

SUPPLEMENTARY MATERIAL – APPENDICES

Appendix 1.

List of questions used for collecting data for factor analysis.

SA = Strongly agree, A = Agree, N= Neutral, D = Disagree, SD = Strongly disagree

Items	SA	A	N	D	SD
A. Production knowledge					
I have knowledge on how to acquire land easily for production					
I use quality inputs for production					
I get seedlings from a reliable source					
I have knowledge on pest and disease control on nursery beds					
I have knowledge on pest and disease control on a grains of paradise farm					
I have knowledge on pest and disease control on a black pepper farm					
I have knowledge on fertilizer application on grains of paradise					
I have knowledge on fertilizer application on black pepper					
B. Need for achievement					
I practice optimum input application as recommended by scientists					
I use recommended planting distance for grains of paradise					
I update my farming activities base on recent changes in recommended technology					
I use recommended planting distance for black pepper					
I acquire additional knowledge on marketing trends of prices of inputs and final products.					
C. Risk management					
I take risk and actively involved in the monitoring of the value-adding process to reduce wastage of products					
I have an average size of a retail store					
I decide on the type of value-added products for large scale production to get more profit.					
I make sure there is enough grains of paradise to meet the requirements of customers					
I make sure there is enough black pepper to meet the requirements of customers					
I explore and use facilities for storage and processing.					
D. Need for autonomy					
I decide on the kind of weed control on my farm					
I decide on the method of propagation of NTFPs and food crops					
I decide on the quantum of produce to be sold during different periods in a year					

E. Marketing knowledge and networking

I decide on how to optimally combine resources (financial, physical and human) to meet customers' requirements

I can identify niche markets and supply the products as per the orders placed by the buyers

I market my products in furthest places if necessary

I depend on middlemen for the sale of grains of paradise

I depend on middlemen for the sale of black pepper

I use my family members as a source of labour

I use hired labour

I exchange and share opinion on technology with other farmer entrepreneurs in preparatory, production and marketing stage of value-added products

F. Managerial ability

I plan to utilise time as a resource effectively and efficiently

I have access to good funding sources

I keep regular records

I have the knowledge to manage my farm

Appendix 2.

Reliability test results.

S/No	Sub-scale	Items	Mean	Range	SD	Cronbach Alpha
1	Production knowledge	8	2.72	1-5	0.92	0.57
2	Need for achievement	5	3.04	1-5	0.60	0.28
3	Risk management	6	2.81	1-5	0.55	0.58
4	Need for autonomy	3	3.04	1-5	0.68	0.82
5	Marketing knowledge	8	3.02	1-5	0.97	0.11
6	Managerial ability	4	3.24	1-5	0.88	0.57
7	All	34	2.93	1-5	0.78	0.86

Appendix 3.

Factor loadings.

Variables	Factors							
	1	2	3	4	5	6	7	8
X 1	-0.672	-0.224	0.058	-0.208	-0.088	0.041	-0.088	-0.111
X2	0.424	0.161	-0.054	0.285	0.235	-0.577	0.098	-0.270
X3	0.317	0.217	0.228	-0.292	-0.394	0.390	-0.312	0.285
X4	0.056	0.247	0.162	0.823	-0.052	0.005	-0.032	-0.066
X5	0.121	0.051	0.11	0.895	0.044	0.002	0.02	-0.043
X6	0.105	-0.764	0.107	-0.086	0.239	0.154	0.137	0.126
X7	0.190	0.728	0.089	0.114	-0.044	-0.026	0.137	-0.057
X8	0.169	0.020	0.736	0.204	0.137	0.153	-0.042	-0.217
X9	0.081	-0.004	0.773	-0.008	0.194	0.048	0.144	0.097
X10	0.410	0.185	0.678	0.196	0.132	-0.106	0.206	-0.055
X11	0.517	0.397	0.478	0.13	-0.233	-0.047	0.146	0.013
X12	0.126	-0.148	0.13	-0.013	-0.736	-0.036	0.059	-0.023
X13	-0.145	-0.116	-0.148	0.081	0.129	0.131	-0.832	0.061
X14	0.016	0.01	0.4	0.195	0.579	-0.287	-0.15	0.017
X15	0.137	0.19	0.529	-0.151	-0.690	-0.572	0.039	0.204
X16	0.354	0.289	0.047	-0.230	0.201	0.195	0.12	0.461
X17	0.584	0.424	0.373	0.060	-0.213	-0.03	-0.054	-0.013
X18	0.684	-0.067	0.051	0.080	-0.133	0.009	0.334	0.202
X19	0.192	0.816	0.147	0.035	0.000	0.082	0.023	-0.087
X20	0.629	0.253	0.196	-0.355	0.210	-0.134	0.023	-0.087
X21	0.629	0.241	0.085	0.246	-0.082	-0.14	-0.316	-0.097
X22	0.488	0.155	0.153	0.244	-0.106	-0.462	-0.339	0.200
X23	0.149	0.535	-0.018	0.105	0.079	0.155	-0.112	0.574
X24	0.756	-0.147	0.13	0.082	-0.107	0.122	0.209	0.256
X25	0.273	0.743	0.106	0.014	0.37	0.076	0.007	0.025
X26	0.772	0.196	0.271	-0.172	0.279	-0.022	-0.005	-0.141
X27	0.216	0.017	0.346	0.13	-0.042	0.409	0.339	0.153
X28	-0.004	-0.167	-0.06	-0.078	-0.1	0.015	0.013	0.769
X29	0.103	0.254	0.166	0.039	0.08	0.694	-0.178	0.181
X30	0.675	0.200	0.445	-0.024	0.154	0.042	0.017	-0.068
X31	0.277	0.137	0.319	-0.274	0.629	0.078	0.080	0.133
X32	0.467	-0.200	0.188	0.353	0.047	0.063	0.463	0.2
X33	-0.027	0.419	0.146	-0.376	0.354	0.160	0.221	0.145
X34	0.431	0.173	0.324	0.016	0.421	0.123	0.257	-0.197

Source: Authors' own computation based on field data, 2018. NB: The rotated component matrix uses 0.50 as a cut-off point for factor loading for naming the factors.

Appendix 4.

Naming of extracted factors.

Factors	Percentage of variance (%)	Cumulative %
Factor 1: Access to market information	16.6	16.6
X1: Easy acquisition of land		
X18: I have knowledge on pest and disease control on the grain of paradise farm		
X20: I have the ability to identify a market niche and supplying the products as per the orders placed by the buyers		
X21: I take risk and actively involved in the monitoring of the value-adding process to reduce the wastage		
X24 I know the required fertiliser application for grains of paradise		
X26 I acquire additional knowledge on marketing trends on the price of ingredients and final products		
X30 I know the quantum of produce to be sold during different periods in a year		
Factor 2: Personal commitment	12.0	28.6
X6 I use recommended planting distance for grains of paradise		
X7 I use recommended planting distance for black pepper		
X19 I have personally gained knowledge on how to control pest and disease on black pepper farm		
X25 I have personally gained knowledge on fertiliser application on black pepper farm		
Factor 3: Attention to details	10.0	38.6
X8 I take my time in the application of quality inputs		
X9 I get seedlings from a reliable source		
X10 I decide on the most reliable weed control on my farm		
Factor 4: Adaptability to new technology	7.7	46.3
X4 I decide on practising optimum input ingredients as recommended by scientists		
X5 I use the updated technology as recommended by stakeholders		
Factor 5: Family support	6.9	53.2
X12 I use my family members as a source of labour		
X31: I have an off-farm job that supports my farm job		
Factor 6: Knowledge on value addition	5.7	58.9
X2: I can decide on the type of value-added products for large-scale production to get more profit		
X15: I know how to manage my farm for higher profits		
X29 I depend on intermediaries for the sales of NTFPs		
Factor 7: Availability of farm labour	5.3	64.2
X13 I use hired labour		
Factor 8: Networks with value chain actors	5.2	69.4

X14: I exchange and share opinion on technology with other agripreneurs in the production, marketing and value-added activities

X28 I depend on intermediaries for the sale of grains of paradise

Appendix 5.

Description of variables used in the Ordinary Least Squares and Quantile regression.

Variable	Description	Measurement	Expected sign	Mean	SD	Relevant literature
Dependent variables						
Entrepreneurial score	The General Entrepreneurial Tendency (GET2 TEST) score of each farmer	Number		28.78	3.40	
Independent variables						
Personal and demographic characteristics						
Age	Number of years from birth	Number	-	51.10	7.69	Folmer et al., 2010 ; Sinyolo et al., 2017
Ln education	Natural log of the number of years of education	Number	+	5.30	4.62	Folmer et al., 2010; Nagler & Naudé 2014
Household size	Total number of people in a household	Number	+	7.23	2.36	Folmer et al., 2010
Gender	Sex of the respondent	1=Male, 0=Female		0.44	0.50	Anggadwita and Dhewanto, 2016; Fitz-Koch et al., 2018
Per capita	Monthly per capita expenditure of each household	Expenditure/ household size	+	72.18	72.21	Zhu et al., 2017
Personal commitment	Personal commitment of the farmer to NTFP production	Factor 2 from factor analysis	+	3.03e-07	1.00	Anggadwita and Dhewanto, 2016
Attention to details	Attention to details by the farmer	Factor 3 from factor analysis	+	1.54e-07	1.00	McElwee, 2006
Family support	Support NTFP producers received from family	Factor 5 from factor analysis	+	8.36e-07	1.00	Kuada, 2009 and Xiong et al., 2018
Production characteristics						
Years of farming	Number of years of farming	Number	+	10.72	2.55	Lans et al. 2017; Rosairo and Potts, 2016
Off-farm job	Participation in off-farm job	1=Yes,0=No	+	0.22	0.41	Haugen and Vik, 2008; Hansson et al., 2013
Ln farm size	Natural log of the size of the farm	Acres	+	2.75	1.41	Sinyolo et al., 2017

Availability of farm labour	The availability of farm labour to support farming	Factor 7 from factor analysis	+	8.30e-07	1.00	Dias et al., 2019a
Adaptability	The ability of the farmer to adapt to new technology	Factor 4 from factor analysis	+	1.48e-07	1.00	Fitz-Koch et al., 2018
Value addition and marketing characteristics						
Marketing information	Access to marketing information	Factor 1 from factor analysis	+	8.25e-07	1.00	Belcher and Schreckenberg, 2007
Value addition knowledge	Knowledge level on value addition of NTFPs	Factor 6 from factor analysis	+	6.01e-07	1.00	Amoah and Wiafe, 2012
Networks with value chain actors	Having relationship between various NTFP value chain actors	Factor 8 from factor analysis	+	1.14e-06	1.00	Chell and Baines, 2000; Witt, 2004.

Source: Authors' compilation based on field data and literature review, 2018.