

NATIONAL IMPLEMENTATION OF REGIONAL PESTICIDE POLICIES IN WEST AFRICA: ACHIEVEMENTS, CHALLENGES AND PRIORITIES SYNTHESIS REPORT

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ACRONYMS

ANDE	Agence Nationale de l'Environnement
CAP	Centre Anti-poison Sénégal
CDH	Centre pour le Développement de l'Horticulture
CEDEAO	Communauté Economique des Etats de l'Afrique de l'Ouest
CERE	Centre d'Étude et de Recherche en Environnement
CILSS	Comité Permanent Inter-états de Lutte contre la Sécheresse au Sahel
CNGP	Comité National de Gestion des Pesticides
CNGPC	Commission Nationale de Gestion des Produits Chimiques
CNP	Comité National des Pesticides
CNRA	Centre National de Recherche Agricole
COAHP	Comité Ouest Africain d'Homologation des Pesticides
CP	Comité des Pesticides
CPI/OUA	Conseil Phytosanitaire Inter-africain de l'Organisation de l'Unité Africaine
CRPU	Comité Régional des Pesticides de l'Union
CSIR	Council for Scientific and Industrial Research
DNA	Direction Nationale de l'Agriculture, Ministry of Agriculture
DPV	Direction de la Protection des Végétaux, Ministry of Agriculture
DPVCQ	Direction de la Protection des Végétaux, du Contrôle et de la Qualité
ECOWAS	Economic Community of West African States
EPA	Environnemental Protection Agency
FMP	Faculté de Médecine et de Pharmacie, Université Cheik Anta Diop
IER	Institut d'Economie Rurale, Ministry of Agriculture
HIP	Homologation Interafricaine Phytosanitaire
IRAG	Institut de Recherche Agronomique de Guinée
ISRA	Institut Sénégalais de Recherche Agricole, Ministry of Agriculture
LANADA	Laboratoire National d'Appui au Développement Agricole
LCAE	Laboratoire Central d'Agrochimie et l'Ecotoxicologie
LNPV	Laboratoire National de la Protection des végétaux
MC	Ministry of Commerce
ME	Ministry of Environment
MOA	Ministry of Agriculture
MS	Ministère de la Santé
MT	Ministère du Travail
NAFDAC	National Agency for Food and Drug Administration and Control
NARI	National Agricultural Research Institute
NEA	National Environment Agency
NESREA	National Environmental Standards and Regulations Enforcement Agency
NPMC	National Pesticide Management Committee
OCLALAV	Organisation commune de lutte antiacridienne et de lutte antiaviaire
OMA	Observatoire du Marché Agricole Mali
PPRSD	Plant Protection and Regulatory Services Division, Ministry of Agriculture
PRC	Pesticide Registration Committee
SNPV-DS	Service National de la Protection des Végétaux et des Denrées Stockées

UCTR-PV	Unité de Coordination Technique Régionale en Protection des Végétaux
UEMOA	Union Economique et Monétaire Ouest Africaine (WAEMU in English)
WAEMU	West African Economic and Monetary Union
WACPR	West African Committee for Pesticide Registration (COAHP in French)

1. INTRODUCTION

1.1. Regional input policies

West African countries have long recognized their strong regional interdependencies in agricultural and food markets. For many centuries, long distance trading routes have linked different agro-ecological zones within the region. In more recent years, particularly since the Sahelian droughts of the early 1970s, cross-border movements of people, livestock, farm inputs and food staples have underscored the importance of regional interdependencies for ensuring food security.

Beginning in the 1990s, regional organizations such as CILSS and ECOWAS¹ have increasingly promoted regional harmonization of agricultural input policies as a means of accelerating agricultural productivity growth, increasing technology spillovers and improving national and regional food security. Given that the region's collection of multiple small countries straddle common agro-ecological zones, harmonized regulations throughout the region hold the promise of enabling input suppliers to exploit economies of scale in input production, procurement and distribution. Cross-border flows of agricultural inputs such as improved seeds, fertilizer and pesticides, in turn, accelerate prospects for technology spillovers (Alston 2000; Haggblade 2013). To exploit these potential productivity gains, West African countries have generally promoted regional collaboration, with particularly strong bonds developing among the francophone members of WAEMU² and CILSS (Table 1).

While regional policies governing inputs such as fertilizer and seeds have been well studied (Keyser et al. 2015), regional pesticide policies and markets have not. In addition to filling this gap, the pesticide studies in this series offer a potentially instructive contrast between the longtime CILSS member countries, which introduced common regional pesticide regulations in 1992, and non-CILSS ECOWAS member countries, which introduced a common regional regulatory framework 15 years later, in 2008, using the CILSS framework as its model for managing regional pesticide policies in the humid coastal zone.

Over the past 25 years, CILSS member countries have implemented harmonized regional pesticide policies among its member states despite very different levels of human, administrative and scientific capacity. In contrast, ECOWAS efforts to expand this model to the coastal countries of West Africa have proceeded more slowly following the 2008 agreement to expand regional pesticide regulations to the coastal countries. Concerned about the slow national uptake

¹ Founded in 1975, the Economic Community of West African States (ECOWAS) includes 15 member states: Benin, Burkina Faso, Cape Verde, Cote d'Ivoire, Ghana, Guinea, Guinea Bissau, The Gambia, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo. Largely overlapping with the membership of CILSS, ECOWAS nonetheless excludes Mauritania and Chad (both CILSS members) while including non-CILSS members Nigeria, Ghana, Sierra Leone and Liberia. ECOWAS aims to create a West African free-trade zone and eventually a common monetary union for a region with an estimated 2010 population of about 300 million people.

² The West African Economic and Monetary Union (WAEMU), known as UEMOA in French and founded in 1994, includes the eight francophone countries sharing the common currency of the CFA franc: Benin, Burkina Faso, Cote d'Ivoire, Guinea Bissau, Mali, Niger, Senegal et Togo.

of regional pesticide regulations in the coastal countries, ECOWAS formally engaged CILSS, in April 2013, to help jump-start its efforts to expand regional pesticide implementation to the coastal countries.

This staggered implementation of regional pesticide policies provides a learning opportunity. The early adopting CILSS member countries provide a 25-year window for exploring how the Sahelian countries managed to implement regional pesticide policies, even in countries with low levels of human and physical capital. Lessons learned there can help to pinpoint ways in which ECOWAS can improve future country implementation of regional inputs policies more broadly throughout coastal West Africa.

Country	Regional organizations			
	CILSS		ECOWAS	UEMOA
	original	2011 expansion		
Benin		√	√	√
Burkina Faso	√		√	√
Cape Verde	√		√	
Chad	√			
Côte d'ivoire		√	√	√
Gambia	√		√	
Ghana			√	
Guinea		√	√	
Guinea-Bissau	√		√	√
Liberia			√	
Mali	√		√	√
Mauritania	√			
Niger	√		√	√
Nigeria			√	
Senegal	√		√	√
Sierra Leone			√	
Togo		√	√	√
total members	9	4	15	8

1.2. Objectives

This paper aims to identify the reasons for uneven rates of country implementation of mutually agreed-upon regional pesticide³ regulations in West Africa. In doing so, it synthesizes the findings from seven comparative country case studies. Together, these collective profiles provide a profile of the structure and dynamics of regional pesticide markets. Comparison across countries allows us to examine the status of national implementation of regional pesticide policies and to identify gaps and problems in implementing regional pesticide policies.

By comparing case study findings from across the region, this work aims to help understand why some countries move rapidly to implement agreed-upon regional pesticide policies, while others have moved slowly or not at all. Ultimately, these comparisons aim to help identify key factors favoring country-level implementation of agreed-upon regional agricultural policies in West Africa.

1.3. Methods

The present synthesis document summarizes the results of seven national studies of regional pesticide policy implementation in West Africa. The team selected countries to represent a range of market sizes and regulatory experiences (Table 2). The countries examined include three longtime CILSS members (Mali, Senegal and Gambia) as well as four coastal ECOWAS members expected to participate in the newly designed humid zone pesticide regulatory body (Côte d'Ivoire, Ghana, Guinea and Nigeria).

<i>Market size</i>	<i>CILSS CSP Countries</i>	<i>Coastal ECOWAS Countries</i>
Large		Cote d'Ivoire* Ghana* Nigeria**
Medium	Burkina Faso Mali* Senegal*	Guinea*
Small	Cape Verde Chad Gambia* Guinea Bissau Niger Mauritania	Benin Liberia Sierra Leone Togo
*Full case study countries. **Rapid appraisal only.		

³ Pesticides include several broad categories of agricultural inputs including herbicides, insecticides, fungicides, nematocides, rodenticides and growth regulators.

Each study began by enlisting local collaborators to summarize available evidence on pesticide markets, regulatory frameworks and key private and public sector actors affecting market growth and regulatory controls. Then, using a standard research protocol, each country team has roughly two weeks conducting interviews with national regulators and key private sector importers, distributors and retailers and farmers. The core team –composed of Boubacar Diallo, Amadou Diarra, Steven Haggblade, Oyinkan Tasié and Abdramane Traoré – began by conducting the Mali study together in June and July 2016. From that experience, the team revised and standardized the research protocol.

The research protocol began with the collection of available secondary data on pesticide use and regulations, with the help of a local consultant hired to help assemble these materials. Two core team members then visited their assigned case study countries to collect detailed primary and secondary data, conduct market visits and key informant interviews, guided by our local focal points. Each of the case studies provides the full research protocol, including market profiles, respondent selection and interview guide, as well as a complete list of persons interviewed in Mali (See Diallo and Tasié 2017, Diarra and Diallo 2017, Diarra and Tasié 2017, Haggblade et al. 2017, and Traoré and Haggblade 2017a, 2017b). Given the size and complexity of the Nigerian economy, the Nigeria team was unable to complete a full national case study. Instead, they have provided a rapid appraisal assessment (Tasié et al. 2017).

Following their field visits, the country teams spent a month or more compiling and analyzing available data and summarizing the qualitative views expressed by private traders and regulators. In addition to detailed discussions with regulators and private sector actors, the authors searched out and analyzed available secondary data on pesticide prices, import quantities and farm-level adoption and following up with specific key informants.

In early 2017, the teams produced full draft reports which they circulated in draft form to 6-10 key informants in each country for detailed review and comment. After receiving feedback from these key private and public sector actors, the teams finalized each of their country reports. This synthesis document contrasts country performance and summarizes key findings from these seven individual country reports

2. RAPIDLY GROWING REGIONAL PESTICIDE MARKETS

2.1. Market overview

West African countries collectively import roughly \$900 million worth of pesticide products each year (Table 3). Because most suppliers do not manufacture pesticide active ingredients domestically, these import figures provide the best available estimate of wholesale market value.

In terms of product composition, herbicides dominate, accounting for about 60% of total pesticide use (Table 3). Herbicides kill weeds and thus substitute primarily for hand weeding labor, which has historically dominated farmers' weed control efforts. Selective herbicides, such as 2,4D and atrazine, target broadleaf and certain grassy weeds enabling farmers to spray on their fields without damage to their cereal crops. Nonselective herbicides, such as glyphosate and paraquat, kill all plants indiscriminately, including cereal crops. Farmers therefore use nonselective herbicides primarily during land preparation and before plant emergence to kill weed populations before they can outcompete crops for moisture, sunlight and nutrients. Many farmers use a mix of non-selective herbicides during field preparation and selective herbicides after plant emergence.

Table 3. West Africa Pesticide Imports, circa 2015*

Country	Pesticide imports (\$ millions)			total
	herbicides	insecticides	other**	
Benin	1	2	5	7
Burkina Faso	12	6	1	20
Cape Verde	0	1	0	1
Cote d'Ivoire	77	46	9	132
Gambia	0.0	0.3	0.0	0.4
Ghana	101	35	52	189
Guinea	4	2	4	10
Mali	11	24	5	40
Mauritania	0.8	0.1	0.8	1.7
Niger	0.0	1.7	0.3	2.0
Nigeria	338	103	16	457
Senegal	4	6	5	15
Sierra Leone	0.5	1.1	3.6	5.2
Togo	1	3	1	5
West Africa	552	229	104	885

* average for available data, years 2014 to 2016
 ** fungicides, growth regulators, rodenticides, nematocides
 Sources: COMTRADE (2017).

Insecticides account for a further 25% of pesticides used. In the dry Sahelian zone of West Africa, cotton and horticulture farms rely heavily on insecticides to control a range of insect pests that would otherwise cause heavy crop damage. In the humid coastal zones, cocoa,

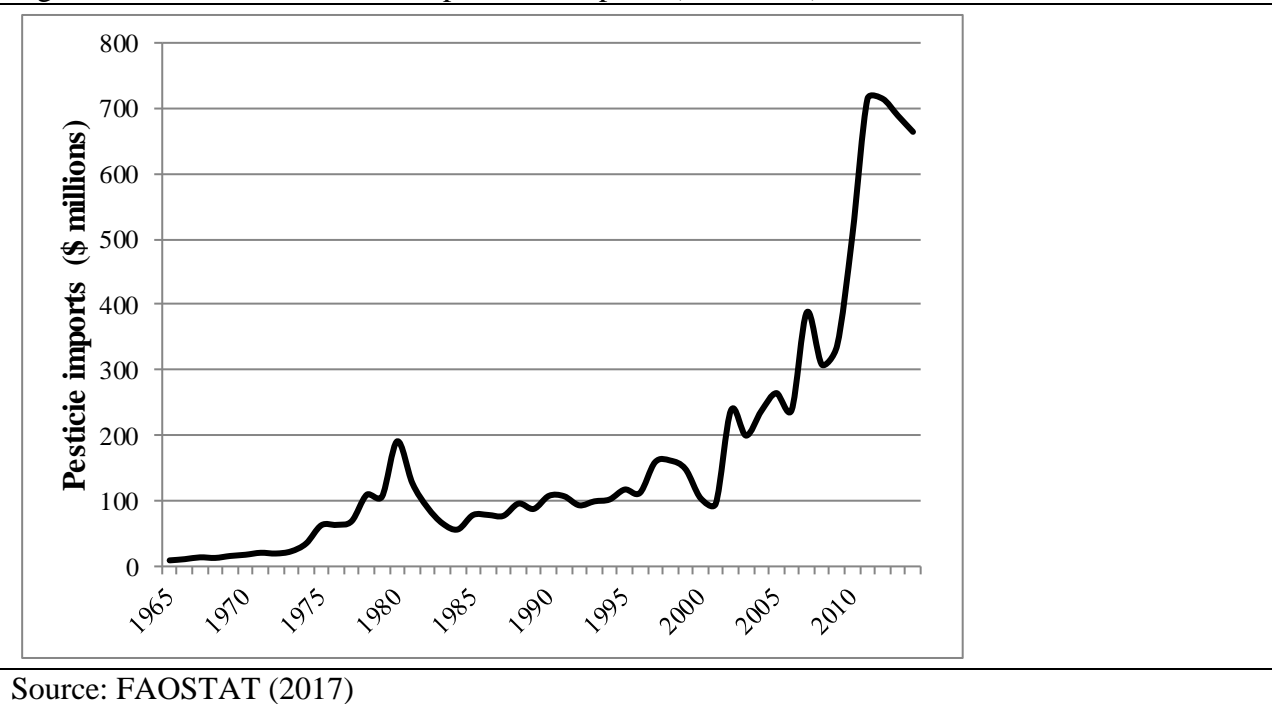
bananas and other tropical crops similarly rely on insecticides whose active ingredients target specific crop pests.

Fungicides and other pest control products, such as nematicides and rodenticides, account for the remaining 15% of pesticides applied by West African farmers. The fungicides, which dominate this group, become particularly prominent in the high-rainfall coastal zones where heavy humidity favors fungal growth (Table 3).

2.2. Market trends

Pesticide markets have grown rapidly in West Africa, particularly since about 2005 (Figure 1). Among the case study countries, the three largest (Nigeria, Ghana and Côte d'Ivoire) have experienced a pronounced jump in pesticide imports over the past decade and a half (Table 4). In part, this higher growth may result from imports of active ingredients which get formulated and retailed both domestically and in the smaller landlocked countries of the interior.

Figure 1. Trends in West African pesticide imports (\$ millions)



	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010	2015
Large countries											
Nigeria	5	9	28	95	22	17	16	14	49	149	457
Ghana	1	2	3	13	8	14	18	17	91	264	189
Côte d'Ivoire	1	2	6	13	11	13	22	25	34	55	132
subtotal	7	13	38	122	41	44	56	56	174	467	778
Medium sized countries											
Burkina Faso	0	0	2	4	4	8	7	8	23	15	20
Guinea	0	0	0	0	0	1	2	3	4		10
Mali	0	1	2	1	4	12	15	13	23	18	40
Senegal	0	1	4	5	3	8	8	8	11	10	15
subtotal	1	2	8	10	11	29	32	33	61	43	84
Small countries											
Cape Verde		0	0	0	0	1	1	1	1	1	1
Gambia	0	0	0	1	1	1	1	1	1	1	0
Guinea Bissau	0	0	0	0	0			0	0		
Liberia	0	0	1	2	2	1	1	1	1		
Mauritania	0	0	1	0	1	1	0	0	0	0	2
Niger	0	0	0	2	2	4	2	3	2	2	2
Sierra Leone	0	0	1	0	1	1	1	1	1		5
Togo	0	0	1	1	7	11	5	6	3	4	5
subtotal	1	2	3	6	14	20	11	13	9	8	15
Note: blanks indicate missing data for that three-year period.											
Sources: FAOSTAT (2017), COMTRADE (2017).											

Growing markets, in turn, have led to a proliferating number of traders (Table 5). In Côte d'Ivoire, the number of registered pesticide importers has increased from 12 in 2000 to 67 in 2016. In Guinea's much smaller market, the number of traders has increased tenfold over the same period, from 2 to 21. The number of pesticide retailers appears to have increased even faster (Table 5). In addition to the officially registered traders, tracked by government regulators, large numbers of unregistered traders operate in most West African markets, many of them seasonally.

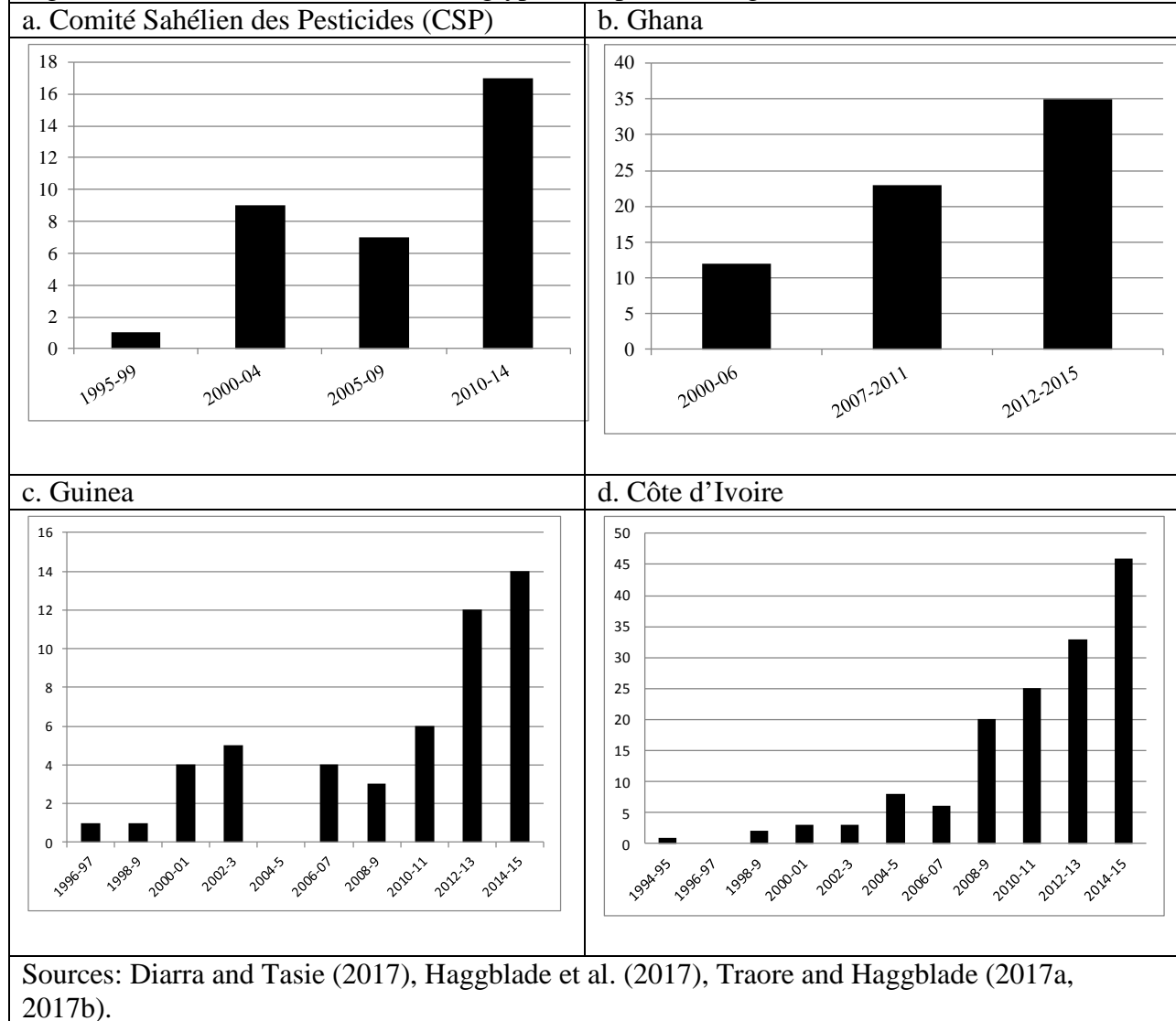
	2000	2016	annual growth rate
Côte d'Ivoire			
importers	12	67	11%
retailers	113	779	13%
applicators	44	396	15%
Guinea			
importers	2	21	16%
Sources: Traore and Haggblade (2017a, 2017b).			

Across all pesticide categories, the numbers of newly registered products have increased rapidly. Time-series data available from the CSP (CILSS member Sahelian countries), Ghana and Guinea suggest that the number of new pesticide products authorized for sale has grown at roughly 10 percent per year over the past decade (Table 6).

Herbicides, which have propelled much of this growth in total pesticide use, illustrate this brand proliferation most clearly. Glyphosate, the most commonly used herbicide world-wide, is also growing very rapidly in West Africa. The Sahelian countries, for example, approved only one brand of glyphosate for sale during the only 1995-99 period. That number jumped to 17 during the five-year period running from 2010-14 (Figure 2). In Ghana, glyphosate product registrations have jumped from an average of 2 per year in the early 2000s to a dozen annually in recent years. In Côte d'Ivoire, glyphosate product registrations have increased by a factor of five, from 4 per year in the 2005 to 23 per year a decade later (Figure 2).

	1995	2000	2005	2010	2015	annual growth rate
CSP (Sahel)						
Herbicides	2	23	38	59	144	15%
Insecticides	17	93	88	87	172	8%
crops	17	92	88	79	133	6%
public health	0	1	0	8	39	34%
Fungicides	0	2	1	3	11	17%
Others	0	1	0	1	5	17%
Total pesticides	36	212	215	237	504	10%
Ghana*						
Herbicides			36	90	212	10%
Insecticides			49	94	205	9%
Fungicides			17	27	64	10%
Others			7	5	27	21%
Total pesticides			109	216	508	10%
Guinea**						
Herbicides		10			94	17%
Insecticides		20			54	7%
Fungicides		2			10	12%
Others		4			4	0%
Total pesticides		36			162	11%
Notes:						
* Ghana years refer to 2006, 2011 and 2015						
** Guinea years refer to 2001 and 2015						
Sources: Diarra and Tasié (2017), Haggblade et al. (2017), Traore and Haggblade (2017).						

Figure 2. Trends in the number of new glyphosate products registered



2.3. Drivers of growth

Three broad forces are driving this rapid growth in pesticide use by West African farmers: falling pesticide prices, rising farm labor costs and pressure to intensify agricultural production.

2.3.1. Falling global pesticide prices

Globally, pesticide prices have fallen over the past several decades. This general trend results from the expiration of patent protection for major global pesticide active ingredients and the subsequent release of cheap generic products. In Africa, many of these generics now come from China. Historically, private sector agro-chemical companies have conducted research and

development, leading to a steady release of new pesticide active ingredients beginning in the 1950s (Haggblade et al. 2017). Initially protected by international patents, these products have gradually gone off patent in recent decades. As a result, generic pesticides now account for about 80% of all sales globally (Dominguez 2015).

The most startling example concerns Roundup, Monsanto’s trademark name for the active ingredient glyphosate developed by their laboratories. The last global patent protection for Roundup expired in late 2000, triggering a wave of investment in large-scale production facilities in China. As a result, prices in China fell by 69% over the past decade and a half (Huang and Xiao, 2017) and by 50% globally (Benbrook 2016). Data from Mali’s market information service document the resulting softening of domestic prices, even in the interior Sahelian countries. Between 2008, when Mali’s Observatoire du Marché Agricole (OMA) first began tracking herbicide prices, and 2015, generic glyphosate sold under the trade name Kalach fell by 35% in domestic currency terms and 50% in dollars. Over the same period, Monsanto’s original brand Roundup fell slightly in CFA franc terms and by about 30% in dollars (Table 7).

Our field work in Ghana, Guinea and Côte d’Ivoire suggests that exchange rate movements can sometimes amplify and sometimes counter-act these international price movements. As a result, incentives to smuggle pesticides across country borders lead to variable trade flows over time. Large regional importers nonetheless confirm that growing availability of cheap Asian generic pesticide active ingredients has generally dampened international prices over the past decade and a half, increasing farmer interest and application of pesticides.

Brand	2008	2009	2010	2011	2012	2013	2014	2015	Change
Price in CFAF/liter									
Kalach 360	4,833	4,313	4,313	2,804	2,958	3,164	3,375	3,125	-35%
Roundup 360	4,833	5,250	4,938	6,000	5,000	4,458	4,479	4,375	-9%
Price in US dollars/liter									
Kalach 360	10.8	9.1	8.7	5.9	5.8	6.4	6.8	5.3	-51%
Roundup 360	10.8	11.1	10.0	12.7	9.8	9.0	9.1	7.4	-31%

Source: Haggblade et al. (2017a)

2.3.2. Rising farm labor costs

Over the past several decades, rapid urbanization has increasingly pulled rural labor off the farm and into West Africa’s growing cities and towns (Losch et al. 2014, Hollinger and Staatz 2015). Agricultural input traders and regulators in virtually all of our case study countries highlight the impact of growing rural labor shortages on herbicide demand among even small farmers. In Mali, the combination of falling herbicide prices and rising rural wage rates means that farmers in southern and central regions now indicate that herbicides allow them to control weeds at half the cost of hand weeding labor (Haggblade et al. 2017).

As nonfarm employment opportunities increase, as they do in proximity to urban areas, so does farmer interest in purchasing herbicides. In places like Guinea and Mali, employment in gold mines draws large numbers of rural workers off the farm. Because wage rates rise in peri-urban areas and fall off in remote rural areas, so too does herbicide adoption. In villages located within 50 kilometers of the capital city of Bamako, Mali, 75% of cereal farmers apply herbicides, while in remote rural areas 400 km away only 25% do (Haggblade et al. 2017).

Overall, our market informants in the case study countries concur that pressure on rural labor supplies contributes to rising farmer interest in herbicides and to herbicides growing share in total pesticide sales.

2.3.3. Agricultural intensification

Population pressure simultaneously produces more mouths to feed and less land for farming. As population grows and as fields become smaller from generation to generation, farmers must produce more food on less land. As a result, African farmers faced inexorable pressure to intensify production (Jayne et al. 2016).

Intensification requires both fertilizer and pesticides. Yet most policy makers focus primarily on increasing fertilizer use. Indeed, given low levels of fertilizer use, African farmers will need to increase soil nutrients in order to increase yields.

However farmers and agricultural professionals recognize that increased fertilizer application alone is not sufficient. Indeed, increased fertilizer use without pest control means simply results in greater crop losses. This means that fertilizers and pesticides are complementary inputs. As a result, growing land pressure will continue to provide a long-term stimulus to increased pesticide use on West African farms.

2.4. Current market structure

Currently, West Africa's major pesticide suppliers import the active ingredients they sell. While some firms indicate that they had synthesized active ingredients locally in the past, we found no current examples of local synthesis of pesticide active ingredients in West Africa. Some large firms import the active ingredients in large drums and then combine them with various additives to prepare specific formulations locally. Most, however, find it cheaper to import formulated products, packaged and ready for sale. An extensive network of mostly Chinese suppliers actively recruits West African importers as clients by offering to produce tailor-made brands suited to local conditions with the importers own "house brand" pesticide labels. This proliferation of "house brands" of registered generic pesticides now dominate the West African pesticide markets.

Farmers purchase these branded generic pesticides through one of four main supply channels (Figure 3). Unregistered retailers sell to farmers seasonally. Smugglers of unregistered and counterfeit products supply them with volumes that vary widely across countries and locations, from insignificant to substantial. The unregistered traders also procure some of their supplies

from registered wholesalers. As a result, the unregistered retailers typically sell a range of registered and unregistered products. Given deliberate similarities in packaging (Figure 4), farmers often find it difficult to distinguish between registered and unregistered brands.

Registered retailers dominate pesticide sales volumes in most locations. Though most sell registered pesticides supplied by registered wholesalers, many supplement the branded generics with cheaper unregistered products as these emerge episodically on the local market.

A third, generally smaller supply channel involves large agribusiness firms such as the cotton companies and cash crop plantations which procure pesticides in bulk directly from suppliers. Collective organizations of rubber and cocoa growers, for example, procure on behalf of their members, buying in bulk and specifying quality requirements to the major importers who supply them (Diarra and Tasié 2017 and Haggblade and Traoré 2017).

Finally, all governments in the region have established plant protection services, usually within their ministries of agriculture. In the event of a major pest infestation – such as migratory locusts, grain-eating birds or a new insect pest – government plant protection services import and distribute necessary pesticides to farmer groups (Haggblade and al 2016, Diarra and Diallo 2017). Because pests migrate easily across country borders, these emergency efforts often involve coordination across multiple countries. In fact, the CILSS CSP and its common regional pesticide regulations emerged as a result of repeated early efforts by Sahelian countries to combat regional pest infestations that followed on the heels of the Sahelian droughts of the 1970s. Section 3 below describes the origin of these regional pest control efforts in greater detail.

2.5. Emerging issues

Pesticides markets have grown rapidly over the past decade and a half. In contrast, regulatory capacity has not generally kept pace. As a result, the proliferation of pesticide brands, traders and marketed quantities has placed increasing pressure on existing national regulatory systems. This pressure gives rise to several important emerging issues.

2.5.1. Unregistered traders and products

- *Traders.*

Traders and regulators throughout West Africa report that the number of registered pesticide traders has increased rapidly since 2000. Where available, time-series data suggest that the number of registered traders has increased by a factor of 5 to 10 times in some locations (Table 5).

Figure 3. Pesticide Supply System Structure in West Africa

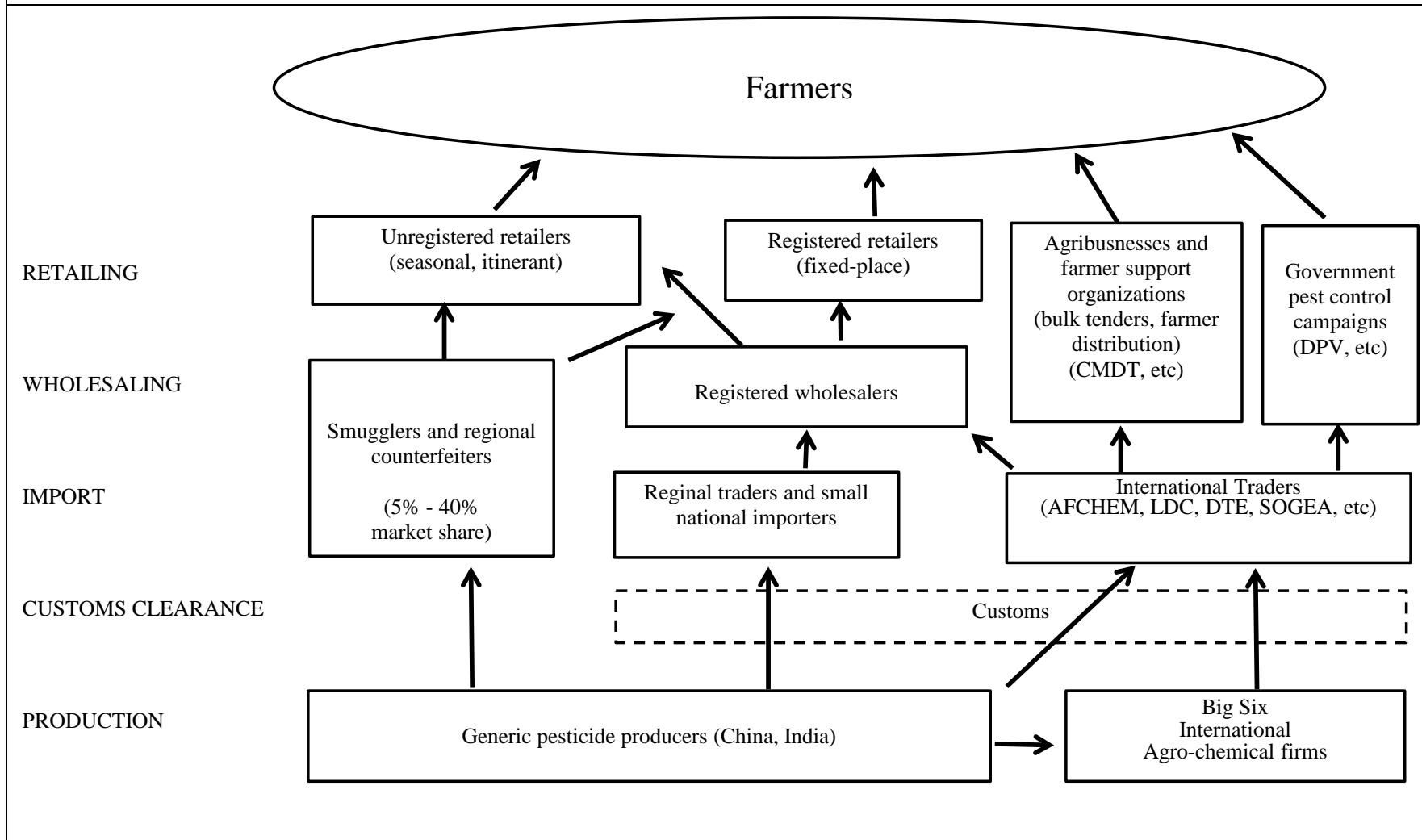


Figure 4. Growing profusion of glyphosate brands sold in West Africa



a. Roundup and its imitators (above)



b. The « Red Berets », Glycel its imitators (above)

Unregistered pesticide traders have entered the market as well. Their numbers have increased, possibly faster than the registered sellers. In Côte d'Ivoire, market participants estimate that about 7 out of 10 pesticide retailers in Abidjan is registered, while in interior markets only 1 to 3 out of 10 is registered (Traoré and Haggblade 2017b). Unregistered traders report that they prefer to operate without registering in order to avoid the time and financial costs associated with registration. Registered traders, typically larger in scale, comply in order to avoid regulatory hassles.

Many of the unregistered retailers operate seasonally. In Mali, market watchers estimate that seasonal and itinerant traders may increase the number of pesticide retailers by a factor of 10 during the peak agricultural season (Haggblade et al. 2017a). During the peak season, our market visits revealed a broad spectrum of retailers –bicycle shops, shoe repair shops, food retailers, hardware stores – selling pesticides seasonally.

- *Products.*

Unregistered pesticide products have also begun to appear in many West African markets. Their prevalence varies considerably, both temporally and spatially. During the civil war in Côte

d'Ivoire, stakeholders estimate that as much as 30% of the national market was supplied by Ghanaian pesticides, unregistered in Côte d'Ivoire and smuggled across the border. After the fighting ended in 2009, with the resumption of normal border controls and extensive training on counterfeit herbicides by Croplife and customs officials in both countries, the share of illegal imports has fallen to 5-10% of the Ivorian market (Yao 2014, Traoré and Haggblade 2017b).

The rise of generic pesticides globally has led to an explosion in the number of generic brands of pesticides sold across West Africa. Consider glyphosate, the herbicide that constitutes the most widely sold pesticide in West Africa. This single active ingredient is sold under 39 different registered brand names in the CILSS CSP countries (Figure 4). Ghana's EPA has registered 70 glyphosate products for sale domestically, while Côte d'Ivoire's CNP has authorized 147.

Unregistered imitations have emerged alongside this proliferating number of registered pesticide brands. However, the exact scale of unregistered pesticides is difficult to estimate with precision. While many unsophisticated, artisanal imitations are easy to spot, more sophisticated counterfeiters produce unregistered counterfeit products that even copyright holders have difficulty identifying (Figure 5).



As a very rough indicator, our team conducted market inventories in Ghana which identified 94 different glyphosate products on sale, 26 of them unregistered. A similar exercise in Mali found 60% of marketed glyphosate brands to be unregistered (Table 8). However, a simple counting of the number of brands on sale does not necessarily reflect volumes of unregistered products sold. Contraband brands often emerge overnight on local markets in small, one-off small lots. Moreover, the heavy seasonality of pesticide sales makes estimation of the total volume of unregistered products difficult. A regional study conducted in 2012 estimated that, on average, unregistered pesticide products accounted for about 35% of pesticide volumes sold, although the shares varied widely across countries (MirPlus 2012).. In Gambia, regulators and traders note frequent repackaging of pesticides and sales in unlabeled small containers (Figure 6).

Glyphosate products found on local markets	Ghana		Mali	
	number	percent	number	percent
registered	68	72%	17	40%
unregistered	26	28%	25	60%
total	94	100%	42	100%

Sources: Diarra and Tasie (2017); Haggblade et al. (2017a).

Regionally, market participants identify Ghana as the hotspot for unregistered and counterfeit pesticide distribution. Neighboring countries of Mali and Côte d’Ivoire indicate that the majority of unregistered herbicides on sale there come from Ghanaian suppliers. For this reason, Croplife has focused its anti-counterfeiting awareness training in Ghana and surrounding countries to show customs and ministry of agriculture officers how to spot counterfeit pesticide products (Yao 2014, Diarra and Tasie, 2017, Traoré and Haggblade 2017

In contrast, Nigerian markets appear to have very low levels of unregistered pesticide sales (MirPlus 2012; Tasie et al. 2017). At first, this seems surprising, given Nigeria’s reputation as a source of highly sophisticated counterfeits of branded pharmaceutical and consumer products (US Commerce Department 2014). We suspect that Nigeria’s highly skilled counterfeiters focus instead on high-value products, particularly brand-name medicines and drugs. Low-value generic pesticides offer exceedingly thin financial margins and hence meager profits for sophisticated counterfeiters who could earn far more by focusing on more lucrative markets.

2.5.2. Product quality, safety and testing capacity

Farmers and traders complain that the proliferation of pesticide brands, many of them unregistered, leads to wide variations in product quality and widespread suspicion of under-dosing of active ingredients (Keita et al. 2016; Diarra and Tasie 2017). Our Ghana study reports as follows:

...” several well-established local traders complained bitterly about the existence of “fake” products on the market. One noted that he had conducted efficacy trials on some of these products, concluding that several of the fraudulent, unregistered pesticides were ineffective.” (Diarra and Tasie 2017, p.13).

Figure 6. Repackaged, unlabeled pesticides on sale in the Gambia



Verification of these complaints is complicated by the absence of accredited formulation verification testing laboratories in West Africa. In our studies, we identified only one laboratory accredited under the relevant international standard ISO 17025. Senegal's Regional Center for Ecotoxicology and Environmental Security (CERES-LOCUSTOX), based in Dakar, has obtained ISO 17025 certification for the analysis of pesticide residues and its impact of non-target flora and fauna. A second laboratory, the Central Laboratory of Agrochemistry and ecotoxicology (LCAE), a technical unit of the National Laboratory to support the agricultural development (LANADA) in Côte d'Ivoire, is currently in the advanced stages of ISO accreditation, and they hope to receive final certification by the end of 2017.

2.5.3. Health and environmental impact

Growing pesticide use, along with increased volumes of unregistered products of unknown quality, has led to broad stakeholder concerns about the quality and safety of pesticide products currently available in many parts of West Africa. Despite widespread concerns, the environmental impact of this increased volume of pesticide application remains largely unmonitored and therefore unknown. The rapid pace of recent pesticide market growth appears to have outpaced regulatory capacity to monitor product quality, safety, and environmental impact.

Despite written regulations outlining government commitments to monitor health and environmental impact, our country studies reveal only episodic and irregular efforts to assess the impact of growing pesticide use on farmers who apply them, consumers who eat food grown with them, water quality downstream, and the environmental impact on non-target plants and on various species of birds, fish, insects and mammals. In the aggregate, sustained, systematic efforts to monitor health and environmental impact of pesticide use in West Africa appear to be lacking.

Welcome exceptions include punctual studies such as those conducted by Diarra, 1998; Cissé, 1999 ; Camara et al, 2003, Abiola et al, 2004; Dieng, 2012; Pivi et Barry, 2013; Chouaibou et al. 2016 ; and Rechcigl 2016. In addition, Senegal currently operates an Anti-Poison Center (Centre Anti-poison, CAP). The unit receives telephone reports of intoxication which it communicates to the Ministry of Health, under which it operates. Initially free, the calls now require reporting households to pay. The CAP has undertaken pesticide studies in southern Senegal and in Ziguinchor (Dieng, 2012).

The absence of comprehensive environmental and public health monitoring stems in part from the high cost of monitoring and in part from the modest regulatory resources available to national entities charged with this task. Given that environmental impacts occur over time, in multiple biological systems (soil, water, humans, insects and mammals), monitoring can quickly become complex and costly. The CILSS model of regional regulatory review, which economizes on scarce scientific personnel and laboratory facilities, has proven efficient in vetting pesticide products prior to release. Regional sampling and studies across common Sahelian agro-ecological zones could perhaps offer parallel economies in environmental monitoring. Currently, however, individual countries are struggling and largely failing to monitor these environmental and health impacts. As pesticide markets continue to grow, so will the need to monitor their impact on human and environmental health.

3. REGIONAL PESTICIDE REGULATIONS IN THEORY

3.1. CILSS (Comité Permanent Inter-états de Lutte contre la Sécheresse au Sahel)

3.1.1. *Origins of regional pesticide regulations*

In the Sahel region of West Africa, a series of large-scale pest invasions arrived on the heels of the devastating regional droughts of the early 1970s. Because locusts, grain-eating birds and other pests moved rapidly and easily across national borders, the need to combat these collective threats motivated strong interest in regional pest control and in regional pesticide regulation. CILSS, the inter-governmental organization created in 1973 to combat the drought, became the obvious institutional vehicle for coordinating a regional response to the ensuing pest attacks.

Pesticide regulatory structures emerged within the CILSS gradually along with regional pest control efforts following the drought. As the droughts came to a close in the late 1970s, the CILSS operational agency, Institut du Sahel (INSAH), implemented a USAID-funded regional integrated pest management (IPM) project from 1980 to 1987. In order to institutionalize an ongoing implementation capacity following termination of the project funding, CILSS established a new unit within INSAH, charged with preparation of regional regulations governing pesticides and crop protection measures. This new unit, the UCTR-PV (Unité de Coordination Technique Régionale en Protection des Végétaux), worked with external consultants from the FAO to prepare draft regional regulations governing pesticide regulation and registration. The CILSS Council of Ministers of Agriculture formally adopted these regional pesticide regulations at their 27th ministerial meeting in Ouagadougou in April 1992.

In 1994, in order to implement these new regulations, the CILSS Council of Ministers authorized creation of the Comité Sahélien des Pesticides (CSP), a new regional regulatory body designed to review applications from pesticide companies for the right to sell specific pesticides throughout the CILSS region. CILSS designers created the CSP as a one-stop-shop for companies wishing to sell pesticides in any of the member countries. Under the CILSS regulations, any pesticide reviewed and approved by the CSP can be legally sold in all member countries.

Under the CILSS treaty, collective decisions of the Council of Ministers of Agriculture require ratification by national parliaments as well as issuance of conforming national regulations before they become applicable within the member countries. Revised regional pesticide regulations, approved by the CILSS Council of Ministers in 1999, provide the current legal basis for harmonized regional pesticide regulation within the CILSS member countries.

3.1.2. *Regional implementing structure: the CSP*

At its inception in 1994, the CSP became the regional regulatory body designated to review applications from pesticide companies for the right to sell specific pesticides throughout the member countries. The CILSS ministerial resolution creating the CSP charged the new body with the following key functions:

- Review and register all pesticide products proposed for sale within the region;

- Establish a list of agencies authorized to conduct efficacy trials;
- Establish a list of laboratories authorized to conduct expert analysis;
- Define methods for verifying the composition and quality of pesticide products as well as their impact on human health, animal health and the environment;
- Specify data and tests required by firms submitting pesticides for regulatory review;
- Maintain a registry of all registered (homologated) and provisionally authorized pesticides;
- Inventory pesticide products sold within the CILSS member countries;
- Maintain a list of dangerous and banned pesticides;
- Liaise with all member country national pesticide committees (CNGP).

Membership in the CSP includes three categories of participants. Ordinary members include two experts from each member state, three toxicologists working in the Sahel and the Permanent Secretary of the CSP. As a result, each member state contributes two members to the semi-annual CSP meetings which determine which pesticides to authorize for sale throughout the member states.

Associate members of the CSP include technical specialists from a variety of regional organizations. These include one representative from ECOWAS, CPI/OUA and AGRHYMET. As its third category of member, the CSP invites observers from Technical Cooperation Agencies such as the FAO and the WHO.⁴

Through their participation in the CSP, member countries jointly review pesticide products proposed for sale within the region. Under CSP procedures, regulatory approval occurs in two stages: a Provisional Clearance Permit, valid for three years and renewable once, or a full Registration status granted for 5 years and renewable multiple times.

3.1.3. National implementation responsibilities pre and post registration

The CSP's regional pesticide registration review process forms the centerpiece around which national implementing agencies operate. At the national level, public regulatory bodies play key roles, both prior to the CSP registration and afterwards (Table 9).

Prior to the CSP regulatory review, national regulatory bodies assume responsibility for conducting tests required to assess each proposed product's biological efficacy and toxicity. These findings form a key part of the dossier presented by private firms requesting product registration.

Following regional regulatory approval by the CSP, national structures are charged with monitoring local markets, licensing distributors and applicators, ensuring the quality and safety

⁴ The legal texts creating the CSP also included provision for one additional an observer from the Comité Phytopharmaceutique de la zone humide de l'Afrique de l'Ouest et du Centre (CPZHAOC). Intended as the ultimate outcome of the HIP project (see section 4.3), this committee never came into being. Instead, the new ECOWAS committee for the coastal countries will play this role (see section 4.4).

of pesticides sold, monitoring on-farm use and conducting monitoring studies to evaluate the impact of pesticides on human and environmental health.

Table 9. Regulatory responsibilities of member countries and the CSP in implementing CILSS regional pesticide regulations

Regulatory stages	Responsibility	
	Regional (CSP)	National
Pre-registration	<ul style="list-style-type: none"> • establish a list of establishments authorized to conduct trials and tests • define testing methods • specify data and tests required for regulatory review 	<ul style="list-style-type: none"> • conduct field trials and tests of product efficacy • conduct laboratory tests of product toxicity
Registration (homologation)	<ul style="list-style-type: none"> • CSP review and decision 	<ul style="list-style-type: none"> • participate in CSP deliberations, twice annually
Post-registration	<ul style="list-style-type: none"> • maintain registry of all authorized pesticides • maintain list of banned pesticides • liaise with country national pesticide committees 	<ul style="list-style-type: none"> • license distributors • monitor products sold on local markets • monitor environmental and human health impacts • confiscate and dispose of counterfeit, unregistered or outdated pesticides • promote awareness of existing regulations and safety issues • provide training and information on proper pesticide use

3.2. ECOWAS (Economic Community of West African States)

3.2.1 ECOWAS pesticide regulations

To facilitate regional trade in agricultural inputs and ensure the quality of pesticide products traded throughout the member states, the ECOWAS Commission has adopted a series of regional pesticide regulations. In May 2008, the 60th Ordinary Session of the Council of Ministers of ECOWAS, on the recommendation of the meeting of Ministers of Agriculture and Food of ECOWAS Member States held in Ouagadougou on 8 November 2007, formally approved the Regulation No. C/REG.3/05/2008 harmonizing the rules governing pesticides regulatory approval throughout the region. The objectives of this regulation include the following:

- To facilitate pesticide trade within and between member States by applying regionally agreed upon rules;
- To facilitate farmers access to good quality pesticides;

- To contribute to the establishment of a favorable environment for private investment in the pesticide industry;
- To protect people and the environment in West Africa against the potential dangers of pesticide uses;

To operationalize these regulations, the President of ECOWAS Commission issued the implementing regulation number 02/06/12 on June 4th 2012 to establish the regional pesticide regulatory bodies described below. Because Chad and Mauritania are members of CILSS but not ECOWAS, the ECOWAS implementing regulations include only seven members in the Sahelian regional pesticide committee, excluding current CSP members Mauritania and Chad. To remedy this inconsistency, ECOWAS, CILSS and UEMOA signed a tri-partite convention on September 8, 2017 to ensure that members of the members of all three organizations (a total of 17 member states) will participate in the expanded regional pesticide regulatory structures (see Table 1).

According to the ECOWAS Treaty, regulations issued by the ECOWAS Council of Ministers become directly applicable throughout the member states. As a result, the pesticide regulations of May 18, 2008 will enter into effect upon publication in the government gazettes of the member states.

3.2.2. Regional implementing structures

To implement regional pesticide at the regional level, ECOWAS regulations call for the establishment of the West African Committee for Pesticide Registration (WACPR). Structurally, the WACPR will be partitioned into two sub-regional committees:

- Sahelian Zone, comprising the nine original CILSS member states of Burkina Faso, Cape Verde, Gambia, Guinea Bissau, Mali, Niger, Senegal and Chad. The headquarters will remain at the CSP in Bamako, Mali.⁵
- Humid zone, grouping together eight coastal ECOWAS members: Benin, Côte d'Ivoire, Ghana, Guinea, Liberia, Nigeria, Sierra Leone and Togo. The headquarters is slated to be located in Accra, Ghana.

As in the CILSS CSP model, the regional regulatory bodies will be responsible for reviewing all new pesticides proposed by the private sector for regulatory approval within the region. At the national level, each country is tasked with the creation of a National Pesticide Management Committee (NPMC). Following review and recommendation by the two WACPR subcommittees, the President of ECOWAS Commission, based in Abuja, will issue all final registration decisions (see Figure 7).

Regulation 02/06/12, which defines the attributions, organization and functioning of the

⁵ The two non-ECOWAS CILSS members of this group, Mauritania and Chad, have been retained in the CSP's successor regulator, the WACPR-Sahelian Zone, by virtue of the Tripartite (CILSS/ECOWAS/UEMOA) convention of September 2017.

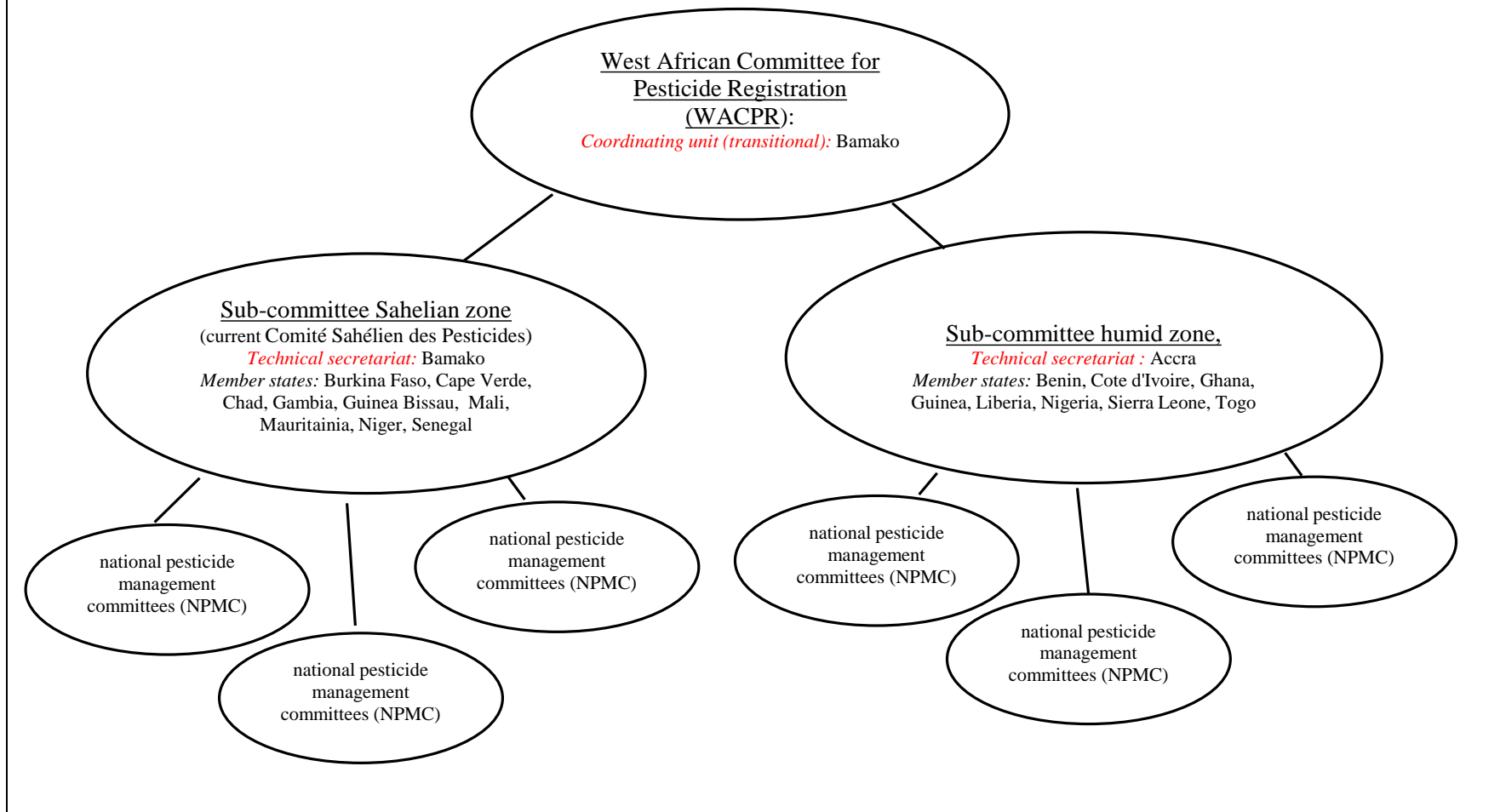
WACPR, designates representatives from the member states as full members of the WACPR. Representatives of all other organizations participate as observers only. Internal operating guidelines will be developed by the WACPR as it becomes functional.

3.2.3. National implementation

Mirroring the CILSS CSP system, national agencies assume responsibility for conducting pre-registration testing and for monitoring post-registration product quality and impact (Table 9). Given the multiplicity of agencies involved at these various stages, each country is tasked with the creation of a National Pesticide Management Committee (NPMC) in each member state. The NPMC's hold responsibility for

- Educating and informing all national actors about provisions of the regional pesticide regulations
- Coordinate and support all national agencies responsible for regulating pesticides.

Figure 7. West Africa Committee for Pesticide Registration (WACPR)



3.3 UEMOA (Union Economique et Monétaire Ouest Africaine)

The Union Economique et Monétaire Ouest Africaine (UEMOA), includes eight francophone countries of West Africa (Table 1). All EUMOA members are also members of ECOWAS, and five of the eight are also members of CILSS.

Established following national independence in the 1960's, the UEMOA operates a regional central bank that issues a common currency, the CFA franc, that serves as legal tender throughout the member countries. In the decades following independence, the CFA franc maintained fixed parity with the French Franc. Following France's adhesion to the EU common currency union, in January 1999, the CFA franc has maintained a fixed parity with the Euro.

In 2009, the UEMOA adopted Regulation N° 04/2009/CM/UEMOA concerning harmonization of pesticide regulation, marketing and control throughout the member countries. By collaborating with ECOWAS, UEMOA produced regional pesticide regulations virtually identical to the ECOWAS regulation. The UEMOA regulations call for the establishment of a third regional regulatory body, the Comité Régional des Pesticides de l'Union (CRPU).

All UEMOA regulations enter into legal effect upon signature by the President of the UEMOA Council of Ministers. Under Article 43 of the UEMOA treaty, all UEMOA regulations become obligatory and immediately applicable in all member states. These regulations are, consequently, legally binding on the five CILSS member states who are simultaneously members of UEMOA (Burkina Faso, Guinea Bissau, Mali, Niger and Senegal).

4. REGULATORY SYSTEMS IN PRACTICE

4.1. National regulatory systems

4.1.1. Differences

Two key differences characterize West African national pesticide regulatory systems, one historical and one administrative.

a) Historical differences

Historically, most CILSS countries introduced national pesticide regulations during the 1990s, after the 1992 CILSS regional regulations were approved (Table 10)⁶ when pesticide markets were relatively small. The CILSS Council of Ministers of Agriculture formally approved its first regional pesticide in 1992. Except for Senegal, national regulatory efforts began afterwards, in response to the CILSS regulations. As a result of this sequencing, national laws and regulations in the Sahelian countries currently conform fully with the CILSS regional regulations. Full conformity required several attempts in most cases, as the discussion below reveals.

In contrast, ECOWAS introduced its regional pesticide regulations much later, in 2008, well after most coastal countries had already established their own national pesticide regulations and regulatory procedures and after pesticide markets had begun growing explosively. Indeed, serious efforts to implement the ECOWAS regional regulations only began in 2013, when ECOWAS enlisted the CILSS CSP to help operationalize ECOWAS regional regulations in the coastal countries. ECOWAS efforts, thus, began about two decades after those of CILSS.⁷

Country	National pesticide regulations	Formal legal adoption of regional regulations		
		CILSS	UEMOA	ECOWAS
CILSS CSP Countries (ECOWAS Sahelian Zone)				
Gambia	1994, 2003	√ (2003)		
Mali	1995, 2001, 2002, 2009	√ (2001)		√ (2014)
Senegal	1984, 2002	√ (2002)		√ (2012)
ECOWAS Humid Zone				
Côte d'Ivoire	1974, 1989		√ (2013)	√ (2013)
Ghana	1994			
Guinea	1992, 1996			√ (2013)
Nigeria	1976, 1996, 2005			

Source: Annex Table A3 and A4.

⁶ In addition to the three CILSS case study countries reported in Table 11, the remaining CILSS member countries introduced national pesticide legislation in the following years: Burkina Faso (1998), Cape Verde (1997), Chad (1995) and Niger (1996) (Pardo-Leal 1999).

⁷ An earlier effort, funded by the French government in 4 coastal countries aimed to harmonize testing pesticide testing and review procedures under the HIP project, from 1993 to 1999. See Section 4.3 below for details.

As a result of this delayed timing, the coastal countries attempting to institute harmonized regional regulations face the difficult task of altering existing national legislation, regulations and administrative processes. The CILSS countries enjoyed a significant historical advantage in that they developed their national regulatory systems much earlier using the harmonized regional regulations as the legal and regulatory model for their national systems.

b) Administrative differences

Administratively, in addition to differing languages and legal histories in the anglophone, arabophone, francophone, and lusophone countries, West African countries have adopted differing institutional homes for key pesticide regulators (Table 11). The Ministry of Agriculture maintains primary responsibility for implementing pesticide regulations in the francophone countries of Côte d’Ivoire, Guinea and Mali. In contrast, the Ministry of Environment manages pesticide regulations in Gambia, Ghana and Senegal. In Nigeria, the Ministry of Health controls pesticide regulations through its National Agency for Food and Drug Administration and Control (NAFDAC). While the CILSS CSP serves as the central regulatory review body for the Sahelian countries (Gambia, Mali and Senegal), each of the coastal countries has established its own national regulator, the National Pesticide Committee in Côte d’Ivoire and Guinea, the Environmental Protection Agency in Ghana and NAFDAC in Nigeria.

These differing homes complicate the already difficult task of harmonizing regional pesticide regulations. While ministries of agriculture typically view pesticides as necessary inputs for raising farmer productivity, ministries of environment and health view them primarily as threats to their constituents. The culture and core objectives, therefore, differ across the various national regulators, as a consequence of their differing ministerial homes.

	Ministry of Agriculture		Ministry of Health	Ministry of Environment
	Extension	Crop protection		
Côte d'Ivoire		✓		
Gambia				✓
Ghana				✓
Guinea		✓		
Mali	✓			
Nigeria			✓	
Senegal				✓

Source: Annex Table A2.

4.1.2. Commonalities

Procedurally, the West African countries generally follow a standard three-step process for regulating pesticides (Table 9). The regulations all center on a designated regulatory body empowered to review applications and authorize or reject specific pesticide products for sale.

The CSP serves as the central regulatory review body for the Sahelian countries, while each of the coastal countries has established its own national regulatory review process.

Prior to formal review by these pesticide regulatory review bodies, any private or public entity wishing to import a new pesticide product must conduct various tests as specified by the regulator. Typically these tests involve biological efficacy as well as tests of toxicology and ecotoxicology on non-target plants and animals. The CILSS countries use standard testing protocols as specified regionally by the CSP. In contrast, the coastal countries have specified their own testing procedures. However, four of the coastal countries – Benin, Côte d’Ivoire, Ghana and Guinea – participated in a French-financed regional HIP project during the 1990s which introduced common testing protocols into these four national regulatory agencies. Our case study reviews in three of the four HIP countries (all but Benin) found that all three use the common HIP testing forms (see Traoré and Haggblade 2017a,b; Diarra and Tasié 2017). These early efforts by the HIP project, discussed further in section 4.3 below, have left behind some common building blocks that will facilitate regulatory standardization in the coastal countries.

Following registration decisions, various national agencies assume responsibility for controlling imports and markets to verify that only approved, registered pesticides are sold and to ensure that products sold conform to the regulators quality, safety and labelling requirements (see Annex Table A2). Monitoring of health and environmental impacts of pesticide use likewise remain the responsibility of individual national governments.

In terms of implementation capacity, most national regulatory agencies face significant staffing and budgetary constraints. Across most of West Africa, pesticide markets have grown rapidly but without comparable budget increases necessary to support a parallel expansion of key regulatory agencies. National regulators, therefore, confront daunting regulatory mandates with modest human, financial and technical resources. Regulators interviewed in our country studies uniformly complained about inadequate human, financial and technical resources for monitoring these growing pesticide markets. Laboratory facilities are likewise limited and mostly unaccredited. Monitoring of environmental and health impact remains similarly weak across the region.

4.2. Implementation of CILSS regional pesticide regulations⁸

4.2.1. Implementation despite legal non-compliance (1992-98)

Under the CILSS treaty, collective decisions of the Council of Ministers of Agriculture require ratification by national parliaments as well as issuance of conforming national regulations before they become applicable within the member countries.⁹ Despite this legal “domestication”

⁸ This section draws heavily on the historical chronology reported by Haggblade et al. (2017) in the Mali country study.

⁹ Unlike CILSS, the ECOWAS treaty stipulates that regional regulations adopted by ECOWAS agencies automatically assume legal force throughout the 15 ECOWAS member countries (Keyser et al. 2015). However, lawyers we have consulted suggest that under some of the Anglophone member country constitutions, national sovereignty may dictate that national regulations take precedence over ECOWAS regional regulations. Under this interpretation, the ECOWAS treaty would be considered as subordinate to national laws and regulations. Under this

requirement, by 1998 only Niger had formally adopted the 1992 CILSS pesticide regulations into national law (Pardo-Leal 1999).¹⁰

Our reviews suggest two sets of constraints may have limited formal action by national parliaments. The first concerned the limited resources and staffing at the UCTR-PV, the unit that served as the Permanent Secretariat for the CSP between 1994 and 1998. With a single staff member, the UCTR-PV did not have the necessary resources to monitor and motivate 9 member parliaments. Working instead through consultants proved difficult, given sensitivities about formal protocols for modifying parliamentary calendars. A second set of difficulties revolved around ambiguities and inconsistencies in the initial regulations, which had been formulated by technicians rather than by trained lawyers.

In spite of parliamentary failure to enact umbrella national enabling legislation consistent with the CILSS regulations in most CILSS member countries, the national technical agencies responsible for pesticide monitoring, in practice, participated in the CSP review process and accepted CSP pesticide registration decisions (Table 12). Since CSP's inception in 1994, CILSS member countries have participated in CSP deliberations and honored CSP registration decisions. In fact, executive regulatory orders issued by the relevant national authorities in Burkina, Chad, Gambia, Guinea Bissau, Mali and Niger referred specifically to the CILSS pesticide regulations or to the CSP (Pardo-Léal 1999).

Despite de facto acceptance of CSP pesticide registration decisions by national technical implementing agencies, the umbrella legislation in all countries but Niger failed to comply fully with the CILSS regional regulations.¹¹ Because the umbrella laws under which these executive actions were issued did not fully conform to CILSS regional regulations, a legal ambiguity arose as to the enforceability of these executive orders. In order to convert tacit support of the CSP by national technical agencies into a fully enforceable legal framework, the CILSS member states turned to the FAO for help in regularizing the legal framework governing pesticide regulation in the member countries.

states-rights interpretation, ECOWAS member countries, like CILSS member countries, would need to pass national legislation and regulations formally adopting the ECOWAS regional pesticide regulations in order for them to take full legal force within a specific country. Professor Ly, of the Dakar University Faculty of Law disputes this interpretation, stating categorically that, "The question of legal primacy and of direct application of the ECOWAS regulations in the internal affairs of member states does not arise. The ECOWAS regulation of May 19, 2008 is directly and integrally applicable throughout the entire territory of the ECOWAS member states." (Ly 2012). To our knowledge, this question has not been litigated.

¹⁰ Note that Gambia's parliament had also drafted CILSS-compliant legislation which they had under active review in 1998. The CSP, however, requested that the Gambians wait for revised regional regulations in order to avoid having to approve the CILSS regulations twice (Pardo-Leal 1999).

¹¹ Niger's 1996 umbrella law on pesticide products (Ordonnance 96-008 of 21 March 1996) did explicitly recognize the CSP and the CILSS regional pesticide regulations. However, implementing instruments failed to comply fully with CILSS labelling and packaging regulations (Pardo-Leal 1999).

Table 12. Implementation Chronology for CILSS Regional Pesticide Regulations

CILSS regional pesticide regulations	National adoption of CILSS regulations	Regional implementing institutions established
Round 1. Initial regulations implemented but not legally adopted (1992-1998)		
Resolution No 7/27/CM/92: Regional pesticide regulations, approved 7 April 1992 by CILSS Council of Ministers	<ul style="list-style-type: none"> • Niger and Gambia prepare new legislation, though not fully conforming with CILSS regulations and definitions. • Others members fail to issue new enabling laws. • No member issues enabling laws that conform fully to CILSS regulations and definitions. 	
Resolution No. 10/29/CM/94: Creates Comité Sahélien des Pesticides (CSP), approved 19 April 1994 by CILSS Council of Ministers	<ul style="list-style-type: none"> • Six countries issue administrative regulations (though not laws) recognizing CSP authority to register pesticides. 	<ul style="list-style-type: none"> • CSP established by CILSS at the INSAH Secretariat in Bamako in 1994. • CSP begins twice yearly meetings beginning in 1994. • Member countries send two representatives to each CSP meeting.
Round 2. National adoption of regional regulations (1999 to present)		
Resolution N° 8/34/CM/99: Revised regional pesticide regulations, approved 16 December 1999 by CILSS Council of Ministers	<ul style="list-style-type: none"> • FAO project reviews all national laws and recommends specific legal actions for each. • Member countries issue national legislation recognizing and fully conforming to the new CILSS regulations. • Mali (2001) • Senegal (2002) • Mauritania (2003) • Chad (2003) • Gambia (2003) • Burkina Faso (2004) • Niger (2004) • Cape Verde (2005) 	<ul style="list-style-type: none"> • CSP continues to function through twice-yearly technical decision-making meetings. • New CILSS regulations (1999) grandfather in CSP decisions made from 1994 to 1999. • Most recent CSP meeting held in November 2017.
Source: Annex Table A3.		

4.2.2. Second push leads to national “domestication” of regional regulations (1999 onwards)

Concerned about slow national ratification of the 1992 regional pesticide regulations by national parliaments, the CILSS secretariat requested assistance from the FAO to help accelerate full legal enactment of the CILSS regional pesticide regulations (Table 13). Under a five-year project launched in 1998 entitled “Mise en œuvre du Code international de conduite sur la distribution et l’utilisation des pesticides dans les pays sélectionnés de la région du Sahel” (GCP/RAF/335/NET), the FAO supported CILSS as well as national-level agencies involved in implementing the CILSS regional pesticide regulations. Centered on the CSP, project efforts supported the establishment of a permanent secretariat for the CSP, based at CILSS’s implementing agency, the Institut du Sahel (INSAH) in Bamako. In addition, the project assisted national governments to reinforce their capacity to assess and monitor the distribution and use of pesticides. The UCTR-PV, which had served as secretariat for the CSP from 1994 through 1998, gave way to the new permanent secretariat to the CSP. The CSP permanent secretariat became operational in 1998 with the start of the FAO project.

As a first step in their legal review, the FAO project team and local partners at CSP reviewed the 1992 CILSS regulations and proposed a revised set of regional regulations (Pardo-Leal 1999). Though they did not alter the content of the original 1992 CILSS regulations significantly, the 1999 revisions addressed several gaps and inconsistencies revealed by the four years of well-intended but largely uncoordinated national legislative and regulatory compliance efforts. In the end, the content of the 1999 regulations differed from the 1992 regulations in five primary ways:

- *Ratification requirements.* The 1992 CILSS pesticide legislation required ratification by all 9 member countries before the regional regulations would become operational anywhere (1992, Article 25). This technically held all member countries hostage to a single delinquent parliament. Given ongoing political unrest in Guinea Bissau, the prospect of new enabling legislation from 100% of member states seemed remote. The revised regulations, issued in 1999, solved this problem by stipulating that approval by five member states (a majority) would make the CILSS pesticide regulations operational throughout the CILSS region (1999 Article 35).

- *Retro-active legalization of CSP homologation decisions from 1994-1998.* Given the failure of most national parliaments to approve 1992 CILSS regulations, all 240 review and registration decisions made by the CSP between 1994 and 1998 were technically without an enforceable national legal foundation. In order to remedy this anomaly, the 1999 CILSS regulations explicitly made the accumulated CSP decisions through 1998 approve retroactive under new (1999 Article 36).

- *Standardized renewal periods.* The 1992 rules included ambiguous language concerning the number of allowed registration renewals. The 1999 common regulations stipulate that the CSP can award provisional approvals (autorisation provisoire de vente, APV) for a three-year period, renewable only once. Full homologation, however, remains valid for a period of five years, renewable thereafter for the same period.

- *Appeals.* The 1992 regulations made no provision for appeals of CSP regulatory decisions. At the suggestion of the CSP secretariat, the 1999 regulations outline a process by which a rejected file could file an appeal (1999 Article 29).

- *Common terminology and definitions.* Country-level efforts to integrate the 1992 CILSS regulations into national law resulted in a welter of differing terminology. Individual countries and statutory instruments referred variously to “pesticides” (Burkina, Gambia, Senegal, Chad), “phytosanitary products” (Cape Verde), agro-pharmaceuticals (Mali, Senegal) and “phyto-pharmaceuticals” (Guinea Bissau). With FAO support for national drafting committees, the 1999 regulations and the enabling national legislation standardized in using the term “pesticide” along with the official definition as stated in the FAO International Code of Conduct (1999 Article 2).

In 1999, the CILSS Council of Ministers of Agriculture formally adopted the revised regional pesticide regulations via Resolution No. 8/34/CM/99. With follow-up support from the permanent CSP secretariat and the FAO, member country parliaments gradually introduced national legislation formally adopting the regional regulations and establishing the national regulatory structures required to implement the CILSS regional pesticide regulations. Mali’s parliament became the first to adopt legislation implementing the regional regulations in November 2001. The 1999 CILSS pesticide regulations and regional regulatory body become legally ratified in 2003, when Gambia became the fifth member state to formally ratify them. By 2005, Cape Verde became the eighth of the nine original CILSS member countries to pass national legislation and regulations explicitly adopting the CILSS regulations and the CSP as a common regional regulator (Table 1). Due to ongoing political turmoil, Guinea Bissau remains the only original CILSS member not to have ratified the 1999 CILSS regional pesticide regulations.

CILSS membership expanded in 2011 when four coastal francophone countries of Benin, Côte d’Ivoire, Guinea and Togo formally joined. At that point, the CILSS regional pesticide regulations and regulatory structures became available to the newcomers. Nonetheless, none of the four has adopted conforming national legislation. Nor have any of the four newcomers submitted any pesticide dossiers to the CSP for review. Instead, they have each continued to regulate pesticides through their pre-existing national pesticide committees. However, since 2013 they have attended the bi-annual CSP meetings as observers.

By convention, the CSP schedules ordinary meetings twice annually and takes all decisions by finding consensus among the ordinary members. Over time, the number of new pesticide products reviewed and registered in any given year have trended generally upwards, with particularly rapid increase in herbicide submissions over the past decade as well as new insecticides, primarily for horticultural products, (Table 2). In November 2017, the CSP held its 40th ordinary meeting at INSAH headquarters in Bamako. As of that time, the CSP had authorized 438 pesticide products for sale, including 190 herbicides and 179 insecticides. Products containing fungicides, mixtures of fungicides and insecticides and mixtures of acaricides and insecticides totaled 50. The remaining 19 approved products contained nematicides, rodenticides, growth regulators and various combinations of aphidicides, bactericides, nematicides and insecticides (CSP November 2017).

4.2.3. Current national compliance with CSP regulations

Private pesticide traders and national regulators throughout the Sahel recognize the authority of the CSP to review and authorize pesticides for sale within the CILSS member countries. They accept CSP registration status as the legal minimum requirement for utilizing specific pesticides. In addition, some large scale users, such as the cotton companies, impose further company-specific requirements including additional testing. In these instances, the CSP registration status serves as a minimum necessary legal requirement for purchase and use throughout the region.

In preparing dossiers for CSP review, national research and testing agencies perform the required efficacy and toxicological tests required by the CSP. Private firms proposing new pesticide products pay the testing agencies to conduct the CSP-mandated testing costs, at a cost of roughly \$8,000 per product (IER 2013). In addition, the firms pay a registration review fee directly to the CSP ranging from \$ 1,200 to 6,000 per submission, depending on the crop, number of active ingredients and whether the submission is for a new product or a renewal. In addition, the CSP imposes an annual fee of \$200 for each pesticide on the registration list. These submission fees serve to finance basic CSP operating expenses. To supplement these own resources, the CSP periodically receives support from various donors, other regional organizations and its member states.

Post-registration monitoring of markets, product quality and environmental impact remain the province of national implementing agencies (see Annex Table A2). The quality and regularity of market monitoring varies considerably across countries and geographically within individual nations. Given tight staffing and limited travel budgets, this monitoring activity generally remains irregular, particularly outside of capital cities where the monitoring agencies are typically based.

Our field interviews with regulators, traders and farmers suggest three areas in which current implementation falls short of CSP stipulations. The first concerns market monitoring of pesticide product quality and registration status. As a result of limited staffing and irregular, uneven market monitoring, unregistered and counterfeit pesticides appear on national markets, sometimes in large volumes, though the quantity of unregistered products varies over time and across countries (see Table 8).

The second limitation concerns the scattered and infrequent monitoring of environmental and health impact of pesticide use. Here again, resource constraints limit the ability of national regulators to rigorously monitor impact of insecticides, herbicides and other pesticides on human health and the environment. The limited human and financial resources of national regulatory and monitoring agencies have not kept pace with the rapid pace of the region's growing pesticide markets.

Finally, the Senegal country study reveals a case of national regulators approving pesticides not vetted by the CSP. These temporary national derogations arise because Senegal's horticulture industry requires specific pesticides to meet EU import standards. Because of the small market for these particular pesticides, horticulture firms who import these product-specific pesticides have not wanted to incur the full cost of CSP testing and regulatory review. Senegal's national

regulatory agency, the CNGPC, therefore has issued a series of product-specific national derogations, permitting annual use of these pesticides despite their non-submission for approval by CSP.¹²

4.2.4. Implications for ECOWAS

The CSP has generally functioned effectively in the Sahelian countries. For this reason, ECOWAS has asked the CSP to help jump-start its stalled regulatory harmonization efforts in the coastal countries.

The CILSS countries enjoyed many advantages not available to the coastal ECOWAS countries (Table 13). The CSP members share a strong felt need to regulate pesticides collectively. In addition, CILSS moved two decades earlier than ECOWAS to introduce regional pesticide regulations. This early timing enabled the regional regulators to issue guidelines that helped to guide the preparation of subsequent national regulations. By moving in this direction during the early 1990s, national regulators in the Sahel were able to focus on establishment of the regional regulatory infrastructure and procedures during a period of relative market calm.

Because they began decades later, ECOWAS faces a far more formidable challenge of changing existing national regulations and well-established national regulatory practices. Moreover, the ECOWAS transition from national to regional registration system in the coastal countries is currently taking place during a time of rapid pesticide market growth. Several prior initiatives and support in the coastal countries are helping them to navigate this difficult twin transition. The discussion below describes two important contributors, the HIP project and various initiatives supported by the UEMOA.

¹² In addition, some importers complain that large buyers, such as the cotton companies, impose additional review requirements, over and above those imposed by the CSP. While the cotton companies cannot import products unless they are registered by the CSP, they can and do sometimes impose additional testing requirements for all bidders on their supply tenders.

Table 13. CSP advantages in implementing regional pesticide regulations

Advantages	Observations
<ul style="list-style-type: none"> • Early introduction of CILSS regional regulations (1992) • Regional regulations shape national structures 	<ul style="list-style-type: none"> • Most countries didn't have national systems in place in 1992. • Therefore, countries modeled national regulations on the common regional regulations.
<ul style="list-style-type: none"> • Strong commitment to working together 	<ul style="list-style-type: none"> • Decades of collaboration in fighting drought and regional pesticide invasions (since 1970s).
<ul style="list-style-type: none"> • Small pesticide markets 	<ul style="list-style-type: none"> • Pesticide markets remained very small through the 1990s. • CSP countries, therefore, established regional and national pesticide regulations during a period of calm, without the pressure of high and rapidly growing volumes.
<ul style="list-style-type: none"> • Common language in the largest markets 	<ul style="list-style-type: none"> • Mostly francophone countries • Avoids labeling problems
<ul style="list-style-type: none"> • Small countries 	<ul style="list-style-type: none"> • All are small countries. • Members see common benefit in sharing scarce technical resources. • No fear of domination by regional hegemons.
Weaknesses	
<ul style="list-style-type: none"> • Limited national monitoring capacity post-registration 	
<ul style="list-style-type: none"> • Few certified testing laboratories 	<ul style="list-style-type: none"> • CERES-LOCUSTOX lab, based in Dakar, has obtained ISO 17025 certification for the analysis of pesticide residues and its impact of non-target flora and fauna. • LANADA lab in Côte d'Ivoire has advanced to the final stages of ISO 10725 certification.
<ul style="list-style-type: none"> • Derogations. 	<ul style="list-style-type: none"> • Senegal's horticulture industry requires specific pesticides (nematicides) to meet EU import standards. Since no other countries require them, the market remains small. Hence, horticultural producers do not want to incur the expense of full CSP approval. Senegal's CNGPC therefore has issued a series of derogations, permitting annual use of these pesticides despite non-approval by CSP.

4.3. Le Projet d'Homologation Inter-africaine Phytosanitaire¹³ (HIP)

From 1993 to 1999, the French Cooperation implemented a regional project to support information exchange and the development of harmonized pesticide testing procedures in five¹⁴ coastal African countries : Benin, Côte d'Ivoire, Ghana, Guinea and Togo (Tableau 8). The HIP project aimed to facilitate exchanges of technical information among the five member countries and to harmonize testing procedures for evaluating the efficacy and impact of phytosanitary products. In each country, the national agency responsible for plant protection services (usually a unit within the Ministry of Agriculture), served as local implementing agency for the project. The scope of the HIP project encompassed not only technical issues affecting regulatory review and registration but also pre-registration testing protocols and post-registration monitoring of marketed products and their impact, intended and unintended. Though the HIP project helped to develop standardized phytosanitary product testing and assessment protocols throughout the member countries, the project did not strive to help launch a joint regulatory review body of the sort created by the CILSS CSP.

The HIP project achieved several outcomes that proved significant in later efforts by ECOWAS and UEMOA to institute a common regional regulatory review body among the coastal West African countries. An early outcome of the HIP project was the launching of a virtual documentation center for phytosanitary products among the five member countries. Based at the SNPV in Côte d'Ivoire, this web-based documentation center assembled, digitized and posted technical and administrative information about phytosanitary products and made them freely available to all private and public groups interested in pesticide products and markets. The information included technical studies on the efficacy of phytosanitary products, testing methods and administrative forms required by national testing agencies of private firms preparing dossiers for new pesticide product regulatory review. Though this web-based documentation center has now discontinued due to lack of regional funding for updated computer equipment and web fees, the documentation center could easily be reconstituted with a modest infusion of regional financial support, according to Côte d'Ivoire regulators our team interviewed (Traoré and Haggblade 2017b). The body of information collected formed the basis for the first edition of the Côte d'Ivoire phytosanitary index in 2000. Ivoirian regulators have updated the index bi-annually since then. The latest edition, issued in 2015, includes 535 pages of regulatory and technical information (Côte d'Ivoire 2015).

Based on this common technical understanding, the HIP project countries developed standardized pesticide testing procedures and protocols for reviewing new pesticide applications. In addition, each member country established a provisional national pytosanitary committee charged with reviewing and vetting national information prior to its posting on the regional

¹³ The term “phytosanitary products” refers to plant protection products, including insecticides, herbicides, nematicides, growth regulators, rodenticides and products for controlling grain-eating birds. It is more restrictive than the term “pesticide”. Pesticides include a broader array to products, including those designed to protect plants from specific pests but also pest-control products aimed at protecting animals (tick-control products) and humans (mosquito control products, for example) from dangerous pests.

¹⁴ Planned expansion to three additional Anglophone coastal countries of Liberia, Nigeria and Sierra Leone, however, never took place.

documentation center. Differing levels of technical expertise within the member countries, however, led to uneven levels of rigor in the review of data and materials posted.

Though now discontinued, the HIP project has helped to lay the foundation for full harmonization of regional pesticide regulations in the coastal West Africa countries. During our visits in 2016 and 2017, our country teams found standard HIP testing requirements and pesticide submission form still in use in Côte d'Ivoire, Guinea and Ghana (Traoré and Haggblade 2017a,b; Diarra and Tasie 2017). By helping to develop standardized phytosanitary product testing and assessment protocols, the HIP project provided a common basis for subsequent harmonization of regional pesticide regulations as well as joint regulatory review as subsequently envisioned by ECOWAS and UEMOA.

4.4. Union Economique et Monétaire Ouest Africaine (UEMOA)

The 2009 UEMOA regulation N° 04/2009/CM/UEMOA introducing harmonized pesticide regulations within the member countries call for the establishment of a new regional pesticide regulatory body, the Comité Régional des Pesticides de l'Union (CRPU). Despite this formal enactment, the UEMOA has not, in fact, created the CRPU. Given prior regional agreements by CILSS members to establish the CSP as a common pesticide regulator in the Sahelian countries and by ECOWAS to establish the WACPR as a common pesticide regulator in the coastal countries, UEMOA's CRPU, if instituted, would become the third regional body formally charged with regulating pesticides among members states in West Africa (Table 1). Instead of creating a third regional regulator, a the potential confusion of overlapping membership across regional groupings, UEMOA has instead simply provided financial support to the CILSS CSP, operating in the Sahelian states since 1994, and the ECOWAS WACPR, not yet launched but intended to begin operating in coastal countries as soon as certain technical harmonization questions are resolved and secure financing source can be identified.

In order to improve regional pesticide management in the Sahel and in the humid coastal zone, the UEMOA and CILSS signed a formal agreement, the "Convention d'appui au renforcement du dispositif sur la gestion des pesticides", on November 7, 2014. This convention aims to improve regional pesticide harmonization efforts among the CILSS/UEMOA members (see Table 1) by helping to finance the set-up of national pesticide management committees (CNGP) in three CILSS/UEMOA coastal states of Benin, Côte d'Ivoire and Togo. The agreement also calls for UEMOA to support ongoing CNGP operation in the remaining UEMOA/CILSS member countries Burkina Faso, Guinea Bissau, Mali, Niger and Senegal.

Later, as ECOWAS efforts in the coastal countries picked up steam, the UEMOA, CILSS and ECOWAS signed a tri-partite agreement to coordination regional pesticide regulatory efforts in West Africa. Signed in September 2017, this agreement establishes the ECOWAS WACPR as the umbrella pesticide regulator in the region, with two sub-regional technical review bodies, one for the Sahel and the other for the coastal countries. Over time, the CILSS CSP will transition into the Technical Secretariat for the WACPR for the Sahel. The CSP will likewise assist the coastal countries in setting up a parallel Technical Secretariat for the Humid Zone (Figure 7).

Operationally, UEMOA is playing an important role in supporting regional pesticide regulation. As central banker for the francophone countries of West Africa, UEMOA has access to significant financial resources and has proven willing to contribute financially to the launching and operation of common regional pesticide regulatory bodies.

4.5. Implementation of ECOWAS Regional Pesticide Regulations

4.5.1. Slow implementation initially (2008 to 2012)

Following approval of regional pesticide regulations C/REG.3/5/2008 by the ECOWAS Council of Ministers in 2008, neither ECOWAS nor its member states demonstrated much urgency about moving towards implementation. At the national level, the Sahelian countries felt little need to alter existing pesticide regulatory procedures given that the ECOWAS-wide regulatory system intended for their already-functioning CSP to continue to play its role as the common regional regulatory review agency for the Sahelian states.

The coastal countries, meanwhile, demonstrated little interest in upending their already well-functioning national regulatory review systems for an as-yet-nonexistent regional regulator. During our case study interviews in the coastal countries, public regulators and private traders in the large market countries of Ghana and Côte d'Ivoire expressed skepticism about the potential benefits of dismantling their national systems and moving to a common regional regulator. Instead, most pointed out the many practical difficulties of harmonizing different existing regulatory systems (Table 14). While Ghana's pesticide regulator (the EPA) has approved the controversial herbicides paraquat and atrazine, Côte d'Ivoire's national regulator (CP) has declared both unsafe. Which position would a newly constituted regional regulator adopt? Given agro-climatic differences, even within a single coastal country, how can efficacy tests in one location be considered valid for the entire breadth of the ECOWAS humid zone? Finally, the large countries fear losing the application fees paid to them by private sector applicants since these funds support their ongoing operating expenses. With diversion of these resources to a central regulator, the national regulators fear the resulting compression of their already-limited budgetary resources.

In the much smaller country case study country of Guinea, however, public regulators expressed more optimism and more interest in moving to the regional regulatory system. In general, it appears that smaller countries, with smaller markets, fewer technical resources and smaller operational budget more readily see the benefits of sharing scarce technical expertise regionally.

At the regional level, implementation of the regional pesticide regulations requires action by the ECOWAS Commission to establish a well-functioning WACPR coordinating unit in Abuja and a sub-regional regulator for the coastal countries based in Accra. However, during the first five years following approval of the regional regulations, neither of these necessary regional institutions was established.

Table 14. Stakeholder perceptions of the advantages and disadvantages of a regional pesticide regulatory system in the coastal West African countries

Category	Avantages	Difficulties
Technical	<ul style="list-style-type: none"> • one application will suffice for obtaining pesticide regulatory approval valid throughout the sub-region, rather than eight separate national reviews • only one set of test results required • new testing requirements likely to prove more rigorous (CSP model) than current national requirements 	<ul style="list-style-type: none"> • reconciliation of differing pesticide approvals and bans may prove difficult • heterogeneity across agro-ecological zones suggests that one single test somewhere in the humid zone is unlikely to provide representative results valid throughout the entirety of the coastal zone • differing languages : how to satisfy labelling requirements in multiple languages
Political	<ul style="list-style-type: none"> • reinforces regional linkages 	<ul style="list-style-type: none"> • differing legal interpretations of the enforceability of ECOWAS regional regulations • key anglophone countries (Ghana, Nigeria) reluctant to accept legal validity of the CEDEAO (2008) regulations ; asserting that national sovereignty requires national legislation to make regional regulations valid nationally
Financial	<ul style="list-style-type: none"> • accredited national laboratories will be well placed to garner testing business from throughout the region 	<ul style="list-style-type: none"> • loss of fees paid to national regulators by firms proposing new pesticides for approval • How will national regulators finance their monitoring activities without these financial resources?
Commercial	<ul style="list-style-type: none"> • will lead to a single regional pesticide market • economies of scale in procurement, marketing and distribution • scale advantages will benefit the large suppliers 	<ul style="list-style-type: none"> • small importing firms risk losing market share as large regional and international firms expand into a fully regional pesticide market • individual countries can refuse to accept regional registration decisions according to C/REG.3/05/2008, Chapter IV article 10, paragraph 4

4.5.2. ECOWAS enlists CSP to jump-start implementation (2013 to present)

Concerned about the slow pace of implementation, the ECOWAS Commission turned to the CILSS CSP for help in jump-starting national and regional implementation of the 2008 ECOWAS regional pesticide regulations (Table 15). In April 2013, the President of the ECOWAS Commission signed a formal agreement with the Executive Secretary of CILSS charging CILSS with the following mandate:

- Establish fully functional NPMCs in all 15 member states plus the two non-member countries of Mauritania and Chad ;
- Establish a sub-regional regulatory review body for the humid zone (WACPR-Humid Zone);

- Align and restructure the CILSS CSP to serve as the sub-regional regulator for the Sahelian zone (WACPR-Sahel);
- Create and help launch the new WACPR secretariat.

In executing this mandate, CILSS has engaged in a series of national workshops and consultations as well as several important regional consultations. In December 2015, CILSS's implementing agency, INSAH, organized a regional workshop with the four new CILSS member countries of Benin, Côte d'Ivoire, Guinea and Togo. The workshop aimed to consult with these francophone coastal countries about requirements for launching the new central pesticide regulatory review body for the coastal countries, the WACPR-Humid Zone. This discussion benefitted from two historical connections. From 1993 to 1999, all four (together with Ghana) had collaborated together under the HIP project, with the result that their regulatory review testing requirements and procedures were already closely aligned. In addition, since joining CILSS in 2011, these four new members have participated as observers in the semi-annual CSP pesticide regulatory review meetings. So they had seen how a sub-regional technical review body could function. The 2015 consultation focused on the following topics:

- Preparation of a list of the most important plant pests in the humid coastal zone (the workshop identified 172 categories of pests for the main cultivated crops) ;
- Composition and functioning of existing national pesticide registration committees (NPRCs) in the member states¹⁵;
- Review of all legal texts establishing the NPRCs;
- Forms and technical documents required for applications to register pesticides in each country,
- Review of the ECOWAS regional pesticide regulations and their implications for the member states,
- Review of the regional regulations issued by the ECOWAS Commission defining the responsibilities and structure of the WACPR.

In May 2017, the CSP hosted joint consultations with all coastal countries, including francophone, anglophone and lusophone ECOWAS members. This recent consultation resulted in the following main conclusions:

¹⁵ The national pesticide registration committees have different names in each of the member states : the Comité National d'Agrement et de Contrôle des Produits Phytopharmaceutiques (CNACPP) in Benin, the Comité Pesticides (CP) in Côte d'Ivoire, the Comité National des Pesticides (CNP) in Guinea and the Comité des Produits Phytopharmaceutiques (CPP) in Togo. In certain countries, such as Ghana and Nigeria, designated regulators such as EPA and NAFDAC appear to perform these functions. Under terms of the ECOWAS regional pesticide regulations, the regulatory review and new-product approval decisions are to be transferred from these existing national entities to the sub-regional regulatory review body, the WACPR-Humid Zone. However, some ambiguity exists as to how this transfer of authority will take place (see Chapter IV, Article 9.5 of the 2008 ECOWAS regulations).

Table 15. Implementation Chronology for ECOWAS Regional Pesticide Regulations

ECOWAS regional pesticide regulations	National adoption of ECOWAS regulations	Regional implementing institutions
Round 1. Uneven, mostly negligible implementation (2008 to 2013)		
<ul style="list-style-type: none"> • C/REG.3/5/2008 harmonizing pesticide registration in ECOWAS, approved by the ECOWAS Council of Ministers May 18th 2008 	<ul style="list-style-type: none"> • Francophone countries generally accept legal primacy of ECOWAS regulations. 	<ul style="list-style-type: none"> • CSP continues to function as the regional body for Sahelian countries (Bamako)
	<ul style="list-style-type: none"> • Major anglophone countries (Nigeria and Ghana) contest legal authority of ECOWAS regulations on national institutions 	<ul style="list-style-type: none"> • no WAPRC secretariat established for coastal countries (Accra)
		<ul style="list-style-type: none"> • no overall WAPRC secretariat established
Round 2. ECOWAS enlists CSP to jump-start implementation (2013 to present)		
C/REG/02/06/12 implementing regulations establishing the WACPR		<ul style="list-style-type: none"> • no overall WAPRC secretariat yet established • CSP to serve as transitional coordinating unit under the Tripartite CILSS/ECOWAS/ UEMOA agreement of September 2017
WACPR-Sahelian Zone	<ul style="list-style-type: none"> • CILSS countries accept principle of migration to ECOWAS regulations 	<ul style="list-style-type: none"> • CSP members accept ECOWAS rules and implement through CSP (Bamako)
WACPR-Humid Zone	<ul style="list-style-type: none"> • CSP asked to help coastal countries establish regulatory frameworks consistent with ECOWAS regulations • francophone countries generally accept legal validity of ECOWAS regulations: Côte d'Ivoire and Guinea gazette ECOWAS regulations in 2013 • some Anglophone countries require new national legislation 	<ul style="list-style-type: none"> • no WAPRC-Humid Zone secretariat is yet established for coastal countries (Accra)

a) Concerning national legal texts governing pesticide registration:

Each country's regulatory system relies on a series of legal documents (laws, ministerial decrees and orders) that form the legal basis for pesticide regulation and registration. To illustrate the complexity of existing national pesticide regulations, Annex Table A3 summarizes the array of enabling registration in force in the case study countries. Overall the workshop concluded that even though some national texts refer specifically to ECOWAS pesticide regulations, no national regulator has yet integrated the regional regulations fully into their national regulatory processes. Among the coastal countries, Côte d'Ivoire appears to have advanced furthest in aligning its national procedures with those stipulated by ECOWAS (Traoré and Haggblade 2017b).

b) Concerning national pesticide registration committees (NPRCs):

Benin and Côte d'Ivoire each operate inter-ministerial committees to review pesticide registration proposals. Togo similarly convenes an inter-agency committee with two thematic groups. Ghana and Nigeria have each established an autonomous agency charged with pesticide registration decisions. In Ghana, the Environmental Protection Agency (EPA) plays this role. In Nigeria, the National Food and Drug Administration and Control Agency (NAFDAC), under the Ministry of Health, manages pesticide review and approval.

Liberia and Sierra Leone, however, do not register pesticides. In Liberia, a pesticide management committee issues import permits but does not register pesticides. Sierra Leone involves five agencies in pesticide management: The Ministry of Agriculture for agricultural pesticides, Ministry of Health for pesticides such as malaria control insecticides used in public health campaigns, the Ministry of Commerce and Industry for import and retail licenses, the Bureau of Standards for laboratory testing and the Environmental Protection Agency for running public information campaigns. Like Liberia, Sierra Leone does not register pesticides but requires import licenses instead.

Guinea's national pesticide registration committee (the CNP) has stopped registering pesticides since 2015 in order to prepare for the new ECOWAS regulator (WACPR-Humid Zone) to take over this responsibility. Meanwhile, pesticides registered previously by Guinea's CNP continue to be imported.

c) Experimentation and testing

Testing required by national pesticide regulators focus primarily on biological efficacy on the intended pests. Because Liberia and Sierra Leone do not register pesticides, they likewise do not conduct efficacy trials.

Toxicology and eco-toxicity testing currently does not appear to take place regularly in the coastal ECOWAS countries. However, Côte d'Ivoire conducts plant residue tests for certain export crops in addition to biological efficacy testing.

d) Duration of national pesticide registration decisions.

National regulators in the ECOWAS coastal countries authorize pesticide registration for varying time periods. Provisional registration status remains valid for between 1 and 3 years. Full registration allows pesticide product sales for between 3 and 5 years, depending on the country. In countries which require only import permits, these permits remain valid for between 1 and 5 years.

4.5.3. Current implementation status

a) Regional institutions

At the regional level, two key regulatory bodies do not yet exist (Table 16). Neither the overall WAPRC coordinating unit in Abuja nor the technical secretariat for the APRC-Humid Zone in Accra has yet been established (Figure 7). Without these management entities, coastal ECOWAS countries legitimately wonder how far they can reasonably proceed towards implementation of the ECOWAS pesticide regulations.

In contrast, the CSP continues to function under CILSS management as the regional regulator for the Sahelian countries. Ultimately, when the ECOWAS WACPR coordinating unit becomes operational, the CSP will transition into the WACPR-Subcommittee for the Sahelian Zone. In the meantime, the CSP has been designated to serve as the transitional coordinating unit until the WACPR secretariat becomes operational (Figure 7).

Technical agreements by existing national regulators will be necessary to harmonize the welter of pre-existing and often conflicting pesticide registration decisions in the coastal countries. Therefore, current CSP efforts focus on a continuing series of technical consultations aimed at ironing out key definitions, definitions, testing protocols and approval and monitoring standards.

b) National implementation status

Legal questions currently constrain national implementation of ECOWAS regional pesticide regulations in the coastal countries. Anglophone countries, in particular, contest the legal authority of ECOWAS to impose regulations on sovereign nations. As a result, parliamentary action will be necessary in each country to pass new national pesticide legislation formally adopting ECOWAS regulations into national law. Given congested parliamentary calendars, our case study interviews suggest this could take two to three years to complete the national legislative process, after which time national implementing institutions could then modify existing ministerial directives to comply with ECOWAS regulations.

In contrast, Francophone countries such as Côte d'Ivoire and Guinea accept the binding nature of ECOWAS treaty obligations and have duly published the ECOWAS pesticide regulations in their official gazettes. Both have likewise moved forward to establish ECOWAS-compliant NPMCs and issue ministerial implementing regulations conforming to ECOWAS norms.

Table 16. Status of regional pesticide regulations in West Africa

Institutions	Legal instruments issued	Regional implementation	National implementation
CILSS	Resolution N° 7/27/CM/92 du Conseil des Ministres en charge de l'Agriculture en 1992 ; N° 8/34/CM/99	First adopted in 1992 ; revised version adopted in 1999; CSP functions since 1994	Ratification through national legislation in all original CILSS member states (except Guinea Bissau)
UEMOA	Regulation No 04/2009/CM/UEMOA	Adopted by the Council of Ministers of Agriculture of the UEMOA in 2009; CRPU not established; Under tri-partite agreement, UEMOA will instead support launch of WACPR and NPMCs	UEMOA provides financial support for establishing NPMCs since 2014
ECOWAS	Regulation CEDEAO N°C/REG.3/05/2008	<ul style="list-style-type: none"> • Approved by Ministers of Agriculture (2008) and by ECOWAS Commission (2009) • CSP functions as WACPR-Sahel and as interim WACPR coordinating unit • WACPR-Humid Zone not yet established 	<ul style="list-style-type: none"> • NPMCs in varying stages of establishment • national legal frameworks need to be adjusted to conform with ECOWAS regulations

5. CONCLUSIONS

ECOWAS has attempted to introduce common regional pesticide regulations during a period of rapid market growth. In some ways, this complicates ECOWAS efforts to harmonize pesticide regulations in coastal countries. Well-established national regulators in the coastal countries face the daunting challenge of managing explosive market growth while simultaneously transforming their regulatory frameworks. Rather than launching a new boat during calm weather, as the CILSS countries did during the early 1990s, the ECOWAS coastal countries are attempting to shift boats during a storm.

Yet, in other ways, the rapid market growth helps to demonstrate the potential benefits of a harmonized regulatory framework. While pesticide markets have expanded over the past decade, national regulatory capacity, in general, has not. Market growth in the presence of contradictory registration decisions by neighboring national regulators has contributed to cross-border smuggling of banned and unregistered pesticide products. Harmonized regulations would mitigate these problems by introducing a common list of approved and banned products. Moreover, growing pesticide sales, because they place pressure on national regulatory staff, help to make the case for sharing regulatory review workloads and focusing limited national manpower on post-registration monitoring, which has historically proven weak. Small coastal countries such as Guinea, Liberia and Sierra Leone see clear benefits of a harmonized regional pesticide registration system, which lightens the regulatory and technical demands on their limited technical resources.

CILSS's long experience implementing regional pesticide regulations offers important historical lessons that may prove useful in resolving current ECOWAS implementation problems in the coastal countries. Since the 1980s, pesticide regulators in the CILSS member countries became convinced of the need to harmonize pest control and pesticide regulatory efforts regionally. Common purpose and trust among the national technical agencies enabled the CSP to function effectively as the regional pesticide regulator since its inception in 1994, despite inconsistencies in the umbrella national and regional legal framework. In the CILSS case, technicians implemented the regional pesticide regulations from the very beginning. The supporting national legal framework, imperfect at the start, adjusted slowly over time. Over a five-year period, from 1994 to 1999, legal experts repaired the inconsistencies in the national and regional legal frameworks (Pardo-Leal 1999). In the CILSS case, technicians led the implementation of harmonized regional pesticide regulations, while the legal system followed.

The coastal ECOWAS countries are witnessing the opposite dynamic. Regional pesticide legislation is pushing already-pressed national regulators to fall into line to conform with regional political agreements mandating harmonized regional pesticide regulations. Rather than technical specialists in the plant-protection services leading the charge and pushing the politicians, as in the Sahel, regional political leaders are pushing the technicians in the coastal countries.

National regulators in the three large coastal ECOWAS countries face legitimate fears. Pesticide regulators in Côte d'Ivoire, Ghana and Nigeria risk losing financial resources when registration fees disappear from their coffers and get transferred instead to a new sub-regional committee. They fear losing control over pesticide registration decisions affecting their countries. They foresee problems in harmonizing conflicting existing national regulatory decisions – such as bans on pesticides in some countries that are legally registered in others -- a problem the Sahelian countries did not face because they began regional decision-making early, before entrenched national positions emerged.

How, in this new environment, can ECOWAS move forward to implement regional pesticide regulations in the coastal countries? To stimulate discussion and action about ways to accelerate implementation of the ECOWAS regional pesticide regulations, the following discussion outlines four key lessons emerging from the CILSS experience that may prove useful in advancing regional pesticide harmonization efforts in the coastal ECOWAS countries (Table 18).

1. Mobilizing financial resources for national and regional regulators.

National pesticide regulators throughout West Africa face increasing difficulty monitoring growing pesticide markets in the face of chronic budgetary and manpower constraints. Stakeholders throughout our case study countries uniformly expressed concern about the daunting task of monitoring rapidly growing pesticide markets with stagnant manpower and financial resources. In the large coastal countries, this pressure becomes especially acute because of the enormous scale of national pesticide markets and because the financing of national regulators has been built to depend in part on the pesticide registration fees paid by private firms submitting products for review. Ghana, for example, requires that its semi-autonomous EPA generate its own resources. The looming loss of pesticide application fees under the ECOWAS regional regulations, therefore, poses a serious resource problem for national regulators.

Where will national and regional regulators obtain the funding necessary to monitor growing pesticide markets? A constructive first step towards answering this question would involve launching high-level discussion of financing needs for national and regional pesticide regulators together with a review potential funding sources.

In addition to the already significant testing and application fees paid by private sector importers when they submit new products for registration, several additional opportunities exist for expanding resources necessary to support national regulatory monitoring and oversight. FAO experts, for example, have suggested instituting a fee on pesticide imports to support national regulatory efforts, including the establishment of certified regional testing laboratories (Davis 2011). ECOWAS has proposed a similar policy of using regional tax resources (CET and VAT) to help finance a regional agricultural development fund (ECOWADF) and the regional agricultural investment plan, RAIP (Hollinger and Staatz 2015). A similar centralized funding mechanism could presumably be established support pesticide regulatory and monitoring activities as well. In addition, UEMOA, the well-funded regional central bank serving the CFA franc zone, has provided financial support for the francophone countries to help establish their pesticide management committees. External donors may also prove willing to contribute,

particularly for initial investment costs necessary to regional testing labs up to international standards and training of associated scientific personnel.

Currently, national regulators face difficult pressures to monitor growing markets with static budget and personnel resources. Serious efforts to evaluate regulatory resource requirement and identify additional revenue sources to cover them would provide significant motivation for national regulators to more actively embrace implementation of the ECOWAS regional regulations. Regional technical committees and coordinating secretariats likewise require secure sources of core financing. Future discussion of regulatory finances will require careful consideration of broadening the resource base supporting regulatory agencies as well as clear formulas for allocating financial resources across national and regional agencies.

2. Technical harmonization.

The Sahelian CSP countries developed their regional pesticide regulations collectively, from the early 1990s onwards, and then applied these common decisions nationally. In contrast, the coastal West African countries began regional harmonization efforts nearly two decades later, long after individual countries had already developed their own independent pesticide regulatory frameworks. As a result, the coastal countries must contend with a legacy of differing national registration protocols, testing practices and a sometimes conflicting body of existing national registration decisions. Ghana, for example, has authorized the sale of paraquat and atrazine, while Côte d'Ivoire and the CSP countries have banned both of these herbicides. Despite the bans, field studies find both of these products on sale in the francophone neighboring countries, smuggled across the border from Ghana. Harmonizing pesticide registration decisions will require resolution of these conflicting regulatory stances and adoption of a common list of pesticides authorized for sale regionally.

Agro-ecological conditions likewise differ across the region, particularly among the coastal countries. Given the relative homogeneity of rainfall and soil conditions across the Sahel, the CSP mandates pesticide field testing at a single site within the zone. In comparison, a single coastal country such as Guinea covers a range of distinctly different agro-ecological zones. Consequently, Guinea's national pesticide regulators require pesticide field testing in each of the country's four different agro-ecological zones. Ghana, Côte d'Ivoire and Nigeria likewise transect a range of diverse ecological zones, moving from dry, low-rainfall zones in the north to extremely humid, high-rainfall zones in the south. Hence the testing protocols in the coastal countries will require clear technical agreements on agro-ecological definitions and testing requirements.

Fortunately, the common pesticide registration procedures and testing requirements developed by five coastal countries during the HIP project (1993-1999) provide a major building block for constructing a regional consensus. Already, the five HIP project participants – Benin, Côte d'Ivoire, Ghana, Guinea and Togo – have reached agreement on major pesticide registration protocols and have implemented common registration review procedures for nearly two decades. This common protocol can serve as a point of departure for discussions with non-HIP countries. Since the small coastal countries of Liberia and Sierra Leone do not currently register pesticides, they will likely prove flexible in adapting the HIP standards. Importantly, the HIP countries

include two of the three regional pesticide market powers, Côte d'Ivoire and Ghana. Harmonization with Nigeria remains the most significant outstanding issue for future discussion.

To achieve technical consensus, the CSP has led a series of important regional technical discussions among the coastal countries to help achieve consensus on standardized definitions and procedures. By all reports, these technical discussions are proving constructive. Given the complexity of the issues, these consultative efforts will need to continue in order to reach final technical agreement necessary before actual implementation of standardized regional registration decisions can begin within the coastal countries. Additional resources will be required to see this process through to completion.

3. Legal harmonization

The CSP countries required two rounds of regional and national legislation before they were able to fully harmonize regional pesticide regulations in the Sahel. Despite collective good will and strong interest by national pesticide regulators in working together to harmonize pesticide regulations, the Sahelian countries largely failed in their initial national efforts to codify the original regional CILSS regulations (of 1992 and 1994) into national legal and regulatory instruments. Technical specialists, it turns out, did not have sufficient legal expertise to map out a fully consistent legal framework governing pesticide regulation. CILSS, therefore, engaged a legal consultant to study national and regional legal texts, identify areas of legal inconsistency and ambiguity and recommend revisions. Pardo-Leal (1999) played this role effectively by helping CILSS and its member states to revise regional and national pesticide legal documents to produce a consistent, legally enforceable framework governing the CILSS CSP and its regional pesticide regulations.

The ECOWAS countries may require similar legal support in preparing a set of consistent and enforceable regional and national legal framework for regulating pesticides. Our country case studies suggest that a common legal understanding among the various member countries will be necessary in order to resolve the conflicting legal interpretations that, to date, have proven to be a stumbling block to national implementation of the ECOWAS pesticide regulations in the coastal countries.

4. Launching the WACPR and its sub-regional committees

Under the new ECOWAS pesticide regulations, the CSP will continue to function as the regional body coordinating pesticide regulations among the Sahelian countries (Figure 7). However, the umbrella WACPR secretariat and the sub-regional technical committee for the humid zone do not yet exist. Under the Tri-partite agreement of September 2017, the CSP will support the creation of a coordinating unit for the overall WACPR at INSAH in Bamako while continuing to serve as the secretariat for the WACPR-Sahelian Zone. Nonetheless, financing for the three regional entities, as well as for national regulatory agencies deprived of their dossier fees, remains an unresolved issue. Our country case studies suggest that national regulators will not be able to move forward with confidence until these regional bodies begin to take shape and clear financing mechanisms have been set in place.

Table 17. Key challenges facing ECOWAS coastal countries

Challenges	Potential solutions
1. Resource constraints for national and regional regulators	
a. financing	<ul style="list-style-type: none"> • Define resource requirements for regional institutions and national regulators • Review potential new sources of financing for pesticide regulators <ul style="list-style-type: none"> ○ Pesticide application fees ○ levy on pesticide imports ○ direct support from regional bodies (ECOWAS, UEMOA) or donors ○ other potential sources
b. testing laboratories	<ul style="list-style-type: none"> • Inventory existing laboratories, facilities, testing capacities and accreditation prospects • Review existing and potential financing sources
2. Technical pre-requisites for harmonizing regional pesticide regulations	
a. definitions (agro-ecological zones, key pests)	<ul style="list-style-type: none"> • Continue regional technical workshop to define AEZ's and scientific criteria for defining ECOWAS pesticide agro-ecological zones for testing and registration approval • Refer to FAO agro-ecological zoning • Inventory key pests affecting major food crops, export crops and horticultural crops
b. develop standardized testing requirements, testing protocols and standard registration submission requirements	<ul style="list-style-type: none"> • Take HIP protocols as point of departure • Engage in technical discussions with Nigeria to harmonize • Involve private sector at key points in these technical discussions
3. Harmonize legal frameworks	<ul style="list-style-type: none"> • Review existing national and regional pesticide laws and regulations • Recommend consistent set of national and regional legal enactments necessary to harmonize regional legal frameworks regulating pesticides
4. Establish regional pesticide regulatory institutions	
a. WACPR- Coordinating Unit	<ul style="list-style-type: none"> • Establish temporary coordinating unit at INSAH, per tri-partite agreement <ul style="list-style-type: none"> • Identify personnel, financing needs and resources
b. WACPR –Subcommittee Sahel	<ul style="list-style-type: none"> • CSP exists and currently fulfills this role
c. WACPRT -- Subcommittee Humid zone	<ul style="list-style-type: none"> • Identify personnel and financial needs • Source funding • Recruit personnel

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Annex A. Supplementary Tables

Annex Table A1. Annual pesticide imports in major West African economies (\$ millions)

	Large importers			Medium-sized importers				Small importers								
	Côte d'Ivoire	Ghana	Nigeria	Burkina Faso	Guinea	Mali	Senegal	Cape Verde	Gambia	Guinea Bisseau	Liberia	Mauritania	Niger	Sierra Leone	Togo	
1961	1	2	3	0	0	0	0			0.0	0.0	0.2	0.1	0.1	0.1	0.0
1962	1	1	3	0	0	0	0			0.1	0.0	0.2	0.1	0.1	0.2	0.0
1963	1	2	4	0	0	0	0			0.0	0.0	0.2	0.1	0.1	0.1	0.0
1964	0	1	6	0	0	0	1			0.1	0.0	0.4	0.1	0.1	0.2	0.0
1965	1	1	5	0	0	0	0			0.1	0.0	0.3	0.1	0.2	0.2	0.1
1966	1	1	6	0	0	0	1			0.1	0.0	0.5	0.1	0.2	0.2	0.1
1967	2	3	6	0	0	0	0	0.0		0.1	0.0	0.2	0.1	0.1	0.2	0.1
1968	2	2	5	0	0	0	1	0.0		0.1	0.0	0.3	0.1	0.1	0.3	0.1
1969	2	3	6	0	0	0	1	0.0		0.1	0.0	0.5	0.1	0.2	0.3	0.2
1970	2	2	9	0	0	1	1	0.0		0.1	0.1	0.4	0.1	0.3	0.2	0.4
1971	2	2	11	0	0	1	1	0.0		0.1	0.1	0.5	0.2	0.1	0.3	0.2
1972	2	1	10	0	0	1	1	0.0		0.1	0.1	0.4	0.2	0.1	0.3	0.2
1973	3	2	10	1	0	1	1	0.0		0.1	0.2	0.4	0.4	0.2	0.4	0.2
1974	5	3	17	1	0	1	2	0.1		0.1	0.1	0.7	0.5	0.3	0.6	0.4
1975	6	4	34	3	0	2	4	0.1		0.2	0.0	0.6	0.7	0.4	0.7	1.3
1976	7	4	35	3	0	4	5	0.1		0.2	0.0	0.8	0.4	0.7	0.4	0.6
1977	8	5	36	2	0	5	5	0.1		0.1	0.1	0.9	0.3	1.0	0.5	1.3
1978	11	3	78	2	0	3	4	0.1		0.9	0.1	1.3	0.3	1.1	0.9	1.3
1979	13	12	59	3	0	1	7	0.1		0.7	0.2	1.5	0.1	3.4	0.1	1.4
1980	17	14	139	5	0	1	5	0.2		0.8	0.1	1.4	0.1	1.2	0.4	1.5
1981	10	13	88	3	0	2	3	0.2		0.8	0.1	1.6	0.1	1.2	0.5	1.0
1982	13	2	50	3	0	3	9	0.2		0.8	0.1	1.0	0.1	1.3	1.0	2.0
1983	9	5	34	2	0	1	3	0.2		0.9	0.1	1.5	0.2	1.4	0.5	3.3
1984	10	7	17	2	0	1	3	0.2		0.9	0.1	2.0	0.8	1.6	0.5	5.0
1985	12	8	33	1	0	3	3	0.2		0.9	0.2	2.0	1.5	2.0	0.6	7.0
1986	12	9	18	7	1	8	4	0.2		1.0		1.7	2.0	3.0	1.2	8.0
1987	13	11	13	9	1	7	3	0.2		1.0		1.5	2.5	4.0	0.5	6.7
1988	11	12	13	8	1	8	12	0.2		0.9		1.4	3.1	6.1	0.6	12.6
1989	13	13	10	9	1	7	15	0.4		1.0		1.3	1.5	4.9	0.7	4.2

Sources: FAOSTAT (2017), COMTRADE (2017)

Annex Table A1. Continued

	Large importers			Medium-sized importers				Small importers							
	Côte d'Ivoire	Ghana	Nigeria	Burkina Faso	Guinea	Mali	Senegal	Cape Verde	Gambia	Guinea Bisseau	Liberia	Mauritania	Niger	Sierra Leone	Togo
1990	13	14	15	8	1	14	5	0.6	1.0		1.1	1.8	3.7	0.6	19.8
1991	14	15	24	8	1	15	5	0.6	1.1		0.9	0.3	3.7	0.8	9.2
1992	16	16	8	8	1	15	6	0.6	1.2		0.5	0.9	3.6	1.0	5.1
1993	18	16	11	8	2	15	7	0.6	1.3		0.6	0.4	3.5	1.0	4.9
1994	20	17	13	8	2	15	7	0.6	1.5		0.7	0.4	0.5	1.0	4.3
1995	26	18	16	6	3	15	8	1.0	0.8		0.8	0.4	3.9	1.0	5.6
1996	20	19	19	7	2	13	8	0.9	0.7		0.4	0.4	2.2	1.0	5.8
1997	29	32	32	15	2	16	7	0.8	1.0		0.7	0.4	3.0	1.0	7.2
1998	34	14	37	19	2	20	10	0.6	1.2		0.9	0.4	2.2	1.0	8.0
1999	35	15	16	11	3	20	12	0.8	0.9		0.7	0.4	5.2	1.0	7.8
2000	17	15	14	8	3	13	7	0.6	1.4	0.4	0.9	0.0	4.2	1.0	5.3
2001	22	20	13	6	2	7	6	0.7	1.0	0.2	1.0	0.1	0.7	0.5	5.0
2002	28	33	108	8	3	18	7	0.7	0.8	0.3	1.0	0.1	4.3	0.6	10.0
2003	38	63	28	9	4	20	8	0.9	1.3	0.7	0.7	0.1	4.0	1.1	7.2
2004	34	73	50	22	4	26	12	1.0	0.5	0.1	1.0	0.6	2.4	1.0	3.3
2005	34	118	36	26	4	25	11	1.0	0.7	0.1	0.8	0.2	1.5	0.7	2.8
2006	34	82	61	20	5	18	9	1.1	1.3	0.1	1.1	0.1	1.4	0.9	2.6
2007	40	110	169	27	5	17	10	1.5	0.7			0.1	2.1		2.4
2008	42	143	82	6	5	10	9	1.8	1.1			0.2	2.2		2.6
2009	47	165	106				10	1.5	0.6			0.1	1.5		2.8
2010	60	255	129	12		15	9	1.4	0.3			0.0	1.6		3.1
2011	57	371	212	18		22	11	1.4	0.7			0.5	3.6		5.0
2012	68	337	254	19		30	12	1.2	0.4			0.2	1.3		6.5
2013	88	241	292	20	13		14	1.0	0.5			2.2	3.3		8.7
2014	134		457	25	10		15	1.6	0.4			1.8	4.4	4.5	4.7
2015	130			16			15	1.1				0.0	0.9	8.9	4.2
2016		189				40	14	1.4				1.7	0.9	2.1	5.3

Sources: FAOSTAT (2017), COMTRADE (2017)

Annex Table A2. National institutions responsible for implementation of pesticide regulations in the case study countries

Country	Pre-registration testing, etc.	Registration	Post-registration		
			regulation	market monitoring	environment, health
<i>CILSS members</i>					
Gambia	NARI		NEA	NEA	NEA
Mali	IER		MOA-DNA	MOA-DNA, MC	CNGP
Senegal	ISRA, CDH		ME	DPV	MS, MT
<i>Coastal ECOWAS members</i>					
Côte d'Ivoire	CNRA, universities	MOA-DVPCQ, CP	MOA-DVPCQ	MOA-DVPCQ, LANADA, MC	ME-ANDE
Ghana	EPA, CSIR, PPRSD	EPA, PRC	EPA	EPA, PPRSD	EPA
Guinea	IRAG, LNPV	CNP, SNPV-DS	SNPV-DS	SNPV-DS, MC	ME
Nigeria	NAFDAC	NAFDAC	NAFDAC	NAFDAC	NESREA
Acronyms:					
ANDE	Agence Nationale de l'Environnement				
CDH	Centre pour le Développement de l'Horticulture				
CERE	Centre d'Étude et de Recherche en Environnement				
CNGP	Conseil National de Gestion des Pesticides				
CNGPC	Commission Nationale de Gestion des Produits Chimiques				
CNP	Comité National de Pesticides				
CNRA	Centre National de Recherche Agricole				
CP	Comité des Pesticides				
CSIR	Council for Scientific and Industrial Research				
DNA	Direction Nationale de l'Agriculture, Ministry of Agriculture				
DPV	Direction de la Protection des Végétaux, Ministry of Agriculture				
DPVCQ	Direction de la Protection des Végétaux, du Contrôle et de la Qualité, Ministry of Agriculture				
EPA	Environmental Protection Agency				
FMP	Faculté de Médecine et de Pharmacie, Université de Cheik Anta Diop				
IER	Institut d'Economie Rurale, Ministry of Agriculture				
IRAG	L'Institut de Recherche Agronomique de Guinée				
ISRA	Institut Sénégalais de Recherche Agricole, Ministry of Agriculture				
LNPV	Laboratoire National de la Protection des végétaux				
MC	Ministry of Commerce				
ME	Ministry of the Environment				
MOA	Ministry of Agriculture				
MS	Ministère de Santé				
MT	Ministère de Travail				
NAFDAC	National Agency for Food and Drug Administration and Control, Ministry of Health				
NARI	National Agricultural Research Institute				
NEA	National Environment Agency				
NESREA	National Environmental Standards and Regulations Enforcement Agency				
PPRSD	Plant Protection and Regulatory Services Division, Ministry of Agriculture				
PRC	Pesticide Registration Committee				
SNPV-DS	Service National de la Protection des Végétaux et des Denrées Stockées, Ministry of Agriculture				
Sources: Diallo and Tasié (2017), Diarra and Diallo (2017), Diarra and Tasié (2017), Haggblade et al. (2017), Traoré and Haggblade (2017a, 2017b).					

Annex Table A3. National laws regulating pesticides in the case study countries

Country	National legislation and regulations regulating pesticides	National adoption of regional pesticide regulations
Côte d'Ivoire	<ul style="list-style-type: none"> • Loi No. 64-490 du 21 décembre 1964 relative à la protection des végétaux • Décret No. 74-388 du 7 août 1974 relatif à l'agrément des pesticides • Décret No. 89-02 du 4 janvier 1989 relatif à l'agrément, la fabrication, la vente et l'utilisation des pesticides in CI 	<ul style="list-style-type: none"> • ECOWAS Regional Pesticide Regulations C/REG.3/5/2008 gazetted by GOCI 15 April 2013 • UEMOA Regional Pesticide Regulations No. 04/2009/CM/UEMOA gazetted by GOCI 18 April 2013
Gambia	<ul style="list-style-type: none"> • Hazardous Chemicals and Pesticides Control Management Act of 1994 (HCPCMA) • Hazardous Chemicals Regulations 1996 • Supplementary Regulations for Pesticide Regulation and Licensing including the CILSS Common Pesticides Regulation 19 November 2003 	<ul style="list-style-type: none"> • CILSS Regional Pesticide Regulations. Résolution N ° 8/34 / CM / 99 adopted by Gambia on 19 November 2003
Ghana	Environmental Protection Agency Act, 1994	
Guinea	<ul style="list-style-type: none"> • Loi L/92/028/CTRN du 06 Août 1992 instituant la législation sur les pesticides • Arrêté n° 5071/MAE/SGG/99 du 14 Septembre portant nomination des membres du Comité National des Pesticides • Arrêté n° 5711/MAEF/SGG/96 du 03 octobre 1996 relatif aux dossiers d'homologation des pesticides • Arrêté n° 5714/MAEF/SGG/96 du 03 octobre 1996 relatif à la licence professionnelle requise pour l'importation, le reconditionnement et la mise sur le marché des pesticides 	<ul style="list-style-type: none"> • ECOWAS Regional Pesticide Regulations C/REG.3/5/2008 gazetted by GOG in May 2013
Mali	<ul style="list-style-type: none"> • Loi n ° 95-061 couvrant la réglementation, l'homologation et le contrôle des produits agro-pharmaceutiques 	

	<ul style="list-style-type: none"> • Décret no° 95-404 spécifiaient que le CSP servirait d'organisme autorisé à étudier les demandes de produits pesticides et à prendre des décisions d'homologation • Loi n°01- 102 / P-RM du 30 Novembre 2001, portant ratification de l'Ordonnance n°01-046 / P-RM du 20 Septembre 2001 autorisant la ratification de la Réglementation commune aux Etats membres du CILSS • Loi N° 02/014 du 3 juin 2002 instituant l'homologation et le contrôle des pesticides en République du Mali • Décret n° 09-313/P-RM du 19 juin 2009 fixant les modalités d'application de la loi 02/014 	<ul style="list-style-type: none"> • CSP designated as decision-making body for pesticide registration decisions, decree issued by GOM 1995 • CILSS Regional Pesticide Regulations. Résolution N ° 8/34 / CM / 99 adopted by GOM on 30 November 2001 • ECOWAS Regional Pesticide Regulations 03/05/2008 published in the official gazette 30 May 2014
Nigeria	<ul style="list-style-type: none"> • Food and Drugs Act 1976 • Drugs and Related Products (Registration, Etc.) Act 1996 (amended) • Pesticide Registration Regulations, 2005 	
Senegal	<ul style="list-style-type: none"> • Loi n° 84-14 du 02 février 1984 portant contrôle des Spécialités Agro pharmaceutiques et des Spécialités Assimilées • Arrêté N° 5381 du 20 Mai 1985 fixant la composition et les règles d'organisation de la Commission Nationale d'Agrément • Loi N°2001-01 du 15 janvier 2001 portant Code de l'environnement • Décret N°2001-280 du 12 avril 2001 portant application du Code • Loi n° 2002-28 du 9 décembre 2002 autorisant le Président de la République à ratifier la version révisée de l'Accord portant Réglementation commune aux Etats membres du CILSS • Arrêté N° 000852 du 08 février 2002 du Ministre chargé de l'Environnement portant création de la Commission Nationale de Gestion des Produits Chimiques 	<ul style="list-style-type: none"> • CILSS Regional Pesticide Regulations. Résolution N ° 8/34 / CM / 99 adopted by GOS on 9 December 2002 • ECOWAS Regional Pesticide Regulations 03/05/2008 published in the official gazette January 2012

Sources: Diallo and Tasié (2017), Diarra and Diallo (2017), Diarra and Tasié (2017), Haggblade et al. (2017), Traoré and Haggblade (2017a, 2017b).

Annex Table A4. Policy chronology of the CILSS regional pesticide regulations

Policy actions	Legal texts	Comments
	1992 CILSS common regulations on pesticide regulation	
		<ul style="list-style-type: none"> • CILSS technical workshop elaborates draft regulations (1991)
Pesticide regulations adopted by the CILSS Council of Ministers of Agriculture (27th session, Ouagadougou, April 7, 1992).	Resolution N° 7/27/CM/92 of the CILSS Council of Ministers of Agriculture	
Comité Sahélien des Pesticides (CSP) established as the CILSS regional regulatory review body (1994)	Resolution N° 10/29/CM/94 concerning the application of regional pesticide regulations adopted by the 29 th session of the CILSS Council of Ministers of Agriculture (Praia, Cape Verde, April 18 and 19, 1994)	<ul style="list-style-type: none"> • CSP based at Institut du Sahel (INSAH) in Bamako • staffing includes only the coordinator of UCTR-PV • First CSP meeting held to evaluate pesticides proposed for registration (homologation), March 1994.
	Failed legal “domestication” by national parliaments	
Country ratification of the regional regulations	<ul style="list-style-type: none"> • Niger (Ordonnance 96-008) • Gambia (draft legislation prepared, 1998) 	<ul style="list-style-type: none"> • Despite approval of a CILSS-compliant national pesticide law, some of Niger’s implementing instruments fail to comply fully with CILSS packaging and labelling requirements. • Gambia prepares draft legislation. CSP advises them to wait for new, revised

		<p>regulations.</p> <ul style="list-style-type: none"> • Multiple countries issue executive regulatory orders recognizing CSP but without revising laws to make legal framework CILSS-compliant (Burkina, Chad, Gambia, Guinea Bissau, Mali, Niger).
	1999 Revised CILSS pesticide regulations	
CILSS establishes Permanent Secretariat of the CSP to improve its functioning		<ul style="list-style-type: none"> • FAO launches Project GCP/RAF/335/NET: “Implementation of the interational code of conduct on pesticide utilization in the Sahel region”(1998 à 2003) • CILSS requests help from the FAO for joint review of the pesticide regulations (1998)
Adoption of revised CILSS pesticide regulations (December 16, 1999)	Resolution N° 8/34/CM/99 adopted by the CILSS Council of Ministers of Agriculture	
National ratification of the CILSS pesticide regulations by the parliaments of CILSS member states (1999 to 2005)	<p>1) Mali : Instrument de ratification du 13 novembre 2001 : Loi n°01– 102 / P-RM du 30 Novembre 2001, portant ratification de l’Ordonnance n°01–046 / P-RM du 20 Septembre 2001 autorisant la ratification de la Réglementation commune aux Etats membres du CILSS</p> <p>Loi N° 02/014 du 3 juin 2002 instituant l’homologation et le contrôle des pesticides en République du Mali</p>	<ul style="list-style-type: none"> • CSP, with FAO support, follows up with individual countries to promote ratification of the CILSS common regulations • To date, only Guinea Bissau has failed to ratify the CILSS common regulations • In May 2016, CSP held its 38th regular session in Bamako. • CSP posts a list of all registered pesticides on the INSAH website

	<p>Décret n° 09-313/P-RM du 19 juin 2009 fixant les modalités d'application de la loi 02/014</p> <p>2) Senegal : Loi n° 2002-28 du 9 décembre 2002 autorisant le Président de la République à ratifier la version révisée de l'Accord portant Réglementation commune aux Etats membres du CILSS</p> <p>3) Mauritania : Loi 2003-027 autorisant le Président de la République à ratifier la Réglementation commune..., du 20 juillet 2003</p> <p>4) Chad : Instrument de ratification 03 Novembre 2003</p> <p>5) Gambia : Instrument of ratification 19 November 2003</p> <p>6) Burkina Faso : Instrument de ratification 2004-016/MAE-CR/SG/DAJC/STAI, du 20 juillet 2004</p> <p>7) Niger : Déclaration de ratification de la Réglementation commune, du 29 juillet 2004</p> <p>8) Cape Verde: Lettres de ratification de la Règlementation Commune 18 juillet 2005</p>	
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Source: Haggblade et al. (2017).