

Identification of entry point and action for multi-stakeholder Feed Safety and Quality Innovation Partnership in the Capacity Development for Agricultural Innovation Systems

Getachew Asmare

National Innovation Facilitator (NIF), Capacity Development for Agricultural Innovation Systems (CDAIS)
Ministry of Livestock and Fisheries, Ethiopia
getasi97@gmail.com

Abstract: This paper draws on workshop data from Feed Safety and Quality Innovation partnership in Ethiopia within the context of Capacity Development for Agricultural Innovation Systems to investigate: (1) to identify entry point for multi-stakeholder partnership and action in Feed Safety and Quality Innovation; and (2) to identify and design a plan of action that guide Agricultural Innovation System (AIS) implementation. The purpose of agricultural innovation systems (AIS) thinking is to approach innovation from a systemic perspective by paying due attention to the way in which innovation emerges from a (complex) interactive dynamic, between a range of actors within particular social, economic, and environmental conditions. Such an approach is meant and expected to enhance the capacity to innovate and the ability to achieve more impact at scale, by enabling the creation of a more complete picture of the factors involved. Accordingly, the Feed Safety and Quality innovation partnership consists of wide range of interested stakeholders representing Government, private, associations, producers and farmers. Various tools and structured questionnaire developed for Agricultural Innovation Systems (AIS) were used to stimulate thinking and elicit information on the innovation capacity of stakeholders in the partnership. A number of direct and indirect challenges exist to animal feed sector in Ethiopia. Among inter alia partnership has selected and recognized the existing poor feed safety and quality situation the key problem experienced over the past years. Stakeholders of the Feed Safety and Quality innovation partnership consulted over the areas in which they thought agricultural innovation would be highly needed to address feed challenges prioritized legal framework for risk assessment, risk management and risk communication on feed safety and quality issues. The Feed Safety and Quality innovation partnership has aspired to collectively carry out in the mid-term to improve the legal framework for risk assessment, risk management and risk communication in order to achieve vibrant legal feed safety and assurance system built. To attain this goal, the main objective of the Feed Safety and Quality innovation partnership is to develop legal framework, guidelines, standards, strategic documents as appropriate on risk assessment, risk management and risk communication with the aim of ensuring the safety and quality of foods of animal origin. In addition, the partnership has formulated actions needed for fulfilling an innovation support plan. The Feed Safety and Quality innovation partnership believed that this action plan provides the basis for feed industry to become an important mechanism in the long-term struggle to fight hunger and reduce poverty in the country that fills an important gap in the current development arena.

[Getachew Asmare . **Identification of entry point and action for multi-stakeholder Feed Safety and Quality Innovation Partnership in the Capacity Development for Agricultural Innovation Systems** . *Nat Sci* 2017;15(11):15-23]. ISSN 1545-0740 (print); ISSN 2375-7167 (online). <http://www.sciencepub.net/nature>. 3. doi:[10.7537/marsnsj151117.03](https://doi.org/10.7537/marsnsj151117.03).

Key words: Agricultural Innovation Systems; Innovation support plan; legal framework; risk assessment; risk management; risk communication; feed safety and quality issues; vibrant legal feed safety and assurance system

1. Introduction

Agricultural development processes increasingly involve complex undertakings that are influenced by the dynamic interaction of environmental and socio-economic factors, such as trade liberalization and demands of global markets, urbanization, climate change, agricultural intensification, concentration and vertical integration of food production and consumption, as well as food safety standards and the need to ensure equitable benefits to actors along value-chains (World Bank, 2007; IAASTD, 2009; FAO, 2014). There is general agreement that, to meet these challenges, agricultural innovation is key.

Agricultural innovations are key to cope up with the challenges of food insecurity, malnutrition, climate change, population growth and unemployment. Agricultural innovations have the potential to boost smallholders' agricultural productivity and accelerate economic growth, ultimately reduce poverty and improve food and nutrition security while maintaining the sustainability of agricultural systems. There are many innovative agricultural technologies and practices proven to have the potential to increase smallholder farmers' productivity while building their resilience and adaptive capacity in certain pockets of the country. However, often they are small in scale

and set up by local NGOs or funded by donors. There is an urgent need to identify these programs and take them to scale. This can be achieved most effectively through partnerships between the government, the private sector and donor agencies, as no one actor can be successful without the impetus and support from the others. Strengthening the capacity of individuals and organizations, as well as that of the enabling environment in which they are embedded, is required to actively promote agricultural innovation (TAP, 2016).

The purpose of agricultural innovation systems (AIS) thinking is to approach innovation from a systemic perspective by paying due attention to the way in which innovation emerges from a (complex) interactive dynamic, between a range of actors within particular social, economic, and environmental conditions. Such an approach is meant and expected to enhance the capacity to innovate and the ability to achieve more impact at scale, by enabling the creation of a more complete picture of the factors involved.

With the increased need to ensure quality, safety and efficacy of the veterinary drugs and feeds a proclamation number 728/2011 was enacted by the Federal Government of the Republic of Ethiopia followed by the enactment of regulation no 272/2012 to establish the Veterinary Drugs and Feed Control Authority (VDFACA). This is an autonomous regulatory body reporting to the Ministry of Livestock and Fisheries.

Feed safety is a prerequisite for food safety and health, however the current state of feed safety and quality produced is very unsatisfactory. Lack of knowledge on Good Agricultural Practices (GAP), Good Manufacturing Practices (GMP), Good Hygiene Systems (GHS) and Hazard Analysis and Critical Control Point (HACCP) in feed processing industries along with lack of animal feed quality control services is adversely affecting the safety and quality of feed, decreasing profitability & productivity of urban & peri-urban commercial livestock operations and predispose to health hazards of both animals and human health.

In addition, a number of studies indicated that the available animal feed is poor quality because of handling problems from production points up to consumption points. In particular, high levels of aflatoxin contamination of the feed is the main concern for the dairy sector, because aflatoxin can seriously reduce livestock productivity and cause public health hazard. Concerns prompted by research findings on aflatoxin published by ILRI scientist have encouraged livestock (health and production) professionals and the feed industry to scrutinize more closely the causes of feed contamination and methods for their control. Consequently, within Veterinary

Drug and Feed Administration Control Authority (VDFAC) an innovation partnership named “Feed Safety and Quality innovation partnership” was established in order to ensure feed safety and quality along feed supply value chains. Hence, the feed safety and quality challenges prevalent in the feed sector is a priority innovation agenda of the Feed Safety and Quality innovation partnership.

The Feed Safety and Quality innovation partnership is a new initiative and multi-stakeholder innovative partnership in animal feed which aims to address specific challenges. This innovation partnership consists of members from Ministry of Livestock and Fisheries (MoLF), VDFACA, Feed producers and exporters, Ethiopian Animal Feed Industry Association (EAFIA), Ethiopian Poultry Producers and Processors Association (EPPPA), Dairy owners and producers, and Farmers.

2. Material and methods

To collect data for this assignment, a workshop was organized for Feed Safety and Quality innovation partnership members on 28-30 March, 2017 in Addis Ababa. Fifteen participants attended the three-day workshop at Top Ten Hotel. Participants represented a wide range of interested stakeholders included:

- Veterinary Drug and Feed Administration Control Authority (VDFACA) directors
- Veterinary Drug and Feed Administration Control Authority (VDFACA) experts
- Feed producers and exporters
- Ethiopian Animal Feed Industry Association (EAFIA)
- Ethiopian Poultry Producers and Processors Association (EPPPA)
- Dairy owners and producers
- Farmers

A number of existing tools and structured questionnaire developed for Agricultural Innovation Systems (AIS) were used during the workshop. The tools listed below were used to elicit information on the innovation capacity of stakeholders in the partnership:

- Timelines
- Problem Tree Analysis
- Solution Tree Analysis
- Net-Map
- Social Network Analysis Questionnaire
- Visioning or Scenario Building
- Action Planning

3. Results and analysis

This section presents the results of the assessment and investigation of the various innovation

tools used during the workshop with members of the Feed Safety and Quality innovation partnership.

3.1. Timelines (History of the Feed Safety and Quality Innovation partnership)

The timeline method is a tool for joint reflection on a network process. The key objective of the timeline tool was to understand the major events

(positive and negative) that might have affected the progress of the feed safety in Ethiopia. Stakeholders were asked to recall all moments they seen as significant for the network process. Hence, stakeholders shared perceptions and opinions what happened about feed safety. The story of the most important moments are summarized below in Table 1.

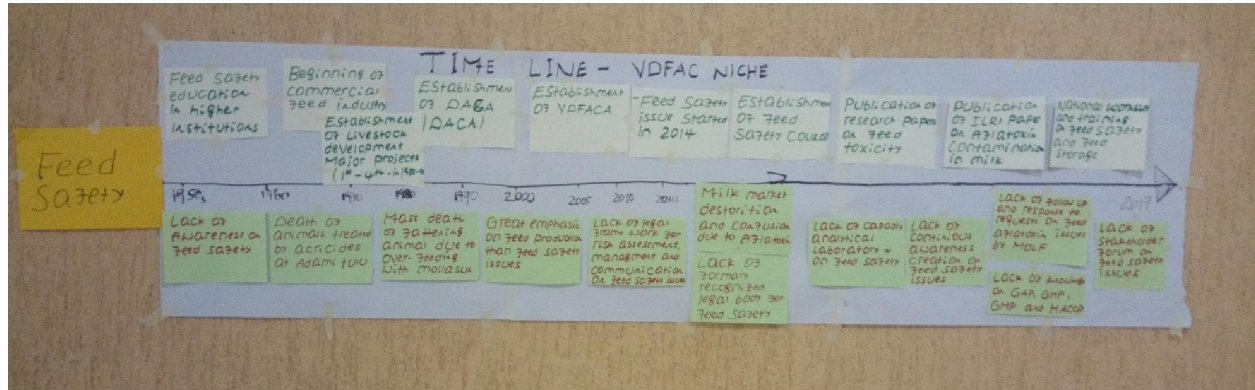


Figure 1: History of the Feed Safety and Quality innovation niche (timelines) drawing

Table 1: History of the Feed Safety and Quality innovation partnership (timelines)

Breakthroughs - key positive events/opportunities	Feed safety education in higher institution	Beginning of commercial feed industry (1960s)	Establishment of DACA	Establishment of VDFACA	Feed safety issue started in 2014	Publication of research papers on feed toxicity	National workshop and training on feed safety and feed storage
		Establishment of livestock development projects, 1 st (1958-63), 2 nd , 3 rd & 4 th (1973-1992)			Establishment of feed safety council	Publication of ILRI paper on aflatoxin contamination in Ethiopia	
Time/Dates (months/years)	1950s	1960s	2000	2013	2014	2015	2017
Set back / Challenges	Lack of awareness on feed safety	Death of animals treated with acaricide in Adami Tulu	Greater emphasis on feed production than feed safety issues	Lack of legal framework for risk assessment, management & communication on feed safety issues	Milk market distortion and confusion due to aflatoxin	Lack of continuous awareness creation on feed safety issues	Lack of follow up & response to request on feed aflatoxin issue by MoLF
		Mass death of fattening animal due to overfeeding with molasses		Lack of formally legally recognized legal body for feed safety	Lack of capable analytical laboratory on feed safety	Lack of knowledge on GAP, GHP, GMP & HACCP	Lack of stakeholder forum on feed safety issues

3.2. Defining the key problem, causes and effects (problem tree)

This exercise involves using the problem tree/solution tree tool to explore the causes and effects of key problems, and some preliminary thinking about the objectives and potential actions to address the problems. As indicated in timeline findings, a number of direct and indirect challenges exist to animal feed sector in Ethiopia, among inter alia partnership has

selected and recognized the existing poor feed safety and quality situation the key problem experienced over the past years.

Stakeholders were asked to analyze the causes and effects around the poor feed safety and quality issue. As indicated in picture 2, problem tree diagram was drawn as a tree structure, the key problem in the middle, the causes as a root and the effects as branches

of the tree. The causes and effects of poor feed safety and quality are summarized in table 2:

3.3. Defining the key solution, causes and effects (Solution tree)

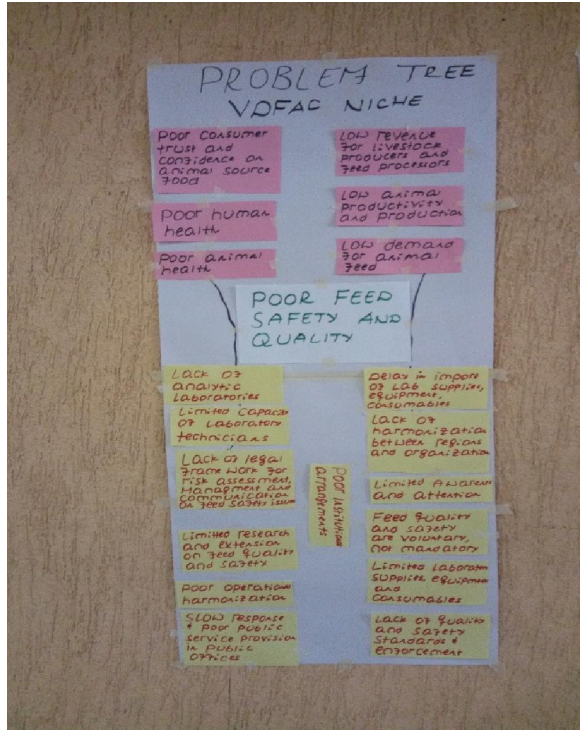


Figure 2: Picture of problem tree drawing (causes and effects of the poor feed safety and quality)

Problem tree is closely linked to solution or object tree, thus stakeholders were asked to draw a solution tree. The problem tree was converted into a solution tree by rephrasing each of the problems into positive desirable outcomes. In this way, root causes and consequences were turned into root solutions, and

key Feed Safety and Quality innovation partnership or influencing entry points were established.

Partnership has suggested the following actions or solutions as shown below in table 3 to overcome problems associated with feed safety and quality.

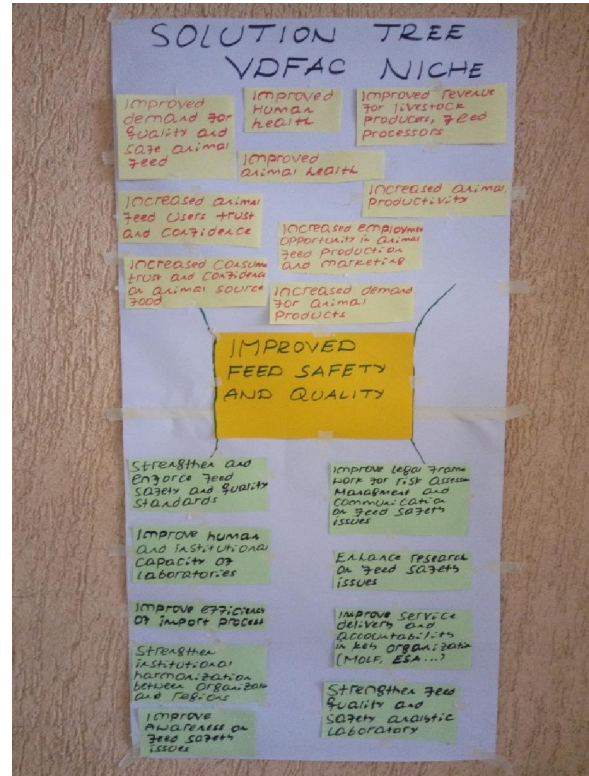


Figure 3: Picture of solution tree drawing (Causes and effects of the improved feed safety and quality)

Table 2: Causes and effects of the poor feed safety and quality (problem tree)

Effects	Low revenue for livestock producers & feed processors	Low demand for animal feed	Low animal productivity & production	Poor human health
	Poor consumer trust and confidence on animal source food		Poor animal health	Low income to households
Key problem	Poor Feed Safety and Quality			
Causes	Lack of legal framework for risk assessment, management & communication		Lack of safety and quality standard & enforcement	
	Poor institutional arrangements	Limited capacity of laboratory technician	Lack of harmonization between regions & organization	Limited laboratory supplies, equipment's & consumables
	Feed safety & quality are voluntary not mandatory	Lack of analytical laboratories	Delay in import of laboratory supplies, equipment's & consumables	Limited research & extension on feed safety & quality
	Limited awareness & attention	Poor operational harmonization	Slow response and poor public service provision in public offices	

Table 3: Causes and effects of the improved feed safety and quality (solution tree)

Effects	Improved demand for quality and safe animal	Improved human health	Improved revenue for livestock producers and feed processors	
	Increased consumer trust & confidence on animal source food	Increased employment opportunity in animal feed production & marketing	Increased animal feed users trust & confidence	Increased demand for animal products
	Increased animal productivity		Increased animal health	
Key Solution	Improved Feed Safety and Quality			
Causes	Strengthen and enforce feed safety and quality standards		Improve legal framework for risk assessment, management and communication on feed safety and quality issues.	
	Improve human and institutional capacity of laboratories	Enhance research on feed safety issues	Improve efficiency of import process	Improve service delivery and accountability in key organizations (MoLF and ESA)
	Strengthen institutional harmonization between region and organization		Improve awareness on feed safety issues	Strengthen feed safety and quality analytical laboratory

3.4. Net-Map and Social Network Analysis Questionnaire (Relationships among actors)

The very objective of Net-Map tool and Social Network Analysis Questionnaire is to understand the relationships of actors namely who is involved, how they work together, influence each other and their power relations.

According to the Net-Map tool exercise and Social network Analysis questionnaire, the following are the key institutions, organizations, associations and private sector actors within the Feed Safety and Quality innovation niches:

- Ministry of Livestock and Fisheries (MoLF)
- Ministry of Agricultural and Natural Resource (MoAN)
- Ethiopian Standard Agency (ESA)
- Feed manufacturers
- Feed raw material producers
- Private feed trader (importer and distributor)
- Animal feed users (Poultry, dairy, fattening associations)
- Ethiopian Animal Feed Association
- NGOs (USAID, ILRI, ACIDI-VOCA, FAO, WB, AFDB)
- Ministry of Industry (MoI)
- Ministry of Trade (MoT)
- Ethiopian Institute of Agricultural Research (EAIR)
- National Bank of Ethiopia
- Food Medicine and Health Care Administration and Control Authority (FMHACA)
- Ministry of Finance and Economic Cooperation (MoFEC)

- Public procurement property Administration Agency
- Revenue and Customs Authority
- Media
- Consumers of animal products
- House of Representatives

In the Feed Safety and Quality innovation niche, members indicated that Feed Manufacturers and Feed Raw material Producers play the most important role in bringing about innovations in feed safety and quality. Ministry of Livestock and Fisheries (MoLF), Ministry of Agricultural and Natural Resource (MoAN), Ethiopian Standard Agency (ESA), private feed trader, animal feed users (Poultry, dairy, fattening associations), Ethiopian Animal Feed Association, and NGOs (USAID, ILRI, ACIDI-VOCA, FAO, WB, AFDB) came second, while Ministry of Industry (MoI), Ministry of Trade (MoT), Ethiopian Institute of Agricultural Research (EIAR), National Bank of Ethiopia Food Medicine and Health Care Administration and Control Authority (FMHAC), Ministry of Finance and Economic Cooperation (MoFEC), Public Procurement Property Administration Agency, Revenue and Customs Authority, Media, Consumers of animal products and House of Representatives were ranked third.

According to Net-Map and social Network Analysis study, MoFEC, and NGOS (FAO, WB, AFDB, ACIDI-VOCA) appeared to be most important financial contributors and comfortable for collaboration to Feed Safety and Quality innovation niche. Over 80% of the Social Network Analysis study

indicated that the Feed Safety and Quality innovation niche has better communication or exchange of information with Feed Raw Materials Producers, Feed Manufacturers, Feed Traders, Policy Makers, End Users (dairy, fattening, poultry farms), and National Bank of Ethiopia.

With regard to visioning, planning and implementation of activities on feed, the feedback from the Social Network Analysis Questionnaire showed that Feed Raw Materials Producers, Feed

Manufacturers, Feed Additive Importers, Distributors, Exporters, Feed Association, End Users (dairy, fattening, poultry farms), and Feed Processors were the main actors.

In general, stakeholders realized that weak linkage and lack of clarity of objective of the partnership with actors that need to be involved. Moreover, it appears that low quality communication exists between the innovation partnership and actors mentioned on the Net-Map.



Figure 4: Picture of Net-map drawing

3.6. Action plan of the feed safety and Quality Innovation Partnership or action planning tool or exercise

Stakeholders noted that as animal feed is an important route by which hazards can enter the human food chain, its safety must be assessed prior to its feeding to animals. Safety assessments are often multifaceted considering both the safety of animals as the primary consumers of the feed, and safety of humans as the indirect consumers of any residues that may remain in food of animal origin. For feed safety assessments, stakeholders realized how important to establish guidelines, standards, legal texts and strategic documents that are generic enough to encompass the requirements of all ingredients. Besides, stakeholders believed that the above mentioned documents and legal framework should be

developed based on the Codex Principles for Risk Analysis. It was also noted that HACCP (Hazard Analysis and Critical Control Point) is an instrument to control hazards in the production process. Implementation of HACCP requires prerequisite programs such as Good Agricultural Practices (GAP), Good Manufacturing Practices (GMP), hygiene systems to be in place.

With regard to visioning, the partnership has formulated actions needed for fulfilling an innovation support plan. The Feed Safety and Quality innovation partnership believed that this action plan provides the basis for feed industry to become an important mechanism in the long-term struggle to fight hunger and reduce poverty in the country that fills an important gap in the current development arena.

Table 4: Action plan of Feed Safety and Quality innovation partnership

Expected outcome					Resources required		
Actions	Who is the lead?	With which partners?	By when?	Indicator of completion	Time inputs (person days)	Funding (USD)	Equipment (if needed)
Establish legal framework for risk assessment, risk management and risk communication (Prepare and Review Terms of Reference, hire a consultant, review the draft legal framework with the innovation partnership)	VDFACA	MoLF, council of Ministries, Media, ILRI	2017-2019	Approved act	90 days	30,000	Stationery
Organize workshop in four regions and Addis Ababa (get feedback)	VDFACA	MoLF, FAO, WB, ILRI	2017-2020	Validated regulation document	45 days	15,000	Stationery
Develop strategic documents, guidelines, tools	VDFACA	MoLF, FAO, WB, ILRI	2017-2018	Completed documents, guidelines, tools	60 days	20,000	Stationery
Capacity building in four regions and Addis Ababa (awareness campaign)	VDFACA	MoLF, FAO, WB, ILRI, EIAR	2017-2020	# of trained persons, # of exchange visits, # of screening lab tools	300 days	90,000	Stationery
Implementation, Monitoring and Evaluation of legal framework	VDFACA	MoLF, FAO, WB, ILRI, EIAR, other stakeholders	2019-2020	Findings, results and reports	120 days	40,000	Stationery

VDFACA = Veterinary Drug and Feed Administration Control Authority, MoLF = Ministry of Livestock and Fisheries, LIRI = International Livestock Research Institute, FAO = Food and Agricultural Organization of the United Nations, WB = World Bank, EIAR = Ethiopian Institute of Agricultural Research

4. Conclusion

As indicated in the action plan the partnership has already designed actions needed to bring about innovation and change in the feed sector. However, the feed safety and Quality innovation partnership has no resource to effectively carry out these actions.

Hence, the current Feed Safety and Quality innovation niche action plan states that to implement all the planned activities requires external funding and support. Thus, the following specific action points would apply to secure funding and solve problems

associated with feed stated in the problem tree analysis.

1. Organize Marketplace workshop – The Feed Safety and Quality innovation niche presented their needs for capacity development to an audience of development organizations, private sector, funding agencies and national service providers. The key objective of the Marketplace is to match capacity development demand and supply.

2. Organize inclusive policy dialogue space to convene multi-stakeholder interaction to address the identified causes for the poor feed safety and quality such as extension and research issues, responses in public service provision, foreign currency shortage, import and customs clearance issues, coordination and harmonization problems, incoherence of policy frameworks addressing similar issues, regulatory, inspection and enforcement issues, institutional arrangements, and technical gaps.

Acknowledgments

The author would like to express his warm consideration and thanks to Capacity Development for Agricultural Innovation Systems (CDAIS) and International Centre for Development Oriented

Research (ICRA) for financial support to carry out this work. Dr Amanuel Assefa, Dr Kebebe Erango and Hanneke Bouta Vermeulen are duly acknowledged for reviewing the article.

References

1. FAO. 2014. Innovation in family farming. The State of Food and Agriculture. FAO, Rome, Italy.
2. Fitaweke M., Thomas C., Ayele G., Fisseha A., Agajie T., Jemal A., Wondessen G. 2011. A Review to improve Estimation of Livestock Contribution to the National GDP. Ministry Of Finance and Economic Development and Ministry of Agriculture. Ethiopia.
3. IAASTD. 2009. Agriculture at a crossroads. Global report. Island Press, Washington, DC, USA.
4. Tropical Agriculture Platform (TAP). 2016. Common Framework on Capacity Development for Agricultural Innovation Systems. Conceptual Background.
5. World Bank. 2007. Agriculture for development. World Development Report 2008. World Bank, Washington D.C., USA.

10/6/2017