FEED THE FUTURE ENABLING ENVIRONMENT FOR FOOD SECURITY PROJECT

# ENABLING THE BUSINESS OF AGRICULTURE: PLANT PROTECTION DATA IN ACTION

*This brief takes a deeper look at plant protection data in the 2017 Enabling the Business of Agriculture Index. It synthesizes data that can be used to strengthen the regulatory environment for plant protection in sub-Saharan Africa and in support of the US Government Global Food Security Strategy (GFSS). It offers particularly timely considerations for mitigating and addressing Fall Armyworm in Africa in the near and long term.*

## BACKGROUND: PLANT PROTECTION AND FALL ARMYWORM

Reliable pest management and robust pest control at country borders go hand in hand with strong agricultural and agribusiness sectors. Strong plant protection regulatory frameworks facilitate safe trade and help safeguard agriculture. Currently, Africa continues to battle an outbreak of invasive, transboundary pests including the Fall Armyworm (FAW) (Stokstad, 2017; CABI, 2017; USAID, 2017). This pest was first reported in mainland West Africa (Nigeria, Togo, Benin) and on the island of Sao Tome in early 2016, and is now confirmed in 28 African countries including several Feed the Future countries: Kenya, Mali, Nigeria, and Senegal (Goergen et al., 2016; Day et al., 2017). FAW in Africa has caused significant damage to maize crops in particular. Annual economic losses in 12 maize producing African countries (Benin, Cameroon, Democratic Republic of Congo, Ethiopia, Ghana, Malawi, Mozambique, Nigeria, Uganda, Tanzania, Zambia, and Zimbabwe) are estimated to be between $2.5 and $6.2 billion (Day et al., 2017). Invasion by FAW will further impact international trade since countries where the pest has not yet been detected are expected to place additional production or handling requirements on exports from FAW-affected countries (Day et al., 2017). Affected countries in Africa are prioritizing immediate and long-term solutions to mitigate and contain the devastating impacts of FAW. Responses to an informal USAID survey conducted in 2017 of countries affected by FAW affirmed the identification of gaps in enabling environment around plant protection as a challenge to adequate response.

### Key Terms

**Pest risk analysis (PRA)** is the process of evaluating evidence to determine whether an organism is a pest, whether it should be regulated, and the strength of the measures to be taken against it. Usually conducted for imported crops or commodities.

**Pest surveillance** is the collection, analysis, and timely dissemination of information about the presence, distribution or prevalence of pests and the plants or animals they affect. It is most often focused on how pests arise from domestic sources.

The World Bank's Enabling the Business of Agriculture (EBA) 2017 data, collected across 62 countries, provides important and timely inputs for policymakers as well as private and public sector actors across agricultural and agribusiness value chains. Launched in 2013, the EBA datasets measure and score the strength of the legal and institutional environment for agribusinesses. In 2017, this included 62 economies scored across eight topic indicators including: seed, fertilizer, machinery, finance, markets, transport, water, and ICT.[1] It can support identification of barriers that impede agricultural sector regulation and

[1] Countries are scored across topic indicators according to their performance against a global ideal or "distance to the frontier" (DTF) on a scale of 0-100, with a larger DTF score indicating better performance in that area. Topic indicator scores are an average of the DTF score for each of the topic's 1-5 indicators. See also DTF Scoring Basics Technical Note. Gender, livestock,

growth and provide a way to benchmark, track and monitor progress and reforms made by countries over time (World Bank, 2017; Feed the Future Briefs).

The 2017 EBA Report's market topic indicator includes particularly timely data on the current state and strength of existing plant protection regulatory frameworks. It provides information on how countries compare to each other on established and globally recognized plant protections good practices as collected through the Plant Protection Index (PPI). This information can be used to prioritize reforms that reduce or mitigate the risks of introducing pests through international trade, and may be particularly useful for informing response and prevention plans and strategies.

## 2017 EBA PLANT PROTECTION INDEX: A CLOSER LOOK AT THE DATA

The 2017 report included the Plant Protection Index, which measured and scored the strength of countries' legislation and regulatory plant and pest protection and phytosanitary frameworks and the efficiency with which they are implemented. Specifically, it measured the existence of practices or laws in the form of eight indicators (Table 1).

**Table 1. PPI Indicators Measure Existence of:**

| | |
|---|---|
| Indicator 1 | A specified government agency or unit designated by law to conduct pest surveillance on plants |
| Indicator 2 | Maintenance of a list of regulated quarantine pests by governments |
| Indicator 3 | Publicly available regulated quarantine pests and pest lists on IPPC and government website |
| Indicator 4 | A government website that contains a pest database with several features |
| Indicator 5 | Legal obligation by land owners/users to report pest outbreaks to governments and penalties are in place for non-compliance |
| Indicator 6 | A specific government agency or unit designated by law to carry pest risk analysis (PRA) for plant products imports |
| Indicator 7 | Publicly available pest risk analysis (PRA) reports |
| Indicator 8 | Risk-based phytosanitary inspections on imports of plant products |

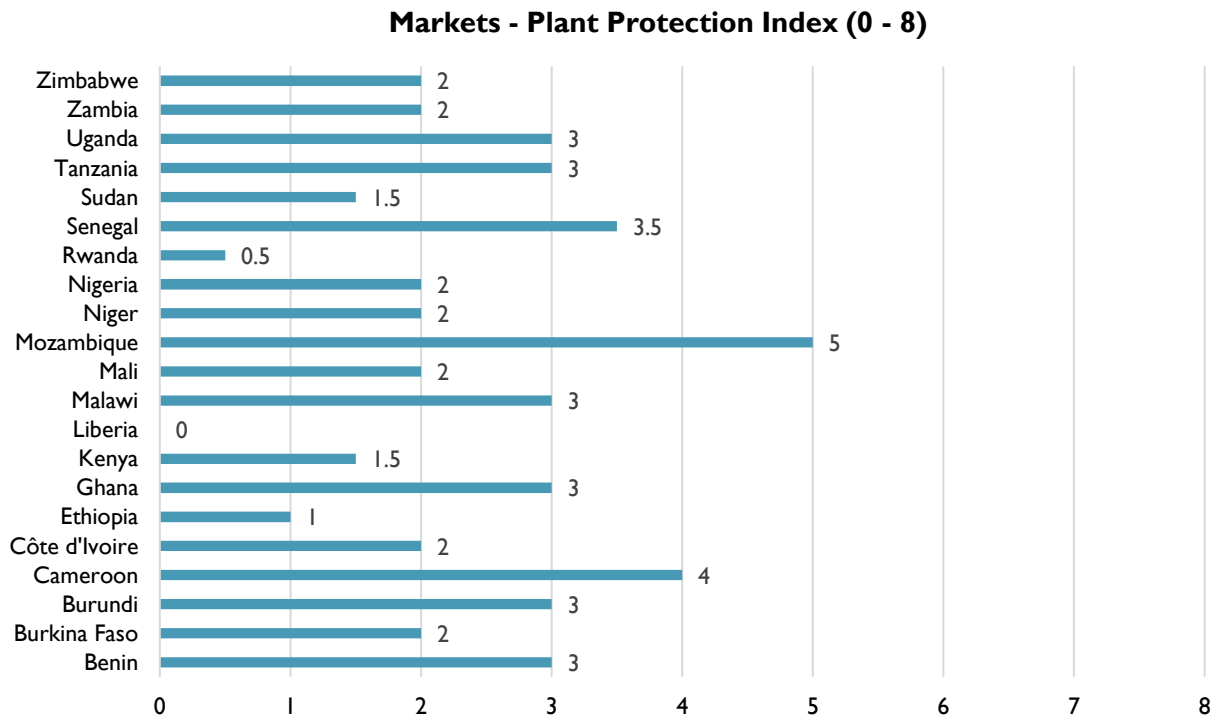
An index score of 0-8 was assigned to each country based on the eight indicators. Indicators 1, 2, 6, 7, and 8 received up to one point each based on a binary yes or no question. Indicators 3, 4, and 5 were also assigned up to one point each but included partial points based on qualifying criteria.[2]

According to EBA 2017 PPI data, many African countries have weak plant protection regulatory systems and practices, hence low PPI scores (the sub-Saharan average PPI score is 2.3 out of 8). These will continue to impact agriculture and trade since reliable and robust pest management and control are closely tied with strong and robust agricultural sectors (IPPC, 2015; World Bank, 2016). Out of a score of 8, Mozambique was the best performer with an overall score of 5. Other countries performing well included Cameroon (4) and Senegal (3.5). Among the worst-performing countries is Liberia, followed by Rwanda and Ethiopia (Figure 1).

environmental sustainability and land indicator data were added this year but are available for a more limited set of countries and are not yet scored. Please consult the EBA website for information about the evolution of these indicators as part of EBA.

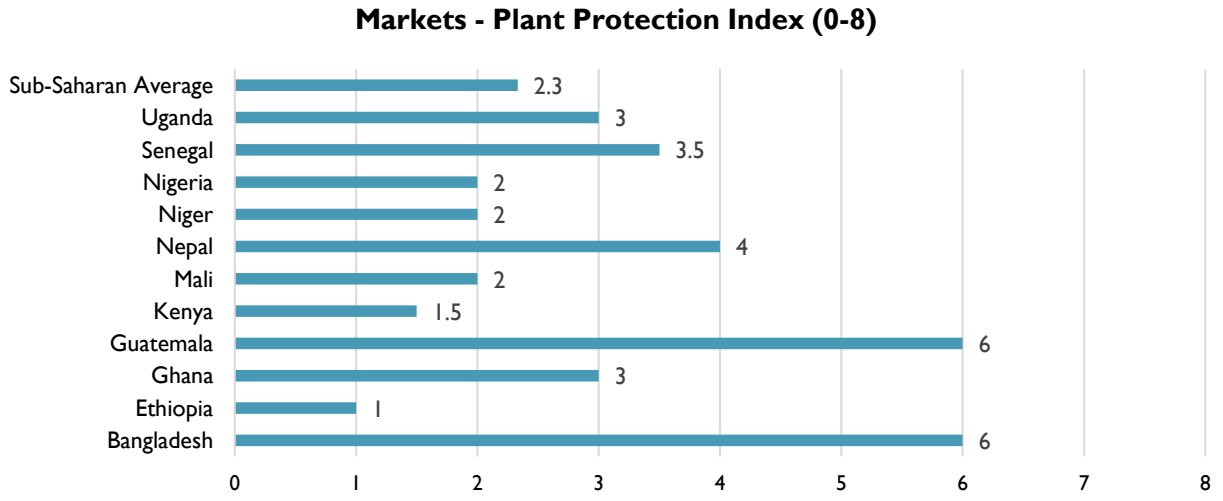
[2] Per EBA 2017 Markets Methodology, in the case of the quarantined pests lists and databases (indicator 3), a half point was assigned if the list was posted to the IPPC website and another half point if it was made available on a relevant government website. Indicator 4 assigned quarter points pending if the government website included the following features: pictures, host information, current status, and potential treatment methods, and a zero score if there was no database on a government website or if there was but met none of these criteria (and therefore essentially not of high enough quality to be useful). Finally, in terms of reporting pests and penalties for non-compliance (indicator 5), a full point was assigned if both conditions were in place, only a half point if they are obligated to report but no penalties for non-compliance and no points if they were not obligated.

**Figure 1. Sub-Saharan Africa Plant Protection Index Scores**




USAID-designated Feed the Future (FTF) focus countries under GFSS performed relatively well on the index. PPI scores of many of the designated FTF countries were higher than the sub-Saharan average (Figure 2). Bangladesh and Guatemala had overall scores of 6, reflecting strong plant protection practices and regulatory frameworks. Ethiopia and Kenya had low PPI scores across the eight indicators measured. These low scores could be improved through designating a national agency to conduct pest surveillance, maintaining list of regulated quarantined pests, publicly making available the lists of regulated quarantined pests and pest databases, and conducting regular phytosanitary inspections. [3]

**Figure 2. Feed the Future Focus Country Plant Protection Index Scores**




[3] A quarantined pest is a pest of potential economic importance to the area endangered thereby and not yet present there, or present but not widely distributed and being officially controlled (FAO/IPPC 2007 Glossary of Phytosanitary terms).

National legislation and regulations are fundamental to providing a regulatory framework for protecting agricultural resources from alien pests and diseases (Hlasny, 2012; Eschen et al., 2015). Strong pest and plant protection frameworks can facilitate safe trade and help safeguard agriculture and the meaningful gains made in agricultural development. This data is timely, and could be used to institute countrywide reforms in an effort to strengthen plant protection regulatory frameworks in many African countries including the designated FTF countries.

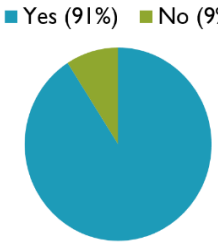
### *Presence of a government entity designated by law to conduct pest surveillance on plants*

Establishing a government agency or assigning a specific unit to conduct pest surveillance is a major step toward international cooperation to prevent the introduction and spread of plant pests. It further indicates that a country recognizes that movement of pests can have devastating consequences on food security and agricultural trade (IPPC, 2015). Pest surveillance is the collection, recording, analysis, interpretation, and timely dissemination of information about the presence, distribution or prevalence of pests and diseases and the plants or animals they affect (IPPC, 2010; Acosta and White 2011; Anderson et al., 2017).

Results reveal that 67 percent of SSA countries (14 out of 21) and 91 percent of FTF (10 out of 11) countries have a government agency that is designated with the task of carrying out pest surveillance on plants. The seven countries lacking a designated agency are Kenya, Liberia, Malawi, Rwanda, Sudan, Tanzania and Zambia. (Figure 3).

**Figure 3. SSA Countries and Feed the Future Countries**


| YES | NO |
|---|---|
| Benin | Kenya |
| Burkina Faso | Liberia |
| Burundi | Malawi |
| Cameroon | Rwanda |
| Côte d'Ivoire | Sudan |
| Ethiopia | Tanzania |
| Ghana | Zambia |
| Mali | |
| Mozambique | |
| Niger | |
| Nigeria | |
| Senegal | |
| Uganda | |
| Zimbabwe | |




| YES | NO |
|---|---|
| Bangladesh | Kenya |
| Ethiopia | |
| Ghana | |
| Guatemala | |
| Mali | |
| Nepal | |
| Niger | |
| Nigeria | |
| Senegal | |
| Uganda | |

Countries that do not have a specified government agency can use frameworks and guiding documents provided by the International Plant Protection Convention (IPPC). IPPC, which was adopted in 1951 and revised twice in 1979 and 1997, is a multilayered treaty for international cooperation in plant protection and the global instrument that is responsible for setting and harmonizing phytosanitary standards. Per IPPC guidelines, the designated national agency obligations and responsibilities should include: inspection of regulated plants and plant products moving in through trade to prevent introduction and spread of pests, pest surveillance, transparent reporting of plant pest problems, issuance of phytosanitary certificates, conducting pest risk analysis, and ensuring staff are up to date with respect to phytosanitary knowledge and procedures (IPPC, 2010, 2015). The IPPC offers different models that countries can choose from depending on availability of resources and national competencies. Most importantly, these agencies should try to be independent and employ technically competent experts and subject specialists to carry out designated activities including pest surveillance and pest risk analysis. In addition, they should work closely with other stakeholders, including universities, research institutions, regional plant protection organizations, and private companies. Setting up such an agency has many benefits including increasing the efficacy with which countries can prevent the introductions and spread of pests and increasing the credibility of their national phytosanitary systems for trading partners.

The ability to have successful and efficient pest surveillance systems is influenced by the availability of resources such as equipment, trained subject matter experts, and accurate diagnostics backed by science. Consequently, countries with higher PPI scores tend to invest in resources and hire competent experts to oversee and implement successful pest surveillance strategies. Research studies show that the longer a pest remains undetected, chance of successful eradication decreases and the cost to government, industry, and environment and functioning of agriculture increases (Magarey et al., 2009). Therefore, implementing pest surveillance systems or improving pest surveillance systems in countries that already have such units should be a priority. Furthermore, detecting and stopping pests before they establish is cost-effective, optimizes the likelihood of eradication and reduces the overall impact on production, trade, agriculture and environment (Florec et al., 2013; Tobin et al., 2014; Anderson et al., 2017).

*Existence and public availability of a government or national protection agency maintained list of regulated quarantine pests*

The EBA PPI data showed that only 38 percent (8 out of 21 countries) maintain a list of regulated quarantine pests (Figure 4a). Out of the eight countries that maintain regulated quarantine pest lists, only four (Burundi, Malawi, Senegal and Zambia) made the list publicly available (Figure 4a). Results also revealed that 45 percent (5 out 11) of FTF countries maintain a list of regulated quarantine pests and 36 percent (4 out of 11) made this list publicly available (Figure 4b).

**Figure 4a. SSA: maintain a list of regulated quarantine pests and make list publically available**

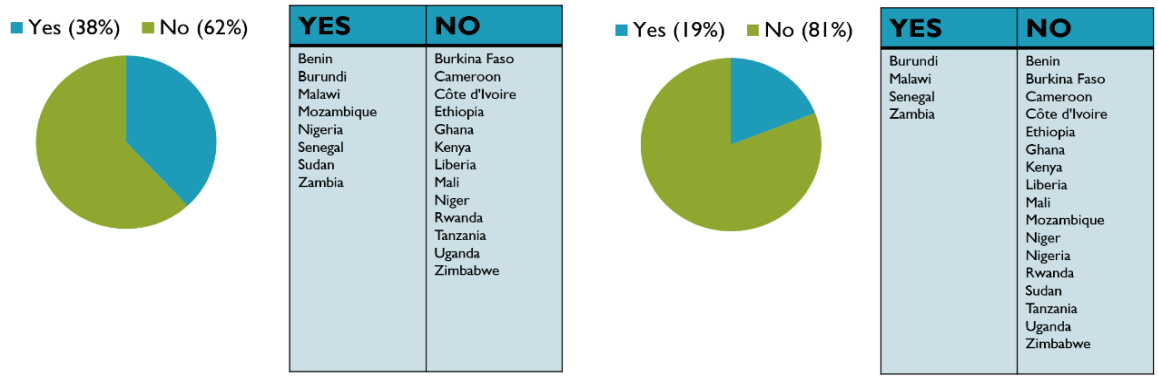
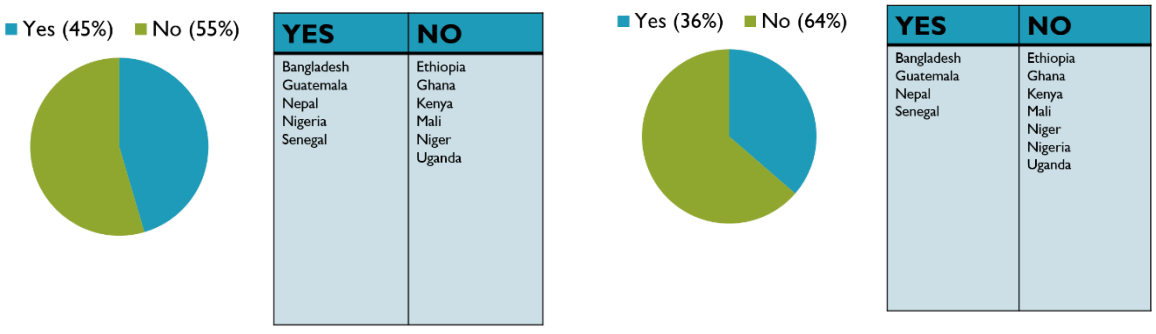



**Figure 4b. FTF: maintain a list of regulated quarantine pests and make list publically available**




As part of good practices for international trade, IPPC encourages countries to establish, maintain, and regularly update lists of regulated quarantine pests on both a publicly available government website and the IPPC website (IPPC 1997, 2015). The EBA PPI data further revealed that only 19 percent of SSA countries (4 out of 21) and 27 percent of FTF countries (3 out of 11) have uploaded the lists of regulated

quarantine pests on the IPPC website. The countries that have uploaded the lists to the IPPC website include Burundi, Malawi, Mozambique, Sudan, and, from FTF, Bangladesh, Guatemala, and Nepal.

This list of regulated quarantine pests contains the pest's scientific name and category and regulated commodities for that pest. It is established by an importing contracting party and specifies all the regulated pests for which phytosanitary measures need to be taken. The availability of these lists facilitates safe trade while enhancing transparency. Countries with higher plant protection index scores, including Mozambique, Bangladesh, Guatemala, Nepal, and Senegal, maintain lists of regulated quarantine pests as stipulated by IPPC.

Limitations contributing to a general lack of updated lists by African countries include: lack of financial resources; few qualified personnel and subject experts who can produces and publish these lists; and a shortage of modern labs that can aid with rapid and accurate identification of pests (Smith et al., 2008; Bachabi et al., 2017).

To further make progress in strengthening plant protection systems, national stakeholders as well as aid organizations like USAID need to continue helping African countries ramp up their pest diagnostic capacity—critical capacity that would allow them to update the lists of regulated pests and strengthen the resilience of the agricultural sector to prevent and mitigate impacts of current and future harmful pest outbreaks like FAW.

Some past examples include the USAID-supported International Plant Diagnostic Network that aims to establish regional networks and help improve the capacity for insect pest diagnostics while sharing expertise in sample identification, development of standard operating procedures, and utilization of distance diagnostics and information management web portal in some African countries. At the moment, three regional networks (two in Africa, one in Central America) are being developed with support from US and European partners including past and present USAID-funded integrated pest management research centers and Innovation Labs. Such networks and regional bodies can help African countries develop up-to-date national and regional lists of regulated quarantined pests, lists which could be posted on IPPC's website. Such lists would strengthen trade and support the goals of the World Bank's EBA initiative.

*Presence of a government website that contains a pest database that has several features including pictures, host information, current status and potential treatment methods*

Many countries in sub-Saharan Africa do not have publicly-available pest databases with several features of pests including pictures, host information, and potential treatment. PPI data showed that only 9 percent of SSA countries (2 out of 21, Senegal and Tanzania) and 9 percent of FTF countries (1 out of 11, Senegal) have a website containing a pest database. This a major area requiring improvement and it is thereby highly recommended that African countries begin to maintain publicly available databases. With the exception of Senegal and Tanzania, all 21 SSA countries lack such records.

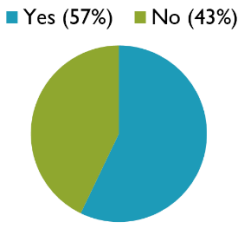
It is important for countries to maintain databases of all the economically important pests, including FAW, and whenever possible, these databases should contain pictures of the insect, the host information, and the current status including its distribution, life cycle, and control measures. Such a database is important as it allows countries to have an updated record of the pests that already exist in their countries while allowing for easy detection and identification of invasive pests in the borders. These databases should also be made available to the public.

Fortunately, following FAW invasions, African countries are beginning to create comprehensive descriptions of the pests. For example, in Ghana, posters and flyers contain pictures of FAW, its life cycle, and how to recognize the eggs and larval stages. Host information has been prepared and circulated among farmers and extension officers and posted on government websites in an effort to keep farmers and other stakeholders informed (CABI, 2017).

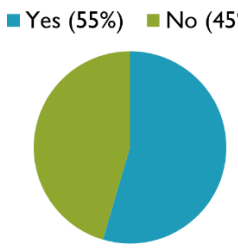
*Mandated reporting, and penalties for non-compliance, for pest outbreak by land owners/users*

When asked if the landowners are obligated to report pest outbreaks, results revealed that 57 percent of SSA countries (13 out of 21) and 55 percent of FTF countries (6 out of 11) do obligate farmers and land owners to report pest outbreaks. IPPC considers it a good plant protection practice and countries with higher PPI scores enforce this. However, as reported before, many countries do no keep a pest database with several features including pictures. As a result, it is nearly impossible for land owners to report unusual pests. As countries begin to make pest databases public, land owners should be empowered with the knowledge and information that they can use to help report any unusual pests. To further facilitate this, extension officers, universities, research institutions, governments, and private agencies can provide land owners and farmers with standard protocols that they can use to consistently monitor and report pest outbreaks.

**Figure 5. SSA and FTF countries and if they mandate reporting for pest outbreak by landowner/users**




| YES | NO |
|---|---|
| Benin | Burkina Faso |
| Cameroon | Burundi |
| Côte d'Ivoire | Ethiopia |
| Ghana | Liberia |
| Kenya | Malawi |
| Mali | Nigeria |
| Mozambique | Senegal |
| Niger | Uganda |
| Rwanda | Zimbabwe |
| Senegal | |
| Sudan | |
| Tanzania | |
| Zambia | |



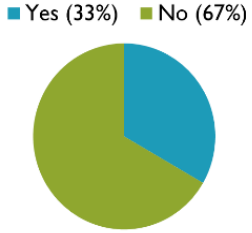

| YES | NO |
|---|---|
| Bangladesh | Ethiopia |
| Ghana | Mali |
| Guatemala | Niger |
| Kenya | Nigeria |
| Nepal | Senegal |
| Uganda | |

*Pest Risk Analysis (PRA): Presence of a specific government entity designated by law to carry out PRA for plant products imports and public availability of PRA reports*

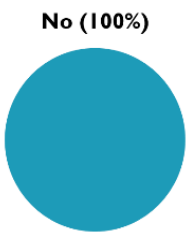
Pest risk analysis (PRA) is the process of evaluating biological, scientific and economic evidence to determine whether an organism is a pest, whether it should be regulated, and the strength of the phytosanitary measures to be taken against it (IPPC, 2007). They are mostly performed for imported crops or commodities and carried out by the recipient (importing) country. They rely on information from the producer country and take into account possible biological, environmental, economic, and social impacts of pest entry and establishment. It can range from a simple expert opinion or a formalized multistep process as per IPPC and World Trade Organization SPS agreements (IPPC, 2007). Carrying out PRA allows countries to formulate pest management plans that may involve absolute prohibition, risk managed entry or no necessary action (Eschen et al., 2015).

The majority of sub-Saharan African countries do not have a specified government agency to carry out pest risk analysis and in those countries that have a designated agency, this information in not publicly available (Figure 6a). According to the results, only 33 percent African countries (7 out of 21: Burkina Faso, Cameroon, Ghana, Kenya, Mozambique, Uganda, and Zimbabwe) have a government agency or a unit designated to carry out PRA. Results further showed that all 21 SSA countries' pest risk analysis reports are not publicly available (Figure 6a). PRA is a best practice and public availability of PRAs can facilitate access to key information that can facilitate trade across countries while ensuring it does not result in the introduction of new pests across national boundaries.

**Figure 6a. SSA countries that have a specified government agency to carry out PRA, and then those that make those reports publically available**



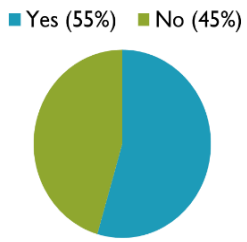

| YES | NO |
|---|---|
| Burkina Faso | Benin |
| Cameroon | Burundi |
| Ghana | Côte d'Ivoire |
| Kenya | Ethiopia |
| Mozambique | Liberia |
| Uganda | Malawi |
| Zimbabwe | Mali |
| | Niger |
| | Nigeria |
| | Rwanda |
| | Senegal |
| | Sudan |
| | Tanzania |
| | Zambia |



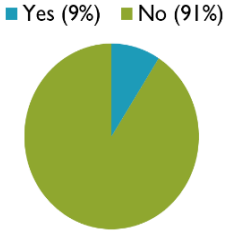

| NO | NO |
|---|---|
| Burkina Faso | Benin |
| Cameroon | Burundi |
| Ghana | Côte d'Ivoire |
| Kenya | Ethiopia |
| Mozambique | Liberia |
| Uganda | Malawi |
| Zimbabwe | Mali |
| | Niger |
| | Nigeria |
| | Rwanda |
| | Senegal |
| | Sudan |
| | Tanzania |
| | Zambia |

Results from USAID FTF countries revealed that 55 percent (6 out of 11, Bangladesh, Ghana, Guatemala, Kenya, Nepal, and Uganda) have a government agency tasked with conducting PRA, and that out of the six countries only one, Bangladesh, had made PRA reports publicly available (Figure 6b).

**Figure 6b. FTF countries and whether or not they have a government agency tasked with conducting PRA, and then if those reports are publically available**




| YES | NO |
|---|---|
| Bangladesh | Ethiopia |
| Ghana | Mali |
| Guatemala | Niger |
| Kenya | Nigeria |
| Nepal | Senegal |
| Uganda | |



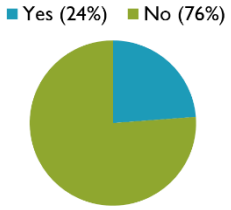

| YES | NO |
|---|---|
| Bangladesh | Ethiopia |
| | Ghana |
| | Guatemala |
| | Kenya |
| | Mali |
| | Nepal |
| | Niger |
| | Nigeria |
| | Senegal |
| | Uganda |

Countries are strongly recommended to designate a national agency and mandate it carry out PRA. In addition, qualified subject experts should be hired, and it is strongly recommended that hired subject experts work with other stakeholders including universities, IPPC, and private industries to carry out rigorous PRAs. Furthermore, these rigorous PRAs should be repeatable, transparent, and supported by current scientific findings (Lodge et al., 2006). Accurate PRA would allow countries to bar entry of any species or plant products unless their risk of invasiveness is low.

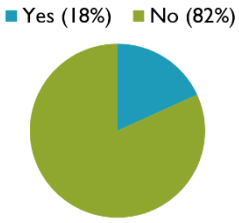
### *Phytosanitary inspections on imports of plant products*

Per IPPC guidelines, phytosanitary inspections of plant products imports should be carried out on an at risk basis. Results show that only 24 percent of SSA countries (5 out 21: Cameroon, Ghana, Mozambique, Tanzania, and Uganda) and 18 percent of FTF countries (2 out of 11: Guatemala and Uganda) carry out phytosanitary inspections on risk basis (Figure 7).

**Figure 7. SSA and FTF countries carry out phytosanitary inspections on imports of plant products**




| YES | NO |
|---|---|
| Cameroon | Benin |
| Ghana | Burkina Faso |
| Mozambique | Burundi |
| Tanzania | Côte d'Ivoire |
| Uganda | Ethiopia |
| | Kenya |
| | Liberia |
| | Malawi |
| | Mali |
| | Niger |
| | Nigeria |
| | Rwanda |
| | Senegal |
| | Sudan |
| | Zambia |
| | Zimbabwe |




| YES | NO |
|---|---|
| Guatemala | Bangladesh |
| Uganda | Ethiopia |
| | Ghana |
| | Kenya |
| | Mali |
| | Nepal |
| | Niger |
| | Nigeria |
| | Senegal |

Phytosanitary inspections are carried out to check compliance with the importing country's requirements, therefore all countries need to carry out phytosanitary inspections based on pest risk assessment data and results. Ghana, Cameroon, and Mozambique already have these inspections in place and should be encouraged to help transfer knowledge to other countries. Carrying out these inspections on an at-risk basis can help countries stop new invasions since commodities deemed to have higher risks of invasive pests would stay for longer periods in quarantine units, allowing countries to carry out rigorous inspections before clearing the imports. Doing so further safeguards the domestic agricultural sector against the entry, establishment, and spread of pests across borders.

## CONSIDERATIONS AND IMPLICATIONS: PLANT PROTECTION AND RESPONSE AND PREVENTION TO FALL ARMYWORM IN AFRICA

Fueled by climate change and global trade, the threat from invasive pests to countries in which the pests were not present or previously reported will continue to increase with SSA countries expected to be the most vulnerable (Paini et al., 2016). Therefore, SSA countries must improve their national plant protection regulatory frameworks to effectively deal with future invasive and transboundary pests and pathogens. By implementing the recommended best practices such as rigorous pest surveillance, pest risk analysis, and updated lists of quarantined pests, countries with low PPI scores could improve not just their scores but also strengthen their plant protection regulation frameworks and their ability to deal with future invasive and transboundary pests.

As African countries continue to deal with FAW and other transboundary pest invasions, it is evident that many of these countries do not have adequate resources to carry out pest surveillance. Furthermore, the extension and research staff in many African countries rely on limited in-country capacity for surveillance and identification of pest problems (Mugambi et al., 2016), with occasional help from external programs (Rogers 2017). Therefore, more resources need to be allocated to the national plant protection agencies that are currently tasked with conducting pest surveillance.

Because the indicators measured by the PPI are guidelines set by IPPC, one recommendation for consideration is the formation of regionally (East Africa, West Africa, Central Africa, Southern Africa) coordinated and harmonized protocols, procedures and plant protection regulatory practices. East African countries, for example, could join forces and set up harmonized pest surveillance and pest risk analysis protocols. The EAC SPS Protocol, which has been ratified by Kenya, Uganda, Rwanda, and more recently by Burundi, is an example of a regional harmonized instrument that mitigates risks arising from pests, diseases, and food safety concerns. The EAC example could be followed by other countries. They could also jointly develop the required lists including those of regulated quarantine pests and pest databases. Countries that have high PPI scores and those that are implementing all the recommended IPPC and

WTO-SPS plant protection best practices should continue to help other countries and these could inform regional or continent-wide workshops. Implementing these practices will help protect domestic food production against invasive pests, further mitigate crop failures, and reduce contaminated products on both domestic and international markets. And since losses due to invasive pests are spread across many stakeholders-everyone along the agricultural and agribusiness value chain should be equipped and empowered with the knowledge they need to be able to monitor pests and pest outbreaks.

Many African countries, research institutions, aid organizations, and UN Food and Agriculture Organizations have been on the frontlines addressing the FAW invasion. They have implemented many short-term solutions including ramping up efforts to rapidly identify pests, assess its geographic extent, create awareness, and initiate control responses and measures to contain outbreaks. However, owing to their short-term nature, many of these actions will cease when the pest is no longer considered invasive. And many of these efforts are challenged by the fact that they can only go so far given the limitations of the enabling environment. The data provided through EBA offers important contextual information that could be used to direct multi-pronged response options and to tailor and prioritize optimal response options for the current enabling environment in a given country.

## DATA-DRIVEN ACTIONS TO STRENGTHEN PLANT PROTECTION SYSTEMS

- African countries should designate a national plant protection unit that will set national standards, guidelines, and protocols to implement the phytosanitary systems; conduct pest and plant surveillance; enforce border inspections of plant consignments; create and maintain updated lists of regulated and quarantine pests; and make these lists available to the public and other stakeholders.
- Produce yearly reports of the progress African countries make toward improving the key weaknesses identified and increasing their plant protection index scores.
- Hold annual or biannual regional technical training workshops. These workshops facilitated by IPPC staffers, together with experts from countries that have strong plant regulatory frameworks, could bring together national plant protection employees, border control staffers, and research/university scientists. This would ensure that the staff and experts working for the national plant protection agencies are competent enough to carry out and implement all the tasks that a national protection agency is expected to do. These trainings should also serve as venues to share best practices.
- World Bank, in partnership with IPPC and stakeholders like USAID, create regional online repositories to host resources, tools, and other information including pest identification manuals, lists of regulated quarantine pests, pest databases, border inspection manuals, and any other materials that is related to plant pests including regulated and quarantined pests.
- Create harmonized regional protocols and procedures and further establish regional pest diagnostic labs to help in the diagnostics of key regulated pests.
- Create incentives to reward countries that make progress in improving their plant protection index and those that further strengthen their national plant protection regulatory frameworks.
- Build pest databases by major crop with accompanying pictures of the listed insects, their host information, life cycle, distribution, current status, and available recommended control measures.
- Allocate enough funding and resources to designated national agencies so that they can rigorously and effectively carry out comprehensive pest surveillance. Furthermore, countries should develop coherent and coordinated dissemination of information about pests within and between countries.
- Create lists of regulated quarantine pests and upload them both on a national plant protection agency website and the IPPC website.
- Countries and national plant protection agencies must obligate landowners to report pest and pest outbreaks and there must be penalties for failing to comply.

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