

Comparative IS-ARM



Information Systems for Agricultural Risk Management

Policy Brief

October 2016

Key message from a study on Cabo Verde, Cameroon, Ethiopia, Mozambique, Niger, Senegal and Uganda

- 1 Information remains the key agricultural risk management (ARM) decision making tool for farmers, governments and investors. The detail of information and accessibility needs for ARM are particularly demanding.
- 2 Three levels of information systems (National, Regional and International) and seven thematic blocks have been analysed in this study.
- 3 Information systems in the seven countries present weak information for agricultural risk management on all the thematic/sub-thematic areas except Price, Satellite image and Trade. Information on animal and plant health is the weakest across all countries.
- 4 Ethiopia is the only country with good information on almost all the thematic areas but it has very weak communication and poor information accessibility scores.
- 5 Improved IS-ARM in most countries requires; specialisation of expertise, increase focus on length/continuity, stimulation of private sector services and public-private partnerships, and enhanced data/information disaggregation.

Context

Information is the key input for risk management in any area of activity. In the agricultural sector, appropriate information is required to facilitate farmers' production and marketing decisions, and to manage the corresponding risks. For instance, access to time series data/information on production and input/commodity markets helps a farmer decide where and when to buy inputs or sell produce to make the optimum benefit. It also provides a tool for assessing how prices, production and yields are performing or affected by hazards. Reliable information is crucial for governments and the private investors: It enables them to design pro-active policies and strategies, and invest in low-cost solutions to respond to the needs of smallholder farmers. Guaranteeing same access to information by all stakeholders facilitates risk transfer and ARM coordination of responsibilities.

Having recognised the importance of information for risk management, the Platform for Agricultural Risk Management (PARM) in October 2016 finalised a study that assessed Information Systems for Agricultural Risk Management (IS-ARM) in seven Sub-Saharan African countries conducted by the CEIGRAM/VISAVET, two research centres from Madrid Universities. The assessment focused on information for seven ARM thematic areas (Table 1): meteorology, climate and soils; satellite image and communications; price of commodities, inputs and market; production level, yield and plant health; animal and human health; policy; and socio-economic and sectorial.

The quality of information systems for each ARM thematic area in the seven PARM countries was assessed on a range of scores from 0 to 100. Low values (≤ 40) mean that the information system is weak and allows only **poor assessment of risks**, medium values (41-69) indicate potential for basic preliminary

risk assessments, and high values (≥ 70) portray information systems allowing for good **risk assessments**. This policy brief relies on the PARM IS-ARM comparative report to present the types of information available for agricultural risk management in PARM countries and outlines the profile of each country. In addition, it puts forward policy lessons to improve information systems for proper agricultural sector risk management.

Table 1: Average scores for information on thematic and sub-areas of ARM in PARM Countries

Good/Proper risk management areas ($\geq 70\%$)		Average/Preliminary risk management areas (69-41%)		Poor risk management areas ($\leq 40\%$)	
Prices	81	Production levels and yields	64	Plant health	26
Satellite image	77	Soils	64	Commodity stocks & inputs	33
Trade	71	Meteorological & climate	62		
		Policies	56		
		Risks of endemic & emerging diseases	55		
		Costs of animal diseases	52		
		Communications	53		
		Socio-economic & sectorial	49		

Source: (PARM IS-ARM Comparative Report, 2016). The table depicts scores for each of the thematic and sub-thematic blocks of agricultural risk management across the PARM countries. It was based on the assessment from a study finalised by PARM in October 2016. The score were assessed on a range from 0 to 100% and the indications for the values are given in the table.

Study Conducted by: Research Centre for the Management of Agricultural and Environmental Risks (**CEIGRAM**), a research centre of the Universidad Politécnica de Madrid, Spain; **VISAVET**- Health Surveillance Centre, a research centre of the Universidad Complutense de Madrid, Spain



**Table 2:** Information systems for the thematic and sub-thematic areas of ARM in the seven Countries

Type of information system	Thematic and sub-thematic areas of agricultural risk management						
	Meteorology, Climate & Soils	Satellite image & communications	Prices of commodity, input & market	Production levels, yields & plant health	Animal & human health	Policy	Socio-economic & sectorial
National Systems	UNMA, UBOS, EIAR & DMN	UNMA, MINADER, CSE, SNPC, MASA	UBOS, Infotrade, FARMIS, EIAR, Manobi, MINADER,	UBOS, EIAR, MINADER, MASA	UBOS	BOU, EIAR, SAP, BCV,	UBOS, EIAR
Regional systems	ACMAD, IGAD – ICPAC, MESA-IGAD, AGRHYMET & SADC	AARSE, RCMRD & AGRHYMET	RATIN, AfDB, Farmgain Africa, AFO, AMITSA, UNECA, RESOMAO, CILSS	AU-IAPSC, IPPC, AfDB, ASARECA, COMESTAT, AfricaRice, WHO–Africa, eRAIL, AGRHYMET & SADC	AU-IBAR, WHO-Africa, WB, DLCO-EA & RustTracker	FEWS-NET, HDE, BCEAO, ARC, SPAIF	AfDB, SIPSA
International systems	CRED-IDD, FAO-Aquastat, WB – CCKP, ESDAC, ISRIC, GYGA & WB-CCKP	NASA, ESA, USGS, CGIAR-CSI, SOS Sahel, UN (Spider), Terra Remote Sensing, ICARDA & RSAC	GIEWS-FAO, WFP-VAM, FEWS NET, FAOSTAT, USDA, FAOSTAT, USDA & UN Comtrade	CountryStat-FAO, FAO-crop calendar, Plantwise, GYGA & ICCO	Factfish, FAOSTAT, OIE, WHO-HSIS, EMPRESS, IAEA, USAID, WB & CDC	GIEWS-FAO, FEWS NET, WFP, WB, IPC, HDE, HDX WB & FAO	

Source: (PARM Construct, 2016). The above table is constructed based on IS-ARM 2016 report for each PARM Country. It presents samples of the national, regional and international information systems across the seven PARM countries.

Information systems in PARM countries

Information systems are systematic and continued forms of information managed and delivered by public, mixed or privately based institutions. We can distinguish between three types of information systems; national, regional and international systems (Table 2). National information systems are maintained by government established statistical/research institutions such as EIAR¹ in Ethiopia, UBOS² in Uganda, and DMN³ in Cameroon and Niger. Privately-based agencies such as Manobi in Senegal, INFOTRADE and FARMIS⁴ in Uganda also manage and deliver relevant information for rural agricultural households. Regional and international information systems on the other hand are led by multilateral agencies. For instance, the FAOSTAT⁵ and GIEWS⁶ services, the WFP-VAM⁷ portal and the World Bank and AfDB⁸ knowledge hubs maintain key information on agricultural risks in Africa.

Some of the information systems focus on a single thematic area of agricultural risk management. For example, the Manobi and FARMIS information systems provide commodity/input market information services, and the DMN manages meteorology/climate information. Many Information systems like EIAR, UBOS, FAOSTAT, WFP-VAM and AfDB provide information on two or more thematic areas of risk management. For example, the EIAR conducts researches across major agro-ecological zones of Ethiopia and it maintains information on climate, prices/market, production/yield, policy and socio-economic thematic areas. The AfDB has a regional information system on both commodity stock/input and production levels/yields. FAOSTAT and WFP-VAM maintain international information on all the seven thematic areas of agricultural risk management in the PARM countries.

Information for agricultural risk analysis

The identified information systems in PARM countries offer diversity of information, but it is essential to know the extent to which the availability and accessibility of information can support effective agricultural risk analysis. Table 1 shows results from the IS-ARM comparative assessment report for PARM countries.

The information on Price, Satellite image and Trade is good for agricultural risk analysis. The databases and websites of national information systems like EIAR in Ethiopia, SIMA and Infotrade, both in Uganda, and Manobi in Senegal provide real time series information on the price of many commodities/inputs across major local markets. In some PARM countries like Ethiopia, Cameroon and Cabo Verde, the national systems are connected and provide well-monitored trade information for a long-time frame. With regard to satellite image information, there exists a good combination of private, public, national as well as many regional and international systems with images and calculated indexes for climate variables and vegetation in all the PARM countries.

While the information on the three thematic areas has potential for good risk analysis, access to satellite information is not offered free of charge, and not all satellite images can be printed or downloaded. In addition, price and trade data in Senegal and Cameroon are considered strictly confidential, and there is hardly any reliable input price and animal trade information in Uganda and Niger.

There is only basic or preliminary information for agricultural risk management analysis on the following risk thematic areas: Production levels and yields, Soils, Meteorological & climate, Policies, Risks of endemic & emerging diseases, Costs of animal diseases, Communications, Socio-economic & sectorial. All PARM countries have national statistical information sources that conduct extensive surveys and collect wide range of data for production levels/yields, socio-economic and policy related information. But the output and yield information is usually not well-disaggregated, unorganised and rarely up-dated. In most cases, the output information also lacks adequate historical length for a rigorous risk analysis. Regional/international systems are noted for census/data on soils, animal diseases and endemics but they produce information from narrow sets of local indicators with shallow monitoring and control activities.

In the areas of meteorology/climate information systems the UNMA in Uganda and NMA in Ethiopia provide daily to monthly weather forecasts recorded from many observatory stations across the country. However, in the case of ANACIM in Senegal, limited coverages are recorded throughout the eastern part of the country, while DMN in Niger has many missing data on humidity, wind speed and solar radiation.

Across the PARM countries there is a prospect for increased access to agricultural risk information due to the doubling effects of mobile phone penetration and internet services over the past few years. Notwithstanding, there are bottlenecks to access information either online or through private-initiated SMSs due to the high cost of service and weak internet systems. In some cases, like in Niger, radio and TV dissemination channels are very poor.

There is poor information for agricultural risk management analysis on two thematic/sub areas – Plant health and Commodity stock/inputs availability. Even though Cabo Verde and Ethiopia have national institutions to manage commodity stocks for food security and price stabilisation purposes, none of the PARM countries has comprehensive information on commodity stock/input availability. Information is poorly developed without any disaggregation for farmer-level risk analysis. In terms of plant health, some information exists for a limited number of crops in Ethiopia and Cameroon. Other countries rely on regional and international systems like the Plantwise initiative, WHO and AU-IBAR but these sources lack historical series and country-specific insights even though efforts are underway to implement country-specific plant pest information systems. In most cases, monitoring and surveillance are conducted through virtual tracking.

Available information across PARM countries

Figure 1 depicts the average country scores on information systems for agricultural risk management. The overall PARM average is 60% which denotes potential for **preliminary/average but not good agricultural risk analysis**. Ethiopia ranks the highest with a score (74%) **above PARM average**. Uganda and Mozambique score within average (both 62%), whilst Senegal (57%), Cameroon (56%), Cabo Verde (55%) and Niger (51%) are below average.

1 Ethiopia Institute of Agricultural Research (EIAR).

2 Uganda Bureau of Statistics (UBOS).

3 Direction de la Météorologie Nationale (DMN), Cameroun.

4 Farm Record Management System (FARMIS), Uganda.

5 Food and Agriculture Organization of the United Nations (FAO) Statistics.

6 Global Information and Early Warning System (GIEWS) of FAO.

7 World Food Programme-Vulnerability Analysis and Mapping (WFP-VAM).

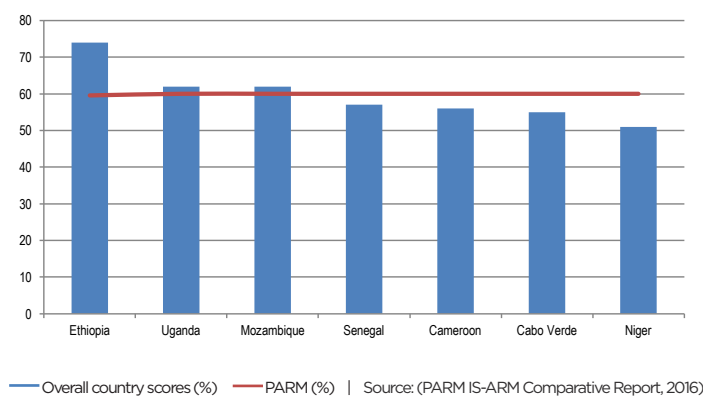
8 African Development Bank (AfDB).

Ethiopia has **very good** information systems for all the thematic areas of agricultural risk except on communication and plant health. Even though information is sometimes not disaggregated at the household level, the national systems in Ethiopia have a mushrooming of affiliated centres such as the EIAR researching on critical risk areas such as meteorological/climate, price/market and commodity stock. They are also connected to one another (for instance ECX, LINKS and EGTE), which allows for complete monitoring of related risk information.

Uganda and Mozambique have **good** overall information for agricultural risk management. Both countries have good information systems on satellite images, prices, trade and policy. However, there are limited historical, up-to-date and comprehensive information on commodity stock and plant health thematic areas, due to the insufficiency of technical personnel and financial resource in both countries.

Senegal, Cameroon, Cabo Verde and Niger are the countries with overall **weakest information systems** for agricultural risk management. These countries have poor records of information on most of the thematic areas including, plant health, cost of emerging diseases, risks of endemics policies and socio-economic.

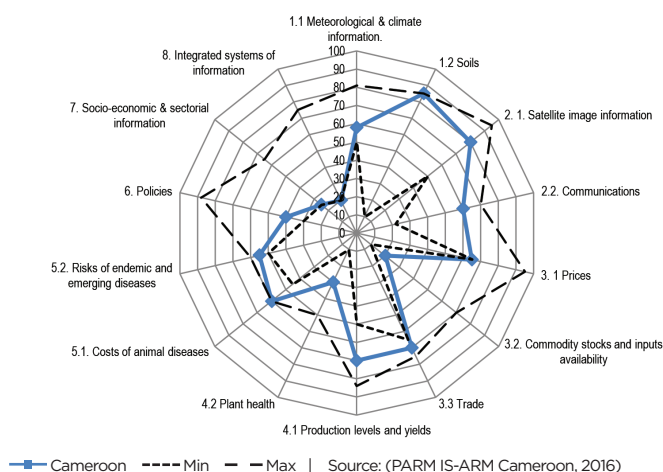
Figure 1: Average IS-ARM score for the seven PARM countries (100=max. score)



Highlights from each PARM country

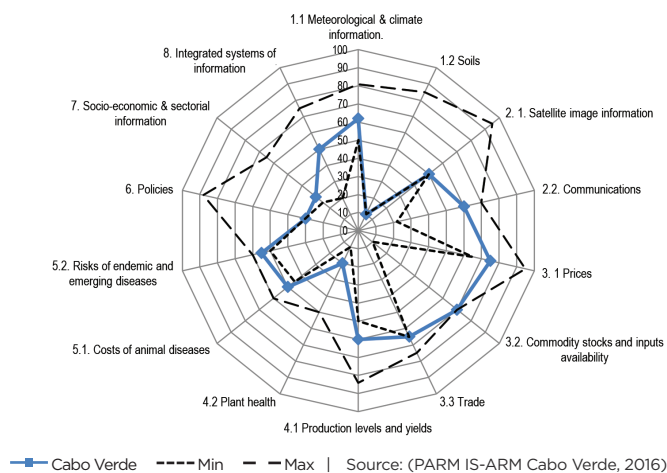
Cameroon has good information systems across some thematic areas but not on commodity stock/input, socio-economic and plant health (Figure 2). Mobile phone penetration is higher than in the other countries, thus a potential for increasing access to information for rural farmers.

Figure 2: IS scores for the thematic and sub-thematic blocks of ARM in Cameroon.



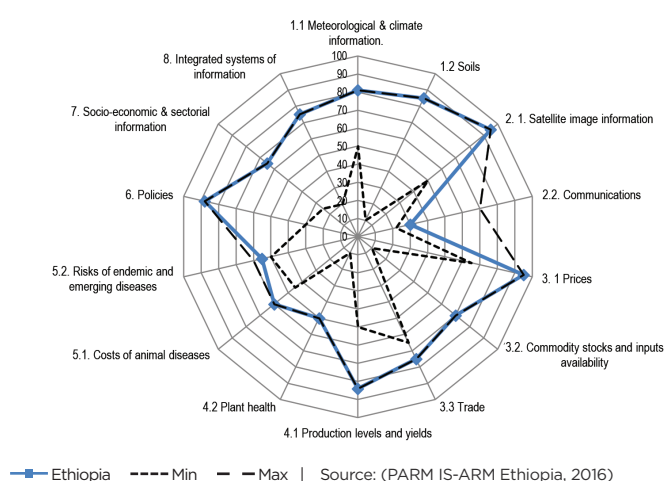
Cabo Verde is a country with fairly good environment for information communication. However, there is no national information on soils. Not much and well-disaggregated information on plant health, policy and socio-economic aspects of farmers livelihoods exists either (Figure 3).

Figure 3: IS scores for the thematic and sub-thematic blocks of ARM in Cabo Verde.



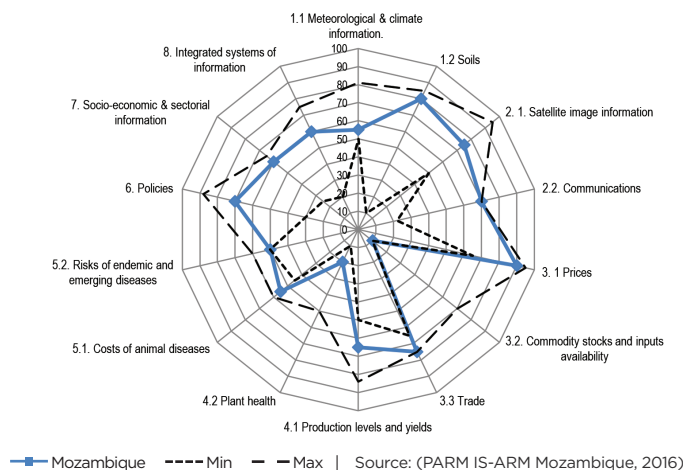
Ethiopia has numerous national information systems delivering very good information across the thematic areas (Figure 4). But the available information on plant and animal health control is weak due to unclear indicators used in defining context. Limited mobile penetration and lack of efficient internet services are also limiting the accessibility of information to smallholder farmers.

Figure 4: IS scores for the thematic and sub-thematic blocks of ARM in Ethiopia



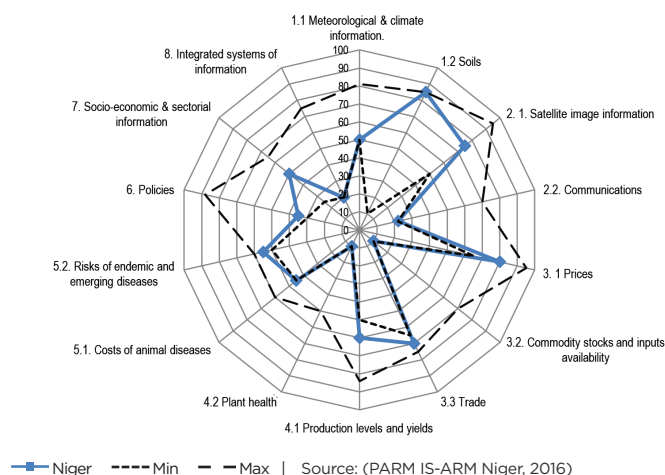
Mozambique is characterized with diversified information systems from national, regional and international sources and fairly good information across most of the thematic areas of risk (Figure 5). However, data on plant health is not disaggregated for farmer-level analysis, and information on commodity stock/inputs is only available for cotton.

Figure 5: IS scores for the thematic and sub-thematic blocks of ARM in Mozambique.



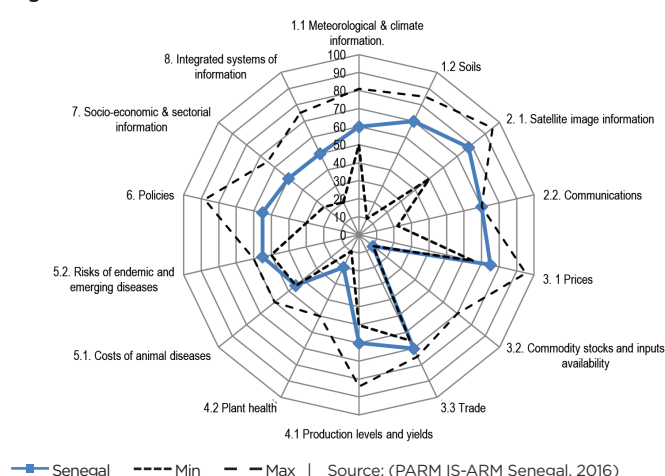
Niger has the weakest information dissemination rate among the PARM countries. No national system on satellite image information exist and communication through broadcast (TV & Radio) and social (phone & text-based) media are also very weak. Access to existing information on thematic areas of commodity stock/input, plant health, animal diseases and policy is very poor (Figure 6).

Figure 6: IS scores for the thematic and sub-thematic blocks of ARM in Niger.



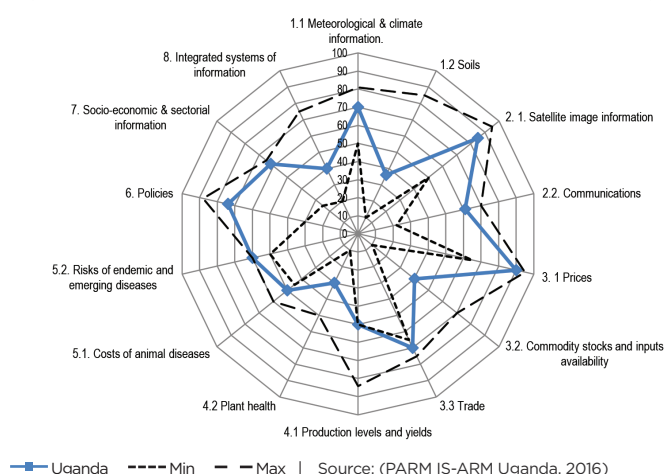
Senegal has well-developed private national information systems such as the Manobi who are making information accessible poor farmers. But legal issues of data confidentiality makes it difficult to securing information on commodity stock, plant health and animal diseases from relevant national sources.

Figure 7: IS scores for the thematic and sub-thematic blocks of ARM in Senegal.



Uganda has very good information on prices of commodities and satellite image but not on plant health and soils (Figure 8). Farmgain and Infotrade are among the most important systems providing information on prices of over 46 commodities in about 23 major markets. Plantwise is launching an initiative to map relevant plant pests and diseases information for future risk analysis.

Figure 8: IS scores for the thematic and sub-thematic blocks of ARM in Uganda.



Policy recommendations

Overall information systems in the seven PARM countries have poor information on commodity stock/input, plant health and animal diseases. Investments are required for an improvement in these areas for agricultural risk management.

Specialise in core professional areas of expertise within the legal mandate of information systems: Most often, it is better to have fewer information systems focusing on narrower topics or areas with trustworthy and relevant data than wider and more superficial ones addressing many topics without sufficient length, relevance or continuity. Detailed information is critical for rigorous risk analysis.

Increase focus on the length of time series and the continuity in reporting values that are essential for risk assessment and analysis. Where possible, information should be accompanied by technical notes describing the most important methodological, quality check procedures and sampling aspects. In several countries and information blocks, the series are discontinued or provided for a limited period of time, only useful to inform and alert for an event or situation, but not for ex-ante risk analysis. Historical and long-term series information should be prioritized to enhance management strategies for projected risks.

Stimulate private-based initiatives on information systems and provide adequate regulatory protection. There is potential to promote private organizations providing risk information to smallholder farmers. In most countries mainly public organisations collect data from public statistical agencies. Where possible, there should be public-private partnerships to improve access to valuable on-demand information to private individuals who are seeking to invest in agricultural and demand risk management information.

Enhance the level of information disaggregation. Data should be disaggregated at the most basic level of analysis, for instance at household production level and agro-ecological zones. This would allow for better analysis of risks situation to improve smallholder farmers' livelihoods.