**Table 3.3 Conceptual Attributes and their levels**

|  |  |  |
| --- | --- | --- |
| **Attributes** | **Potential levels** | **References** |
| Policyholders | Individuals, groups, | ([Sibiko et al., 2017](#_ENREF_176)) |
| Strike levels | Range of strike levels from 15% to 30% | ([Chantarat et al., 2013](#_ENREF_44)) |
| Transparency | Provide regular information regarding index performance | ([Schwarcz, 2013](#_ENREF_171); [Sibiko et al., 2017](#_ENREF_176)) |
| Bundled insurance | Credit, savings | ([Akter et al., 2016b](#_ENREF_10); [Farrin & Miranda, 2015](#_ENREF_69)) |
| Subsidized premium | Different subsidy rates from 20% to 50% | ([Carter et al., 2017](#_ENREF_39)) |
| Insurance Provider | The central government, private insurance companies, micro-credit providers, and local cooperatives. | ([Brouwer & Akter, 2010](#_ENREF_32)) |
| Basis Risk | Range of predicted percentage of index errors | ([Clement, Botzen, et al., 2018](#_ENREF_46); [Vroege et al., 2019](#_ENREF_202)) |

**Table 3.4 Attributes and Levels**

|  |  |
| --- | --- |
| **Attributes** | **Levels** |
| Transparency | Receive Weekly Updates, No Weekly Updates |
| Premium to pay | 100 ZAR, 250 ZAR, 400 ZAR |
| Reimbursement method | Feed, Cash, Voucher |
| Basis risk | 1 out of 10 times, 2 out of 10 times, 3 out of 10 times |

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**Table 3.1 Example of the choice card for a trigger level set at 30%**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | **Contract A** | | | | | **Contract B** | | | | **Option C** | | | |
| Reimbursements will be paid as: | | | Feed  A bale of hay in a field  Description automatically generated | | | | | Cash  A picture containing text  Description automatically generated | | | | Stay without Insurance | | | |
| Transparency | | | No Weekly Updates  Icon  Description automatically generated | | | | | Receive Weekly Updates  A picture containing logo  Description automatically generated | | | |
| Basis Risk | | | 8 out of 100 times | | | | | 12 out of 100 times | | | |
| Premium to pay | | | 250 ZAR  A close-up of a currency note  Description automatically generated with low confidence | | | | | 100 ZAR  A close-up of a dollar bill  Description automatically generated with low confidence | | | |
| The reminder of trigger levels and their expected compensation | | | | | | | | | | | | | | | |
| Pasture  Degradation | 0% | 20% | | 25% | 30% | 35% | 40% | | 45% | 50% | 55% | | 60% | >60% |
| Compensation (ZAR) | 0 | 0 | | 0 | 2500 | 2917 | 3333 | | 3750 | 4167 | 4583 | | 5000 | 5000 |

**Table 4.1**  **Summary Statistics**

|  |  |  |  |
| --- | --- | --- | --- |
| **Statistic** | **Description** | **Mean** | **Standard deviation** |
| Age | Number of years | 56.28 | 14.78 |
| No education | Dummy | 0.39 | 0.46 |
| Primary education | Dummy | 0.24 | 0.43 |
| Secondary education | Dummy | 0.40 | 0.49 |
| Tertiary education | Dummy | 0.07 | 0.26 |
| Herd size | Number of livestock | 18.35 | 14.25 |
| Arable land | Hectares | 2.77 | 2.57 |
| Household size | Number of households | 5.44 | 1.95 |
| Male | Dummy | 0.61 | 0.49 |
| Female | Dummy | 0.39 | 0.49 |
| Drought occurrences in the past five years | Number of years | 2.39 | 1.15 |
| Drought-related livestock mortality | Number of livestock mortality | 5.66 | 7.67 |
| Access to formal credit | Dummy | 0.33 | 0.47 |
| Social grant beneficiaries | Number of efficacies | 0.46 | 0.50 |
| Number of years in farming | Number of years | 11.89 | 7.91 |
| Income | ZAR (US dollars) | 75,259.41 (5,017.29) | 60,087.07 (4005.80) |
| Number of respondents | 110 |  |  |

*The author collected primary data*

**Table 4.2** **Mitigation and Coping Mechanisms for Drought used by farmers**

|  |  |  |  |
| --- | --- | --- | --- |
| **Mitigation Mechanisms** | **N (%)** | **Coping Mechanisms** | **N (%)** |
| Use rotational grazing | 89 (88.10%) | Ask for external support | 64 (63.40%) |
| Store feed | 74 (73.30%) | Government relief | 52 (51.50%) |
| Resistant breeds | 54 (53.50%) | Reduce stocking rate | 46 (45.50%) |
| Mixed farming | 48 (47.50%) | Sell livestock | 40 (39.60%) |
| Sell stock more often | 44 (43.60%) | Migrate | 35 (34.70%) |
| Save money | 35 (34.70%) | Draw from saving | 26 (25.70%) |
| Rainwater harvest | 34 (33.70%) | Take credit | 4 (4.00%) |
| Plant pasture | 7 (6.90%) | Increase daily labour | 1 (1.00%) |
| Buy insurance | 0 (00.00%) | Insurance compensation | 0 (0.00%) |

*The author collected primary data*

**Table 4.3 Reason for not purchasing insurance**

|  |  |
| --- | --- |
| **Reason for not purchasing insurance** | **N (%)** |
| It is expensive | 69 (63.00%) |
| I lack trust in insurance, | 2 (1.80%) |
| It takes a long to pay | 3 (2.70%) |
| I do not need it. | 15 (14.00%) |
| I do not have the information | 21 (19.00%) |

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**Table 4.4 Farmer's perception regarding drought management**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Questions | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| I have recorded livestock mortality in the past 5 years due to drought | | 45,5% | 18,8% | 18,81% | 16,83% | 0,00% |
| I do not have the full capacity to deal with drought | | 54,46% | 8,91% | 3,96% | 31,68% | 0,99% |
| The impact of drought complicates my farming business | | 60,00% | 20,00% | 15,00% | 5,00% | 0,00% |
| I have received drought relief from the government in the past years | | 0,00% | 11,88% | 4,95% | 76,24% | 6,93% |
| I can deal with the impact of drought on my own | | 0,00% | 23,76% | 6,93% | 29,70% | 39,60% |
| I am willing to pay for index insurance as soon as it is available | | 5,94% | 51,49% | 2,97% | 37,62% | 1,98% |
| Drought is frequent in my area | | 64,36% | 2,97% | 1,98% | 30,69% | 0,00% |

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**Table 4.5** **Distribution of risk-aversion**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Risk-taking Scale (0-10) | R1: General | | R2: Animal management | |
|  | N | % | N | % |
| 0 | 14 | (13.86%) | 9 | (8.91%) |
| 1 | 2 | (1.98 %) | 0 | (0. 00%) |
| 2 | 4 | (3.96%) | 2 | (1.98%) |
| Total Risk averse (0,1,2) | 20 | (19.9%) | 11 | (10.89%) |
| 3 | 7 | (6.93%) | 7 | (6.93%) |
| 4 | 14 | (13.86%) | 12 | (11.88%) |
| 5 | 15 | (14.85%) | 5 | (9.90%) |
| 6 | 11 | (10.89%) | 9 | (8.91%) |
| 7 | 15 | (14.85%) | 13 | (12.87%) |
| Total Risk neutral (3-7) | 61 | (61.39%) | 46 | (54.54%) |
| 8 | 9 | (8.91%) | 16 | (15.84%) |
| 9 | 5 | (4.95%) | 15 | (14.85%) |
| 10 | 5 | (4.95%) | 8 | (7.92%) |
| Total Risk takers (8-10) | 19 (18.81%) 39 (38.61%) | | | |
| Scale: 0 shows complete unwillingness to take the risk, 10 indicates complete willingness to take the risk | | | | |

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**Table 4.6 Distribution of risk-aversion in comparison with other community members.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Risk-taking | R1: General | | R2: Animal management | |
|  | N | % | N | % |
| 1 | 20.00 | (19.80%) | 18.00 | (17.82%) |
| 2 | 34.00 | (33.66%) | 23.00 | (22.77%) |
| 3 | 25.00 | (24.70%) | 27.00 | (26.73%) |
| 4 | 17.00 | (16.83%) | 27.00 | (26.73%) |
| 5 | 5.00 | (4.95 %) | 6.00 | (5.94%) |
| Total | 101 | (100%) | 101 | (100%) |
| Scale: 1- I usually take much fewer risks than other members of my community, 5- I usually take much more risks than other members of my community | | | | |

*The author collected primary data*

**Table 4.7 Estimation results for the determinants of risk-aversion**

|  |  |  |
| --- | --- | --- |
|  | **Dependent variable:** | |
| **Explanatory variables** | **R1** | **R2** |
| Age | -0.05\*\* | -0.06\*\* |
|  | (0.02) | (0.02) |
| Female | -0.70 | -1.03\* |
|  | (0.601) | (0.55) |
| Education | 0.15 | 0.24 |
|  | (0.34) | (0.31) |
| Income | -0.00 | -0.00 |
|  | (0.00) | (0.00) |
| Drought frequency | -0.07 | 0.31 |
|  | (0.27) | (0.24) |
| Weather forecast | 0.30 | 0.58 |
|  | (0.58) | (0.53) |
| Livestock sales | 0.11 | 0.06 |
|  | (0.13) | (0.13) |
| Herd size | 0.01 | 0.04 |
|  | (0.029) | (0.026) |
| Farming experience | -0.08\* | -0.07\*\* |
|  | (0.04) | (0.04) |
| Arable land | 0.14 | 0.07 |
|  | (0.11) | (0.10) |
| Single | -0.16 | 0.30 |
|  | (0.80) | (0.74) |
| Constant | 7.94\*\*\* | 8.10\*\*\* |
|  | (2.06) | (1.89) |
| Observations | 101 | 101 |
| R2 | 0.19 | 0.32 |
| Adjusted R2 | 0.09 | 0.23 |
| Residual Std. Error (df = 89) | 2.73 | 2.50 |
| F Statistic (df = 11; 89) | 1.89\* | 3.78\*\*\* |
| Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01 | | |

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**Table 4.8 Implied loss aversion**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Lottery Task | Acceptable loss | | ω=1 α=1 β=1 | ω=0.864 α=1  β=1 | ω=1  α=0.72 β=0.73 | ω=0.864 α=0.72 β=0.73 | Frequency |
|  | |  | λ1 | λ2 | λ3 | λ4 |  |
| 1.Reject All | | <8 ZAR | >2.5 | >2.16 | >1,89 | >1,64 | 18 (16%) |
| 2.Accept\_L1, reject L2 to L6 | | 8 ZAR | 2.50 | 2,16 | 1,89 | 1,64 | 15 (14%) |
| 3.Accept\_L2, reject L3 to L6 | | 11 ZAR | 1.81 | 1,57 | 1,50 | 1,30 | 25 (23%) |
| 4.Accept\_L3, reject L3 to L6 | | 14 ZAR | 1.43 | 1,24 | 1,26 | 1,09 | 30 (27%) |
| 5.Accept\_L4, reject L4 to L6 | | 17 ZAR | 1.18 | 1,02 | 1,09 | 0,94 | 18 (16%) |
| 6.Accept\_L5, reject L6 | | 20 ZAR | 1.00 | 0,86 | 0,97 | 0,84 | 4 (4.0%) |
| 7.Accept ALL | | 23 ZAR | ≤0.86 | ≤0,75 | ≤0,88 | ≤0,76 | 0 (0.0%) |
|  | | Median | 1.81 | 1.57 | 1.500 | 1.30 |  |
|  | | Mean | 1.762 | 1.53 | 1.45 | 1.26 |  |

*The author collected primary data*

**Table 4.9 Estimation results for the determinants of risk-aversion**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Dependent variable: | | | | |
|  | λ1 | λ2 | λ3 | | λ4 |
|  |  |  |  |  | |
| Age (in years) | 0.01\*\*\* | 0.01\*\*\* | 0.01\*\*\* | 0.01\*\*\* | |
|  | (0.00) | (0.0) | (0.00) | (0.00) | |
| Female | -0.02 | -0.01 | -0.01 | -0.01 | |
|  | (0.10) | (0.090) | (0.055) | (0.063) | |
| Education | 0.05 | 0.04 | 0.03 | 0.03 | |
|  | (0.12) | (0.10) | (0.06) | (0.07) | |
| Income | -0.00\* | -0.00\* | -0.00\* | -0.00\* | |
|  | (0.00) | (0.00) | (0.00) | (0.00) | |
| Drought frequency | 0.05 | 0.05 | 0.03 | 0.03 | |
|  | (0.04) | (0.04) | (0.02) | (0.03) | |
| Weather forecast | 0.04 | 0.03 | 0.02 | 0.03 | |
|  | (0.10) | (0.09) | (0.05) | (0.06) | |
| Livestock sales | -0.03 | -0.03 | -0.02 | -0.02 | |
|  | (0.02) | (0.02) | (0.01) | (0.01) | |
| Herd size | -0.00 | -0.00 | -0.00 | -0.00 | |
|  | (0.01) | (0.00) | (0.00) | (0.00) | |
| Single | 0.01 | 0.01 | 0.01 | -0.00 | |
|  | (0.14) | (0.12) | (0.07) | (0.09) | |
| Constant | 1.13\*\*\* | 0.98\*\*\* | 0.93\*\*\* | 1.06\*\*\* | |
|  | (0.29) | (0.25) | (0.15) | (0.18) | |
| Observations | 101 | 101 | 101 | 101 | |
| R2 | 0.24 | 0.24 | 0.25 | 0.25 | |
| Adjusted R2 | 0.17 | 0.17 | 0.17 | 0.18 | |
| Residual Std. Error (df = 91) | 0.48 | 0.41 | 0.25 | 0.29 | |
| F Statistic (df = 9; 91) | 3.23\*\*\* | 3.24\*\*\* | 3.29\*\*\* | 3.39\*\*\* | |
| Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01 | | | | | |

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**Table 4.10** **Conditional model estimates**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Model 1** | | **Model 2** | |
| **Variables** | **Coefficient** | **s.e.** | **Coefficient** | **s.e.** |
| ASC | -1.26\*\*\* | 0.32 | 0.24 | 0.91 |
| Transparency | 0.33\*\*\* | 0.09 | 0.33\*\*\* | 0.09 |
| Reimburse method |  |  |  |  |
| Voucher | 0.18 | 0.13 | 0.18 | 0.12 |
| Feed | 0.77\*\*\* | 0.13 | 0.77\*\*\* | 0.13 |
| Basis risk | -0.46\* | 0.28 | -0.52\* | 0.29 |
| Basis Risk x Education | 0.25\* | 0.10 | 0.27\*\* | 0.10 |
| Premium | -0.21\* | 0.09 | -0.22\* | 0.09 |
| Premium x Education | 0.01\*\* | 0.04 | 0.10\*\* | 0.04 |
| ASC x Size of arable land (hectares) | - | - | -0.26 \*\* | 0.09 |
| ASC x Drought Frequency | - | - | -0.29 \* | 0.14 |
| ASC x Loss aversion (λ4) | - | - | -0.13 | 0.32 |
| ASC x Trigger level 2 | - | - | -0.25 | 0.34 |
| ASC X Weather forecast | - | - | 0.13 | 0.32 |
| **Model statistics** |  |  |  |  |
| AIC | 1049.21 |  | 670.09 |  |
| BIC | 1084.47 |  | 615.92 |  |
| Rho-square | 0.22 |  | 0.24 |  |
| Final log-likelihood | -516.61 |  | -509.19 |  |
| Number of individuals | 101 |  | 101 |  |
| **Signif. Codes: \*\*\*, \*\*, and \* indicate significance at 1%, 5%, and 10% level, where s.e stands for standard error.** | | | | |

*The author collected primary data*

**Table 4.11 The latent class model selection criteria**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Class 2** | **Class 3** | **Class 4** |
| AIC | 1029.92 | 1024.60 | 1023.61 |
| BIC | 1109.25 | 1156.80 | 1208.70 |
| LL | -496.96 | -482.30 | -469.81 |
| Number of parameters | 18 | 30 | 42 |
| Sample Size | 101 | 101 | 101 |

*The author collected primary data*

**Table 4.12** **Latent class model estimates**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | **Class 1** | | | **Class 2** | |
| **Variables** | **Description** | **Estimate** | | **s.e.** | **Estimate** | **s.e.** |
| ASC | Non-insurance option=1, 0 otherwise | -1.98\*\*\* | | 0.43 | -1.98\*\*\* | 0.43 |
| Transparency | Receive weekly index update=1, 0 other wise | 0.86\*\*\* | | 0.25 | -0.35\* | 0.18 |
| Reimburse method |  |  | |  |  |  |
| Voucher | Voucher as mode of reimbursement=1, 0 cash | -0.13 | | 0.145 | 0.27\*\* | 0.18 |
| Feed | Feed as mode of reimbursement=1, 0 cash | 0.64\*\*\* | | 0.22 | 1.10\*\*\* | 0.28 |
| Basis risk | Risk of receiving lower reimbursement | 0.59\*\* | | 0.27 | -0.57\* | 0.30 |
| Premium | Premium to be paid | 0.16\*\* | | 0.08 | -0.30\*\*\* | 0.09 |
| **Class membership probability model** | | | | | | |
| Livestock sales | Animals sold the previous year | -0.26\* | | 0.13 | - | - |
| Size of arable land | Size of arable land (in hectares) | 0.17 | | 0.18 | - | - |
| Weather forecast | Receive weather forecast=1, 0 otherwise | 0.91 | | 0.55 | - | - |
| Young farmers | Respondents that are at most 50 years old | 1.08 | | 0.69 | - | - |
| Drought Frequency | Frequency in past five years | -0.17 | | 0.24 | - | - |
| Loss Aversion | Loss-aversion (accounting PW and DS) | 0.72 | | 0.85 | - | - |
| **Model statistics** | | | | | |  |
|  |  |  |  | |  |  |
| Segment probability | Probability of individual belonging to segment | 0.53 |  | | 0.47 |  |
| AIC | Akaike Information Criterion | 1029.89 |  | | - |  |
| BIC | Bayesian Information Criterion | 1109.21 |  | | - |  |
| Rho-square | McFadden Pseudo R square | 0.2536 |  | | - |  |
| LL (0, whole model) | log-likelihood | -665.76 |  | | - |  |
| LL (final, whole model) | Final log-likelihood | -496.94 |  | | - |  |
| Number of respondents in the model | | 101 |  | |  |  |
| **Signif. Codes: \*\*\*, \*\*, and \* indicate significance at 1%, 5%, and 10% level, where s.e standards for standard error.** | | | | | | |

*The author collected primary data*

**Table 4.13** **WTP estimates from CL model without interaction.**

|  |  |  |
| --- | --- | --- |
|  | Value (ZAR) | Confidence Interval |
| Transparency | 155.50 | [-16.63, 327.66] |
| Voucher | 86.62 | [-61.94, 235.17] |
| Feed | 362.60 | [0.92,724.31] |
| Basis Risk | -220.10 | [-498.05 57.76] |

*The author collected primary data*

**Table 4.14** **The WTP estimates from latent class model-Class 2**

|  |  |  |
| --- | --- | --- |
|  | Value (ZAR) | Confidence Interval |
| Transparency | -116.40 | [-230.14 -2.70] |
| Voucher | 91.56 | [-17.91 ,201.03] |
| Feed | 364.60 | [105.88, 623.37] |
| Basis Risk | -188.90 | [-392.28, 14.57] |

*The author collected primary data*