐	☐

b) *How important is the issue to you*

Very important	Important	No opinion	Not very important	Unimportant
☐	☐	☐	☐	☐

36) BCA will cost too much

a) *Do you agree with the statement*

Strongly agree	Agree	Don't know	Disagree	Strongly disagree
☐	☐	☐	☐	☐

b) *How important is the issue to you*

Very important	Important	No opinion	Not very important	Unimportant
☐	☐	☐	☐	☐

37) BCA application will increase the amount of marketable fruit (improved quality)

a) *Do you agree with the statement*

Strongly agree	Agree	Don't know	Disagree	Strongly disagree
☐	☐	☐	☐	☐

b) *How important is the issue to you*

Very important	Important	No opinion	Not very important	Unimportant
☐	☐	☐	☐	☐

38) BCA application will reduce the general level of disease in the treated crops

a) *Do you agree with the statement*

Strongly agree	Agree	Don't know	Disagree	Strongly disagree
☐	☐	☐	☐	☐

b) *How important is the issue to you*

Very important	Important	No opinion	Not very important	Unimportant
☐	☐	☐	☐	☐

39) BCA application will reduce the wasted costs of irrigating and treating worm infested crops

a) *Do you agree with the statement*

Strongly agree	Agree	Don't know	Disagree	Strongly disagree
☐	☐	☐	☐	☐

b) *How important is the issue to you*

Very important	Important	No opinion	Important	Very important
☐	☐	☐	☐	☐

40) Increased profit resulting from the use of BCA in the seedbed only

a) *Do you agree with the statement*

Strongly agree	Agree	Don't know	Disagree	Strongly disagree
☐	☐	☐	☐	☐

b) *How important is the issue to you*

Very important	Important	No opinion	Not very important	Unimportant
☐	☐	☐	☐	☐

41) Will be able to continue cropping currently worm infested fields if BCA is applied

a) *Do you agree with the statement*

Strongly agree	Agree	Don't know	Disagree	Strongly disagree
☐	☐	☐	☐	☐

b) *How important is the issue to you*

Very important	Import ant	No opinion	Not very important	Unimportant
☐	☐	☐	☐	☐

42) The BCA will be washed away by furrow irrigation

a) *Do you agree with the statement*

Strongly agree	Agree	Don't know	Disagree	Strongly disagree
☐	☐	☐	☐	☐

b) *How important is the issue to you*

Very important	Important	No opinion	Not very important	Unimportant
☐	☐	☐	☐	☐

43) BCA will not be washed out of the soil by overhead irrigation

a) *Do you agree with the statement*

Strongly agree	Agree	Don't know	Disagree	Strongly disagree
☐	☐	☐	☐	☐

b) *How important is the issue to you*

Very important	Important	No opinion	Not very important	Unimportant
☐	☐	☐	☐	☐

44) BCA is a non toxic substance that compliments an organic farming system

a) *Do you agree with the statement*

Strongly agree	Agree	Don't know	Disagree	Strongly disagree
☐	☐	☐	☐	☐

b) *How important is the issue to you*

Very important	Important	No opinion	Not very important	Unimportant
☐	☐	☐	☐	☐

45) The correct application of BCA will be very difficult to achieve

a) *Do you agree with the statement*

Strongly agree	Agree	Don't know	Disagree	Strongly disagree
☐	☐	☐	☐	☐

b) *How important is the issue to you*

Very important	Important	No opinion	Not very important	Unimportant
☐	☐	☐	☐	☐

46) If BCA is applied to the seedbed only it will result in lower labour costs

a) *Do you agree with the statement*

Strongly agree	Agree	Don't know	Disagree	Strongly disagree
☐	☐	☐	☐	☐

b) *How important is the issue to you*

Very important	Important	No opinion	Not very important	Unimportant
☐	☐	☐	☐	☐

47) If BCA is applied to the seedbed you will get more vigorous seedling growth

a) *Do you agree with the statement*

Strongly agree	Agree	Don't know	Disagree	Strongly disagree
☐	☐	☐	☐	☐

b) *How important is the issue to you*

Very important	Important	No opinion	Not very important	Unimportant
☐	☐	☐	☐	☐

48) If BCA is applied in the seedbed it will also protect seedlings after transplanting. (It will be transferred to the field at the time of transplanting)

a) *Do you agree with the statement*

Strongly agree	Agree	Don't know	Disagree	Strongly disagree
☐	☐	☐	☐	☐

b) *How important is the issue to you*

Very important	Important	No opinion	Not very important	Unimportant
☐	☐	☐	☐	☐

49) Seedbed application only of BCA will provide an effective control of nematodes

a) *Do you agree with the statement*

Strongly agree	Agree	Don't know	Disagree	Strongly disagree
☐	☐	☐	☐	☐

b) *How important is the issue to you*

Very important	Important	No opinion	Not very important	Unimportant
☐	☐	☐	☐	☐

50) BCA is a product that will not be commercially accessible for the smaller / poorer farmer

a) Do you agree with the statement

Strongly agree	Agree	Don't know	Disagree	Strongly disagree
☐	☐	☐	☐	☐

b) How important is the issue to you

Very important	Important	No opinion	Not very important	Unimportant
☐	☐	☐	☐	☐

51) Applying BCA to the field will give greater protection to the 'transplanted' crop than seedbed only application

a) Do you agree with the statement

Strongly agree	Agree	Don't know	Disagree	Strongly disagree
☐	☐	☐	☐	☐

b) How important is the issue to you

Very important	Important	No opinion	Not very important	Unimportant
☐	☐	☐	☐	☐

52) Once applied the influence of the BCA will last for several seasons (i.e. provide a control of nematodes for more than one season without reapplication in the treated area)

a) Do you agree with the statement

Strongly agree	Agree	Don't know	Disagree	Strongly disagree
☐	☐	☐	☐	☐

b) How important is the issue to you

Very important	Important	No opinion	Not very important	Unimportant
☐	☐	☐	☐	☐

53) Applying BCA to the field will provide protection to directly sown crops such as French beans

a) Do you agree with the statement

Strongly agree	Agree	Don't know	Disagree	Strongly disagree
☐	☐	☐	☐	☐

b) How important is the issue to you

Very important	Important	No opinion	Not very important	Unimportant
☐	☐	☐	☐	☐

54) Increased profit resulting from the application of BCA to the field only

c) *Do you agree with the statement*

Strongly agree	Agree	Don't know	Disagree	Strongly disagree
☐	☐	☐	☐	☐

d) *How important is the issue to you*

Very important	Important	No opinion	Not very important	Unimportant
☐	☐	☐	☐	☐

55) Will need to change the method of transplanting to insure that the BCA applied to the seedbed will be transferred to the field to continue protecting the transplanted crop

e) *Do you agree with the statement*

Strongly agree	Agree	Don't know	Disagree	Strongly disagree
☐	☐	☐	☐	☐

f) *How important is the issue to you*

Very important	Important	No opinion	Not very important	Unimportant
☐	☐	☐	☐	☐

56) For you personally what are the issues that would most influence your readiness to apply BCA on your farm as a method of controlling nematodes?

(Write in the main issues and rank them by importance where 1 = the most important)

Issues	Rank

Part 6: Sources of advice and information

57) How motivated would you be to follow the advice of the following (listed below) regarding the application of BCA, if available, to control nematodes on your farm in the next year?

(Tick the appropriate box regarding each referent)

	Very motivated	Motivated	Don't know	Not very motivated	Not at all motivated
a) Ministry of Agriculture extension officers					
b) Stockists of agricultural chemicals					
c) Other farmers					
d) Local radio					
e) Agricultural research organisations					
f) Manufacturer of agro chemicals					
g) Seminars and workshops					
h) Publications and promotional posters					
i) Own experience / judgement					

57) Indicate how strongly the following (listed below) would encourage you apply BCA**,** if available, to control nematodes on your farm in the next year?

(Tick the appropriate box regarding each referent)

	Strongly encourage	Encourage	Don't know	Discourage	Strongly discourage
j) Ministry of Agriculture extension officers					
k) Stockists of agricultural chemicals					
l) Other farmers					
m) Local radio					
n) Agricultural research organisations					
o) Manufacturer of agro chemicals					
p) Seminars and workshops					
q) Publications and promotional posters					
r) Own experience / judgement					

58) From whom or what source would you seek advice regarding the application of BCA?

(Write in the most reliable source of advice)

59) From whom or what source would you seek advice regarding the control of nematodes in general?

(Write in the most reliable source of advice)

Part 7: Personal Information

60) Could you indicate if you are:

(Indicate which of the following by ticking appropriate box)

Male	Female

61) How old are you?

Years

62) Which of the following best describes your highest level of general education?

(Tick one of the following options)

Primary school	
Secondary school	
Technical college	
University	

63) Do you belong to any farming organisations?

(Ticking appropriate box)

Yes	No

a) If yes which ones?

Farming organisations:

64) Do you have any further comments regarding issues addressed in this survey?

Other issues:

Thank you for your time and patience in filling out this questionnaire. If you have any further comments on this subject please do not hesitate to contact us. Your responses will be treated in the strictest confidence.

Data Protection Act

We respect your privacy and will always comply with data legislation currently in force in Kenya