

MSEs, producers and digital platform engagement: exploring hybrid value chains in Kenya

AARTI KRISHNAN, UNIVERSITY OF MANCHESTER & OVERSEAS
DEVELOPMENT INSTITUTE

TRANSFORMING ECONOMIES – FOR BETTER JOBS

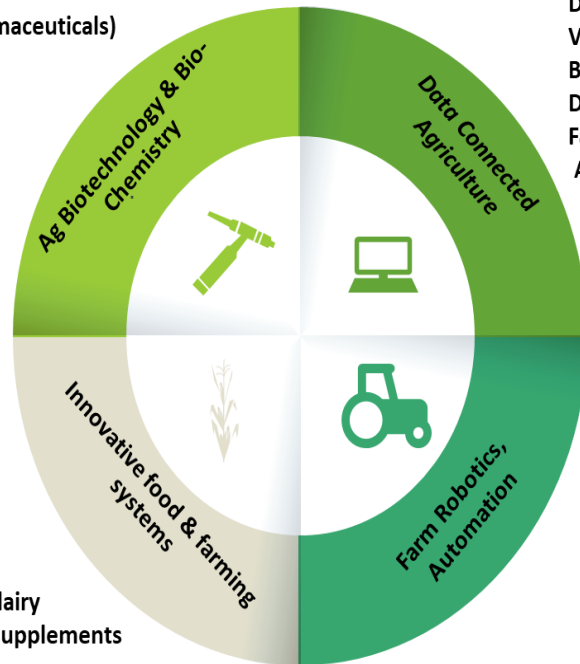
WIDER DEVELOPMENT CONFERENCE, 11-13 SEPTEMBER 2019, BANGKOK

Hybrid value chains

- Increase in polycentric trade (Horner and Nadvi 2018)
- Increased supermarketization (Reaedon et al 2013)
- Strategic diversification occurring and new markets (Barrientos et al 2016)
- AfCFTA, government policies by HCD targeting special new 'emerging' group
- Focus on regional- hybrid value chains
- Compare traditional versus a digital value chain

The AgriTech space in Kenya

Chemicals
Genetics
Biologics (biopharmaceuticals)
Seeds
Biomaterials
Bio-chemicals
Bio-energy



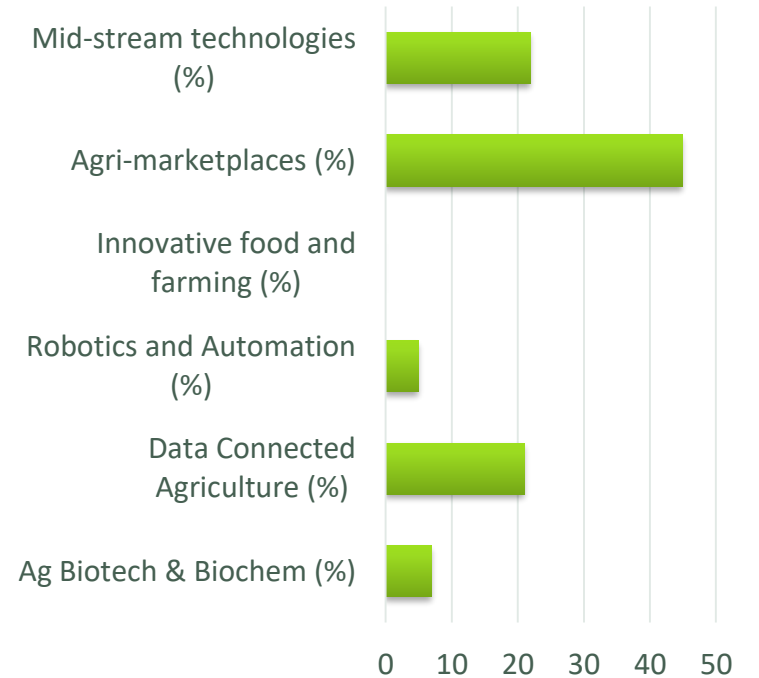
Data Capturing Devices (Sensors)
Video Imaging
Big Data Analytics
Decision Support Software
Farm ERP and Optimization
Agri Market places (apps for inputs and ecommerce)

Precision equipment
Autonomous Equipment
Robotics
Drones

Mid-Stream Technologies

- Traceability (Blockchains)
- Smart warehousing
- Shelf life enhancement
- Logistics optimization

Indoor farms
Plant based meats
Cultured meat and dairy
Nutraceuticals and supplements

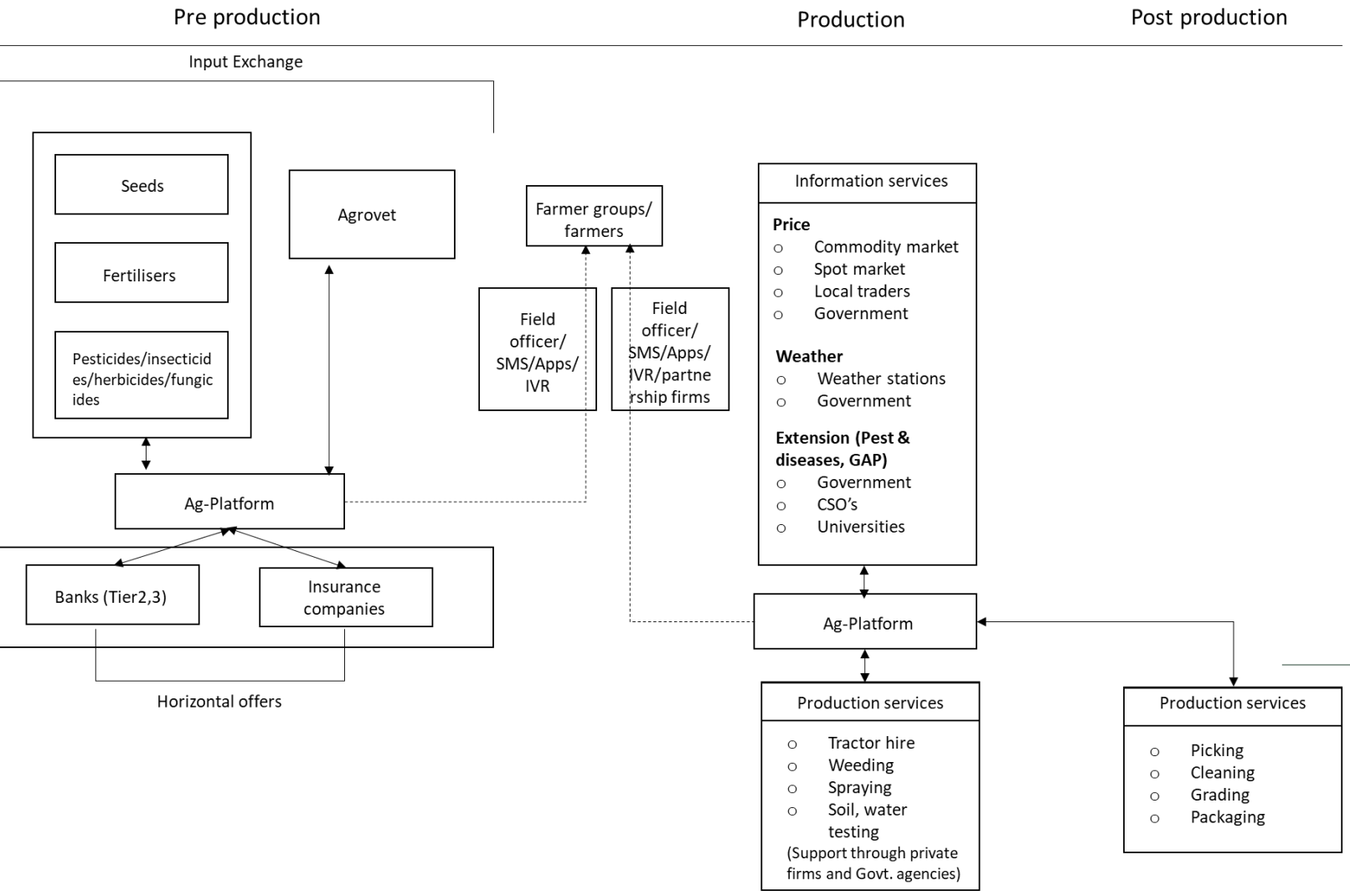


Rise of Ag-platforms in hybrid value chains

- Digital platforms have been defined as technology architectures that support further development - of mobile and web applications which serve as two-sided or multi-sided market that brings two or more user with similar interest together (Gawer, 2014).
- 2 types: Digital innovation platforms and Digital transaction platforms (Koskinen et al., 2018)
- Characteristics of platforms:
 - Scope: breadth of functions and processes that characterize the Ag-Platforms (Krishnan et al 2019)
 - Scale: node of the value chain (which can be trans-national)
- In this context- Upgrading
 - Epistemology: for whom and what it means (DeMarchi et al 2019)
 - Economic upgrading: increase in productivity (through yield) – current focus (CTA 2019)
 - Other definitions can include TFP,

Ag-platform models: Modular approach

Scope→	Type of Scope			
Production Exchange 1	Backward Exchange	Horizontal offers	Information services	
Production Exchange 2	Backward Exchange	Horizontal offers	Information services	Production and harvest Services
Output Exchange	forward exchange	Horizontal offers	Information services	
Trading and sharing 1	marketplace matching	Horizontal offers	Information services +Production and harvest Services	Sharing and exchange of knowledge
Trading and sharing 2	marketplace matching	Horizontal offers	Information services +Production and harvest Services +Complex information services	Sharing and exchange of knowledge
Guarantee purchase and logistics	Guaranteed purchase and prices	Information services		
Full range	All			



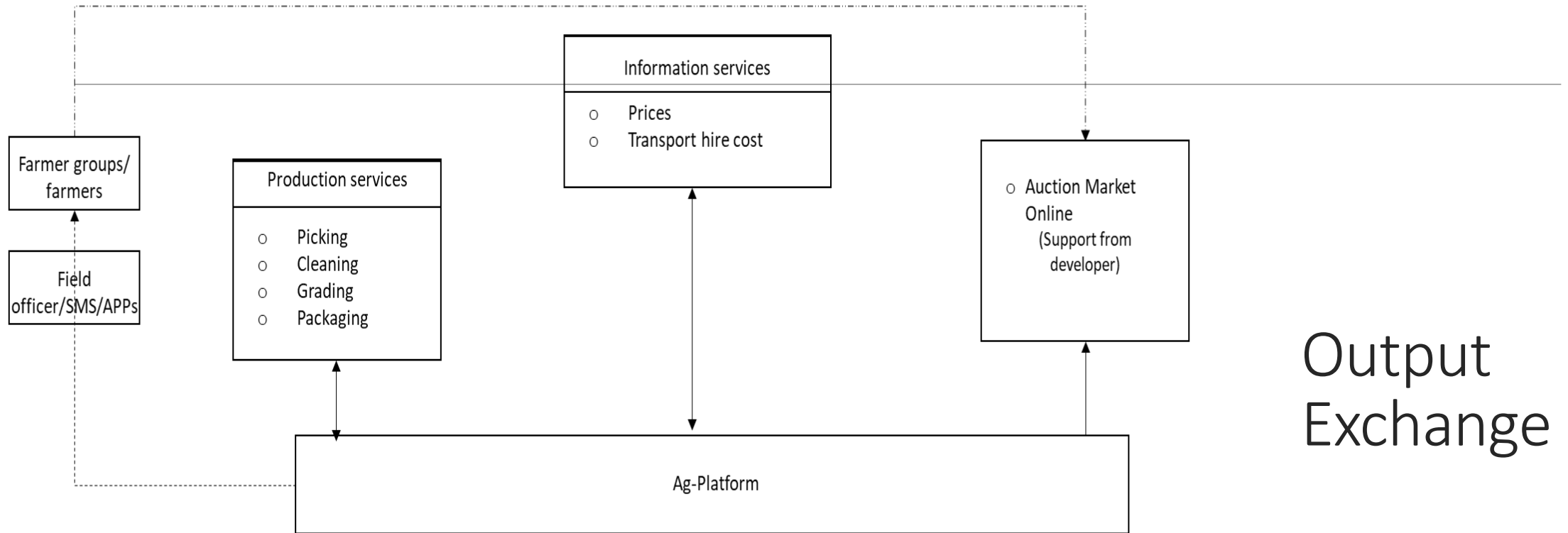
Production Exchange 1 and 2

↔ Deal tie
 - - - - - Product/service use tie

Post production

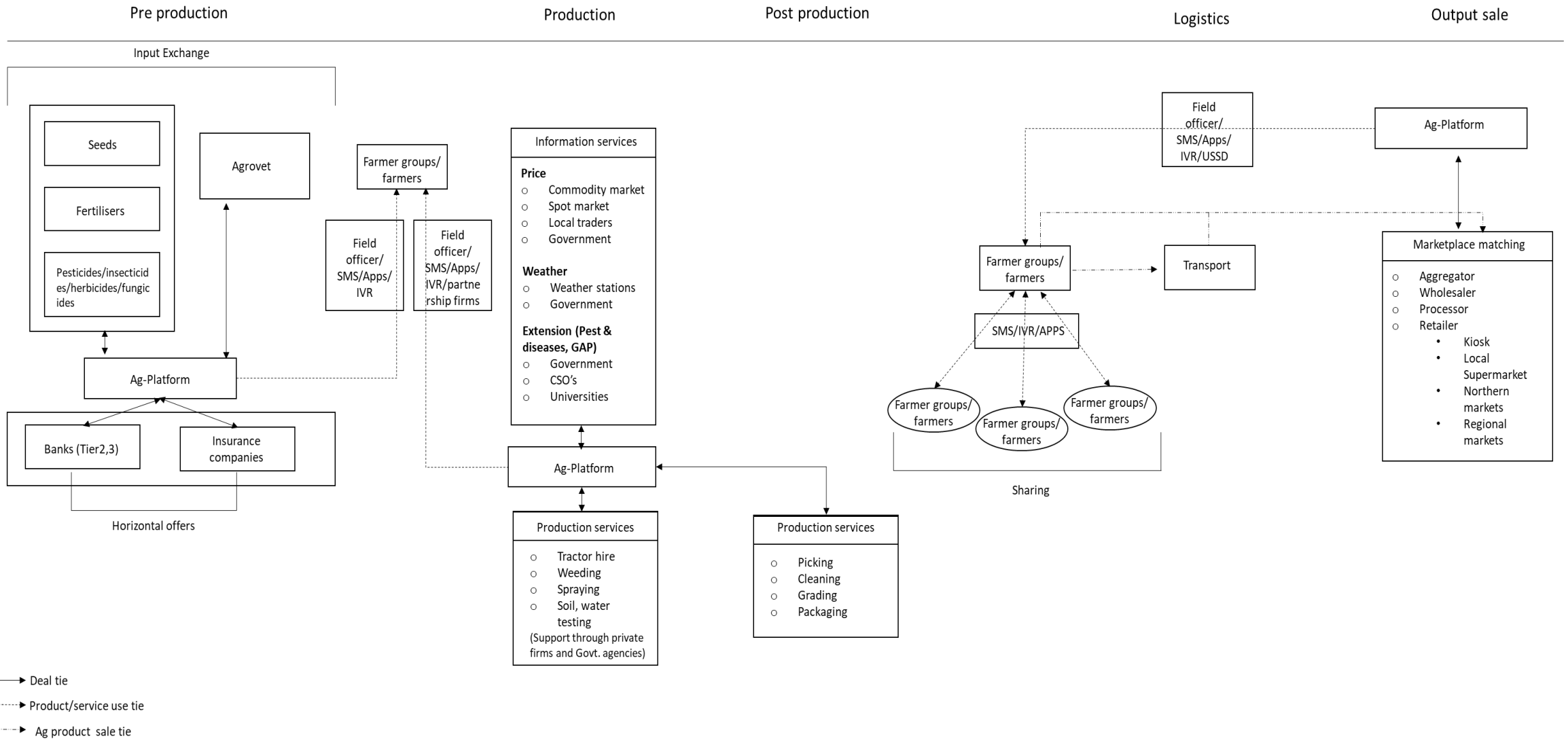
Logistics

Output sale

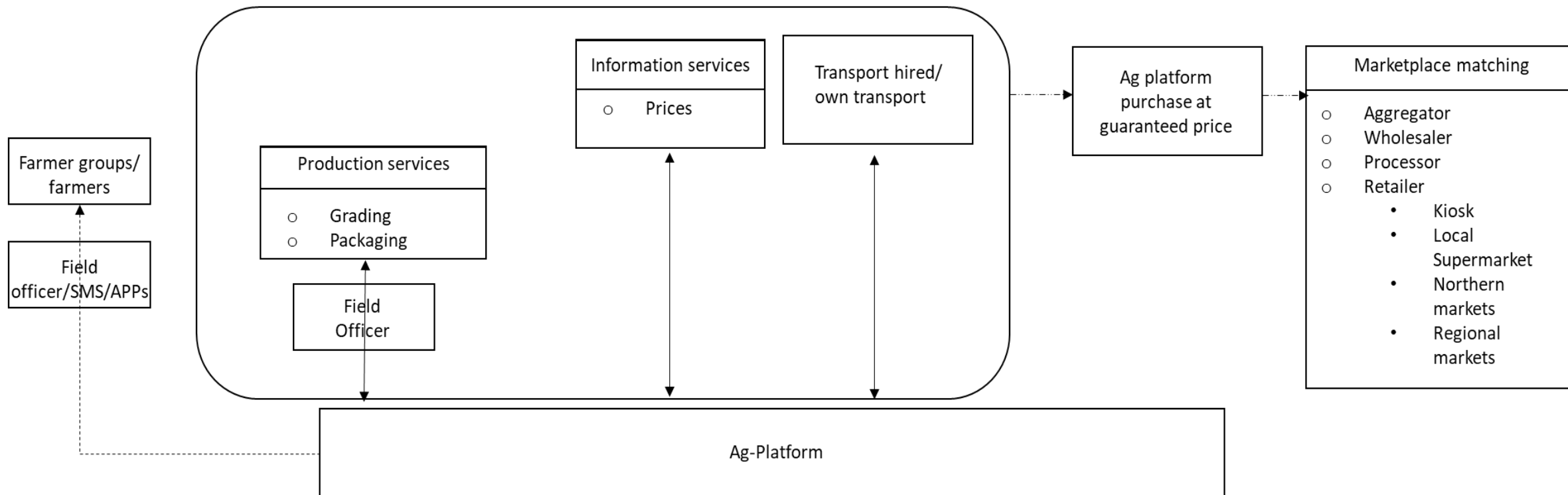


Output Exchange

- ↔ Deal tie
- ⋯→ Product/service use tie
- ⋯→ Ag product sale tie



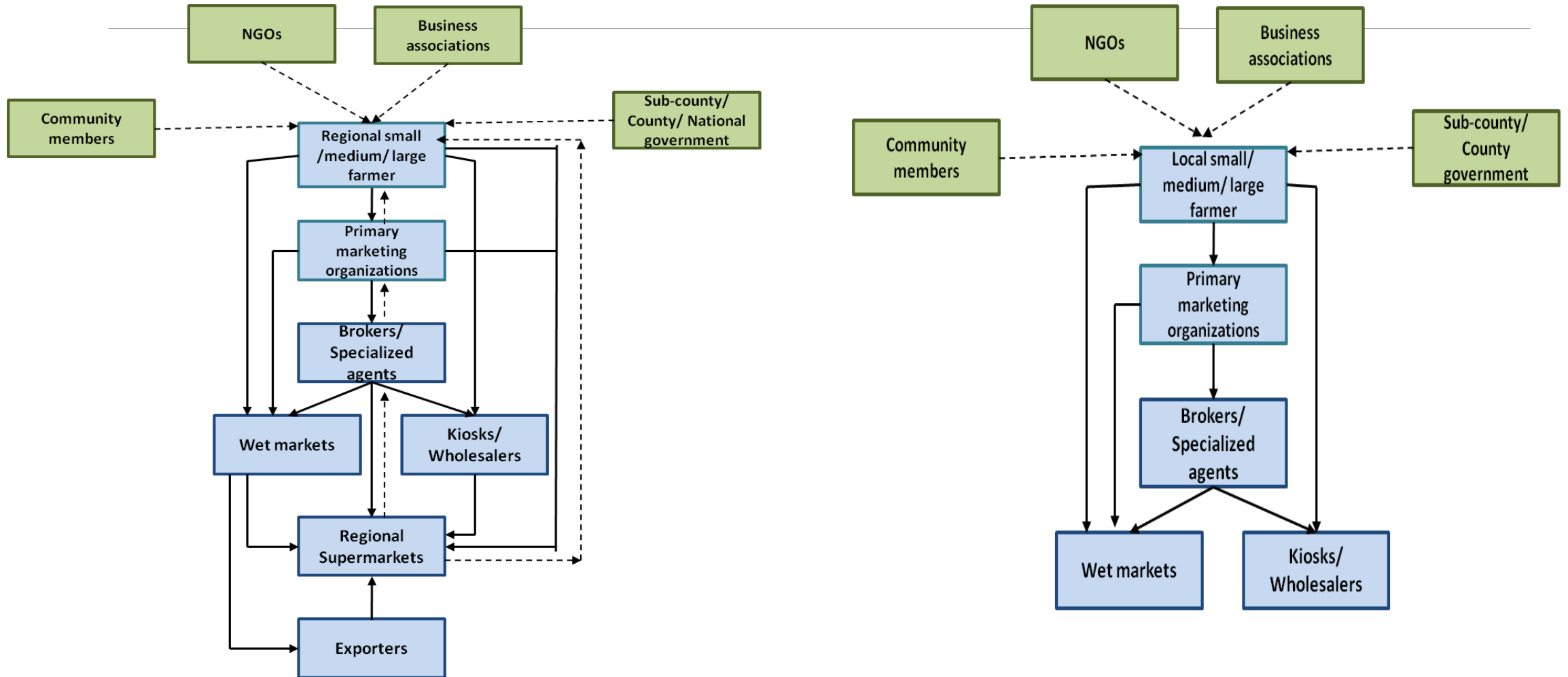
Trading and Sharing 1 and 2



- ↔ Deal tie
- - - - -> Product/service use tie
- - - - -> Ag product sale tie

Guaranteed Purchase and Logistics

Traditional hybrid value chains



Key Questions

- The importance of agency within value chains
- Mapping digital regional-hybrid value chains
- How are producers embedded in traditional versus digital regional-hybrid value chains?
- To what extent do embeddedness, governance affect upgrading in traditional versus digital regional-hybrid value chains?

Embeddedness

Embeddedness	Type 1	Type 2
Network Architecture	<ul style="list-style-type: none"> -Strong to intermediate ties, high quality and intense ties; -Relatively equal distribution of power, with less contestations and struggles 	<ul style="list-style-type: none"> -Intermediate to weak ties, low quality and intensity -highly asymmetrical power relations and frequent struggles
Network structure	<ul style="list-style-type: none"> -strong positionality in the network 	<ul style="list-style-type: none"> - weak positionality in the network
Network stability	<ul style="list-style-type: none"> -high ascribed and earned trust -cooperative and shared values exist to gain shared utility 	<ul style="list-style-type: none"> -low ascribed and earned trust -contested and individually self-regarding values
Societal	<ul style="list-style-type: none"> -shared understanding on culture, beliefs, practices 	<ul style="list-style-type: none"> -lack of understanding of culture, beliefs, practices
Territorial : Firm incorporation	<ul style="list-style-type: none"> -firms and farmers make asset specific investments -firms show commitment in localities 	<ul style="list-style-type: none"> - no asset specific investment made -inability to show commitment to localities
Territorial : Natural Capital	<ul style="list-style-type: none"> -high and good quality stocks of natural endowments 	<ul style="list-style-type: none"> - low-quality stocks of natural endowments

Governance

Pushing Gereffi et al 9 2005) framework to include agency and livelihoods

Learning and knowledge codification and capabilities

Capability classification	Learning mechanism	Learning process	Know-who
Tacit	Personal experience	Embodied	Self
Explicit	Imitation, face to face, spillover	embedded, embodied	Community
	Direct transfer, face to face, replication, pressure of compliance	embedded, encoded, embrained	Vertical
	Direct transfer, face to face, replication	embedded, encoded, embrained	Horizontal

Implicit or ex-ante capabilities (Lall 1993): assets or stocks of capital are *implicit capabilities* required by resource poor actors to participate in markets (Booyesen et al., 2008). Scoones (1998)- Physical capital and productive capital

ICT capabilities index: based on access, use and skills (ITU 2009)

Sampling and method

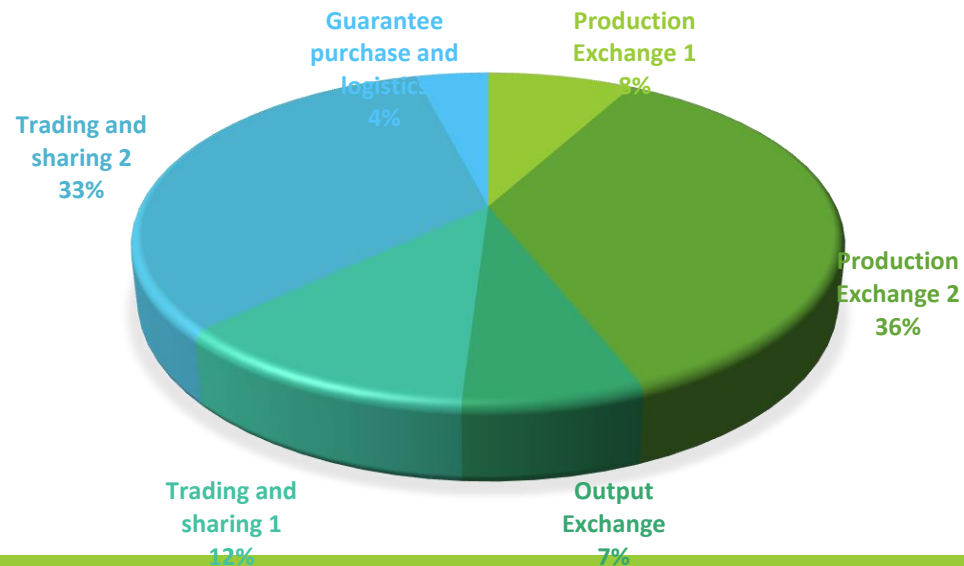
Sampling so far: 620 producers (294 PP; 326 TP)

Crops: Maize, Cassava, Sorghum

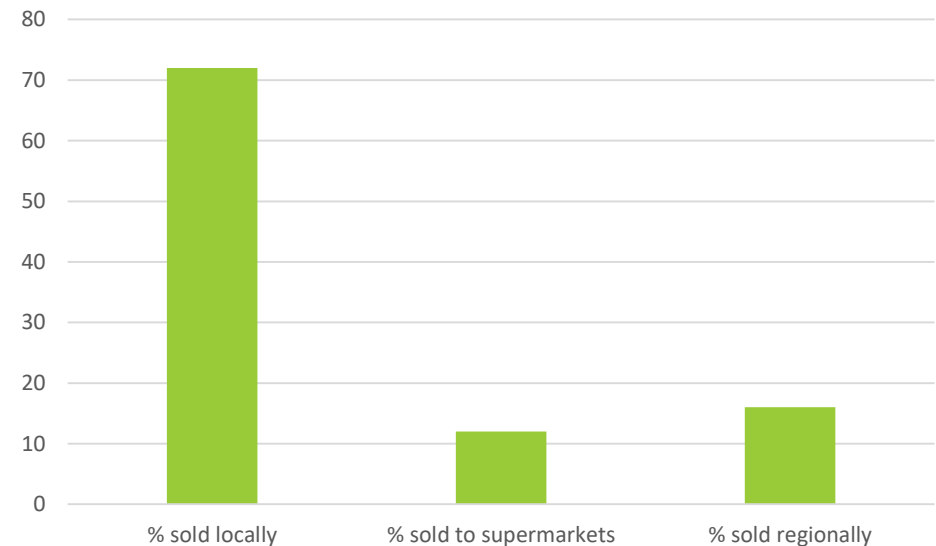
Regions: Meru and Transnozia

Method for analysis: endogenous switching regression models

Platformized Producers (% of total platformized producers)



Traditional Producers (% of total traditional producers)



Basic Descriptives

Variable Category	Variables	PP (n=294)		TP (n=326)	
		Mean	SD	Mean	SD
General Descriptives	Sex (% male in each group)	68.03**	3.619	78.08	3.463
	Farmer group (1= yes, % of each group)	71.21** *	4.034	31.91	3.43
	Strategic diversification (% of each group)	64.84**	1.87	80.95	1.669
	Duration sold to most recent buyer(years)	0.83***	0.08	6.1	0.36
	Contracts: Written (% by VC)	31.51** *	0.43	26.45	0.26
Upgrading	Agricultural productivity (O/I)	1.01***	0.03	1.64	0.08

*Mean value is significantly different from TP at 10% level

** Mean value is significantly different from TP at 5% level

*** Mean value are significantly different from TP at 1% level

a

Embeddedness and Governance index: Descriptives

<i>Variables</i>	<i>TP</i>	<i>PP</i>
Territorial embeddedness: Natural capital (average)	0.563 (0.026)	0.578 (0.014)
Territorial embeddedness- Firm incorporation (average)	0.325** (0.023)	0.466 (0.013)
Network embeddedness - Architecture index (average)	0.396 *** (0.0140)	0.557 (0.009)
Network embeddedness- Stability index (average)	0.363*** (0.022)	0.475 (0.017)

<i>Variables</i>	<i>TP</i>	<i>PP</i>
Implicit capabilities index (average)	0.411 (0.014)	0.336*** (0.023)
ICT index (average)	0.324	0.419***
Tacit learning(% share)	61.99 (2.79)	26.40*** (1.82)
Explicit learning(% share)	38.03 (1.031)	73.61*** (1.273)

*** significant at 1%, ** at 5% T Test

0=poor, 1=high

Selection equation probit (participating on an Ag-platform)

Variables	Independent probit		Jointly estimated probit	
	PP producer;		PP Producer	
	(1)	(2)	(3)	(4)
	Coefficient	SE	Coefficient	SE
Territorial embeddedness (firm) (index)	0.138	0.242	0.056	0.264
Network Embeddedness (architecture) (index)	1.176***	0.388	1.229***	0.389
Network Embeddedness (stability) (index)	1.225***	0.562	1.0984***	0.564
Implicit Index	-0.188	0.187	-0.236	0.188
ICT index	1.071***	0.230	1.039***	0.231
External learning (share)	0.513***	0.197	0.488**	0.192
Sex (1=Male) (dummy)	-0.366	0.239	-0.338	0.242
Part of farmer group (1= in group) (dummy)	0.205*	0.106	0.196*	0.104
Strategic diversification (1=diversified) (dummy)	0.630***	0.231	0.618**	0.249
Contract (1=yes) (dummy)	-0.392***	0.145	-0.417***	0.146
_cons	-2.303***	0.367	-2.305***	0.378

*significant at 10%, ** significant at 5%, *** significant at 1%

Full information maximum likelihood parameters for upgrading

Variables	Yield PP		Yield: TP	
	(1)	(2)	(3)	(4)
	Coefficient	SE	Coefficient	SE
Territorial embeddedness (firm) (index)	0.074	0.072	0.074	0.072
Network Embeddedness (architecture) (index)	0.468***	0.153	0.285*	0.169
Network Embeddedness (stability) (index)	2.662***	0.948	1.387***	0.122
Implicit Index	0.173	0.186	-0.290	0.188
ICT index	1.008*	0.581	0.316	0.307
External learning (share)	0.187***	0.010	0.137***	0.009
Sex (1=Male) (dummy)	-0.290	0.188	0.173	0.186
Part of farmer group (1= in group) (dummy)	0.471***	0.079	0.355*	0.183
_cons	0.273***	0.049	0.347***	0.021
ln σ	-2.263***	0.067		
Pgv	-0.463**	0.199		
ln σ			-2.251***	0.057
Plv			0.732**	0.115
Likelihood ratio test of independent equations χ^2	12.77***			
Number of observations	620			
Log-likelihood	201.29			
Wald $\chi^2(13)$	260.95***			

Initial thoughts

- Societal embeddedness is a major issue (technological determinism)
- Lack of trust (network embeddedness) is a critical factor, more so because of the importance of the network embeddedness- stability for participation and yield
- learning is critical – the need to use internal and external forms; this seems to be more important than having ICT capabilities and internal capabilities
- being part of a well functioning farmer group is critical

What is next?

- How should we look at upgrading- TFP for more complex forms in a value chain context or do we need to think of something new?
- Should we segregate born digital producers versus not? Is that a valuable distinction?
- Should we look at differences across the platform types?
- Measuring disruption from the norm? how is it disruptive and for whom