## PEASANT GRAIN STORAGE AND MARKETING IN TANZANIA: A CASE STUDY OF MAIZE IN SUMBAWANGA DISTRICT

Von der Landwirtschaftlich-Gärtnerischen Fakultät der Humboldt-Universität zu Berlin zur Verleihung des akademischen Grades Doctor rerum agriculturarum (Dr.rer.agr.) genehmigte Dissertation

Vorgelegt von
B.Sc., M.Sc. Gasper Ashimogo
aus Nachingwea, Tansania

1.	INTRODUCTION1				
	1.1	Overview			
	1.2	Problem statement			
		1.2.1	Grain supply variability	2	
		1.2.2	Low government storage capacity	4	
		1.2.3	Households trade-off between food sufficiency		
			and cash needs	5	
		1.2.4	Lack of information	6	
	1.3	Object	tives of the study	7	
	1.4	Resea	rch questions	8	
	1.5	Hypotheses			
	1.6	Data base			
	1.7	Organ	isation of the study	13	
2.	THE		NG OF THE MAIZE SECTOR IN TANZANIA		
	2.1	Recent economic and agricultural trends			
	2.2	Structure of maize production			
		2.2.1	Aggregate national production		
		2.2.2	Regional maize production		
		2.2.3	The National Maize Project	22	
	2.3	Production and marketing trends		23	
		2.3.1	Production trends	24	
		2.3.2	Marketing trends	25	
		2.3.3	Constraints to maize production and marketing	27	
	2.4	Maize as a staple grain28			
	2.5	Conclu	usions	29	

3.	GOVERNMENT MAIZE POLICY				
	3.1	Background			
	3.2	Marke	ting institutional and organisational policies	31	
		3.2.1	Marketing arrangements between		
			1961/62 and 1973/74	31	
		3.2.2	Marketing arrangements between		
			1976/77 and 1983/84	34	
	3.3	Pricing	g policy	35	
	3.4	Grain	storage policy	39	
		3.4.1	Policy development	39	
		3.4.2	Storage capacity	42	
		3.4.3	The Strategic Grain Reserve (SGR)	45	
	3.5	Market liberalisation			
		3.5.1	Meaning and concepts	47	
		3.5.2	Cereal market liberalisation in Tanzania	49	
			3.5.2.1 Reasons for reform	49	
			3.5.2.2 Donor pressure for reform	50	
			3.5.2.3 Specific objectives and measures of the reform	51	
			3.5.2.4 Preliminary achievements of liberalisation	52	
4.	THE	ORETI	CAL AND CONCEPTUAL FRAMEWORK	54	
	4.1	Models for evaluating economic analysis of markets			
		4.1.1	Internal productive efficiency of marketing enterprises .	55	
		4.1.2	The structure-conduct-performance (S-C-P) model		
		4.1.3	The food systems framework	57	
	4.2	Measu	res of marketing efficiency	57	
		4.2.1	Technical efficiency	58	
		4.2.2	Pricing efficiency	59	
		4.2.3	Equity and income distribution		
		4.2.4	Food security		

4.3	Efficien	cy in agricultural commodity storage	.61			
	4.3.1	Theory of storage	.61			
		4.3.1.1 Supply of storage	.61			
		4.3.1.2 Demand for storage	.62			
		4.3.1.3 Equilibrium in storage supply and demand	63			
	4.3.2	Recent developments in theory of storage	.64			
	4.3.3	Role of storage	.65			
	4.3.4	Data requirements for assessment of storage efficiency	.68			
		4.3.4.1 Seasonal price patterns	68			
		4.3.4.2 Storage costs	71			
	4.3.5	Assessment of temporal efficiency	74			
4.4	Theory	of the agricultural household	78			
	4.4.1	Basis of the theory	78			
	4.4.2	Trade model of peasant behaviour	79			
		4.4.2.1 Graphical presentation	79			
		4.4.2.2 Numerical presentation	82			
4.5	Conce	ptual framework	84			
4.6	Data limitations and conceptual problems					
	4.6.1	Data limitations	88			
	4.6.2	Conceptual problems	89			
٠		4.6.2.1 Labour and material costs	89			
		4.6.2.2 Interest rates	90			
		4.6.2.3 Storage losses	93			
		4.6.2.4 Price and other socio-economic aspects	94			
		4.6.2.5 Practical implications of the household model	95			

5.	GR/	AIN STO	PRAGE IN SUB-SAHARAN AFRICA9	96
	5.1	Storag	e as part of the production process	<del>)</del> 6
	5.2	Review	v of grain storage systems10	00
		5.2.1	On-farm storage10	)()
		5.2.2	Off-farm storage10	)2
		5.2.3	Storage costs10	)4
	5.3	The sta	ate of the storage literature10	)5
6.	RES	SEARCH	METHODOLOGY FOR THE CASE STUDY10	)6
	6.1	The st	udy area10	)6
		6.1.1	Geographical location10	)6
		6.1.2	Marketing environment10	8(
			6.1.2.1 Transport infrastructure and facilities10	8(
			6.1.2.2 Market facilities11	11
			6.1.2.3 Off-farm storage capacity11	13
		6.1.3	Agroecological features11	17
			6.1.3.1 Climate and rainfall11	17
			6.1.3.2 Agriculture11	19
		6.1.4	Socio-economic characteristics12	21
			6.1.4.1 Population12	21
			6.1.4.2 Income	22
		6.1.5	Justification of choice of the study area12	23
		6.1.6	Justification of survey focus on maize subsector12	25
	6.2	Metho	ds of data collection12	26
		6.2.1	Secondary data sources12	26
		6.2.2	Primary data sources12	27
			6.2.2.1 Selection of survey villages12	28
			6.2.2.2 Profile of survey villages12	29
			6.2.2.3 Sampling and data collection procedure13	34
		6.2.3	Data limitations13	39

Page

7.	EMF	PIRICAL	FINDINGS OF THE CASE STUDY	142
	7.1	Chara	cteristics of sample households	142
	7.2	Farmir	ng systems	144
		7.2.1	Agricultural resource endowment	144
			7.2.1.1 Land holding and distribution	144
			7.2.1.2 Labour	149
			7.2.1.3 Capital	150
		7.2.2	Seasonal farming activity pattern	150
		7.2.3	Production systems and technology	152
		7.2.4	Yield and aggregate production	153
	7.3	Analysis of the post-harvest maize systems at farm level		
		7.3.1	Pre-storage practices	160
			7.3.1.1 Harvesting and drying	160
			7.3.1.2 Farm to homestead transport	162
			7.3.1.3 Treatment against pests	162
		7.3.2	Storage methods and structures	168
			7.3.2.1 Types of storage structures	168
			7.3.2.2 Effects of storage practices on weight losses.	171
			7.3.2.3 Capacity and life span of storage structures	174
			7.3.2.4 Location of structures	174
		7.3.3	Purpose of storage	175
			7.3.3.1 Utilisation of harvested maize	175
			7.3.3.2 Storage of other products	178
			7.3.3.3 Utilisation of stored maize	179
			7.3.3.4 Total disposal of harvested maize	182
		7.3.4	Period of storage	184
	7.4	Maize marketing and transactions		
		7.4.1	Farmers marketing management and decisions	186
			7.4.1.1 Time of selling	186
			7.4.1.2 Marketing channels for maize	103

			7.4.1.3 Conditions guiding farmers marketing				
			decisions	200			
		7.4.2	Market organisation and trade practice	204			
			7.4.2. Role of the government	204			
			7.4.2.2 Market information	206			
			7.4.2.3 Markets and facilities	208			
			7.4.2.4 Weights and grades	209			
			7.4.2.5 Role of traders	210			
8.	EFFICIENCY AND DISTRIBUTION EFFECTS OF MAIZE						
	STO	RAGE	AND MARKETING	217			
	8.1	Role o	f maize in household income	217			
		8.1.1	Income levels and composition	218			
		8.1.2	Role of maize in income distribution	221			
	8.2	Factor	s determining the marketed surplus of maize	222			
	8.3	Storag	e and marketing efficiency	231			
		8.3.1	Market integration	231			
			8.3.1.1 Market integration between rural and town				
			markets in Sumbawanga district	235			
			8.3.1.2 Integration between regional markets and				
			Dar-es-Salaam markets	236			
		8.3.2	Spatial pricing efficiency	237			
			8.3.2.1 Marketing margins	237			
			8.3.2.2 Marketing costs	244			
		83.3	Temporal efficiency	245			
			8.3.3.1 Storage costs	246			
			8.3.3.2 Seasonal farm gate prices	249			
			8.3.3.3 Returns to seasonal storage	251			

8.4	Implications of maize storage and marketing patterns					
		on foo	d security	261		
		8.4.1	Determination of a subsistence level	262		
		8.4.2	Quantities of maize consumed and food adequacy	264		
٠		8.4.3	Maize deficit households coping strategies	266		
		8.4.4	Seasonal maize purchase patterns	269		
	8.5	Conclu	uding remarks	273		
9.	SUMMARY, CONCLUSIONS AND PROPOSALS FOR					
	FUTURE RESEARCH					
	9.1	Summary		276		
		9.1.1	A revisit of the scope of the study	276		
		9.1.2	Summary of results	279		
	9.2	Conclu	usions	282		
	9.3	9.3 Suggestions for future research		285		
BIB	LIOG	RAPHY	,	289		
API	PEND	ICES		311		