



Ghana Cocoa Supply Chain Risk Assessment



Agricultural Risk Management Team
Agricultural and Rural Development
The World Bank



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Elh. Adama Touré, Sr. Ag. Economist,



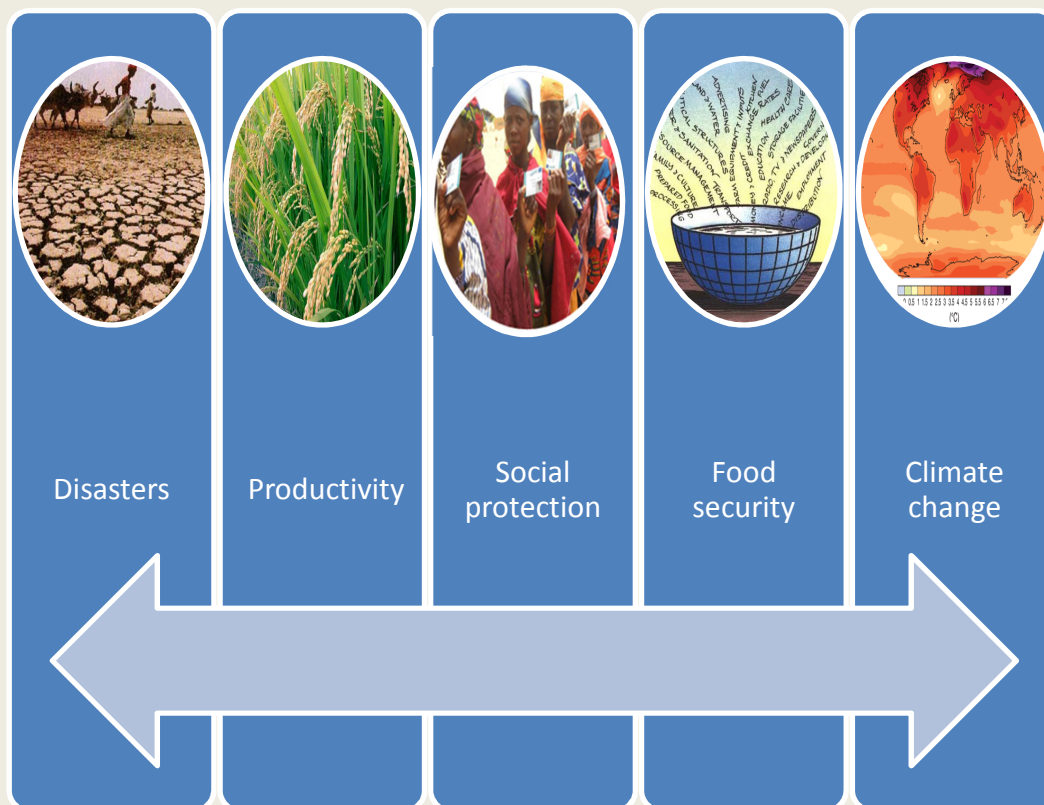
Agricultural Risks : Cross Cutting Agenda

Agricultural risk matters

High vulnerability to agricultural risks with adverse impact on :

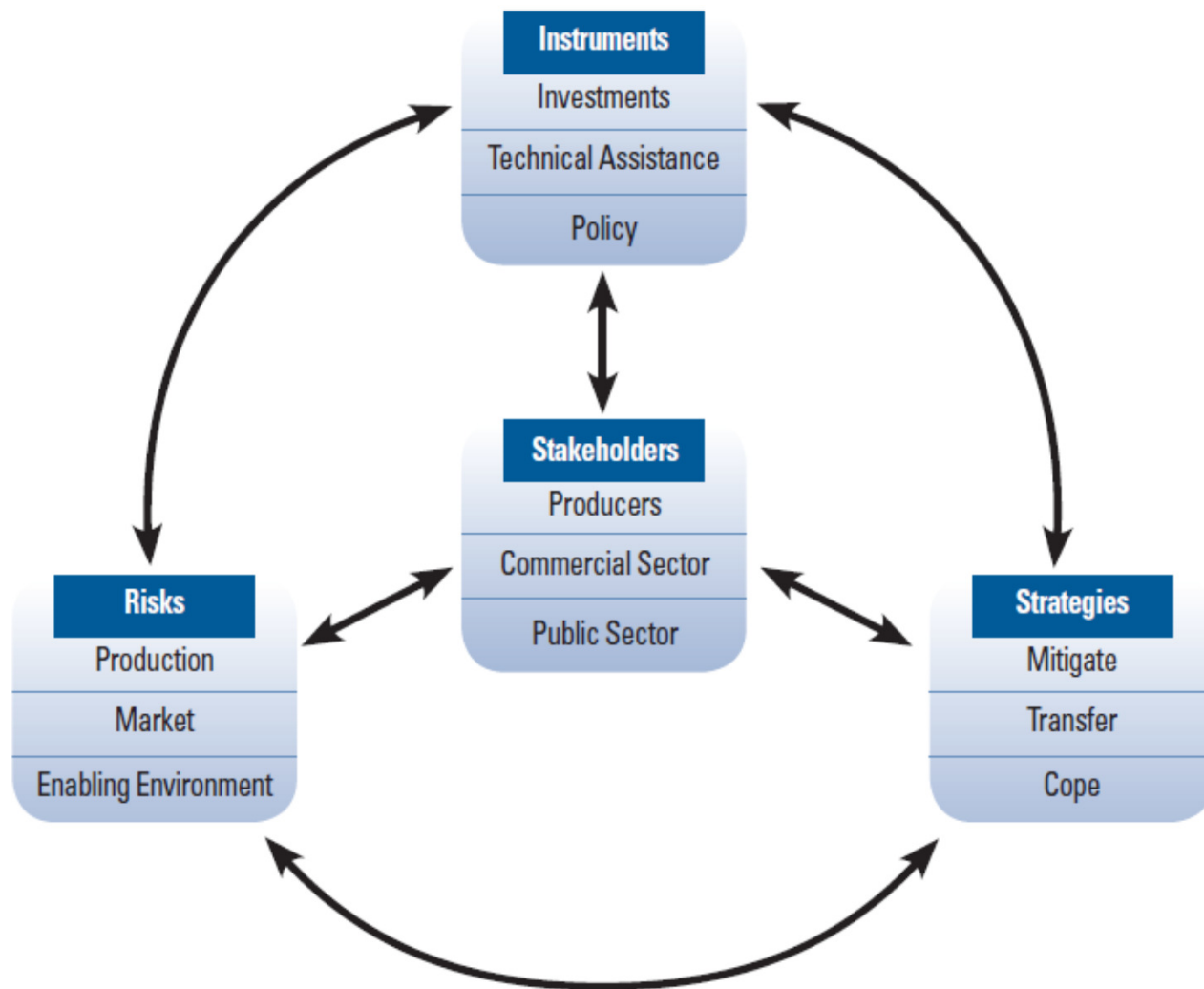
- Household incomes
- Poverty, Food Insecurity, Malnutrition
- Economic growth (GDP)
- Government's fiscal balance
- Diversion of Development financing

Need for improved Assessment for better planning

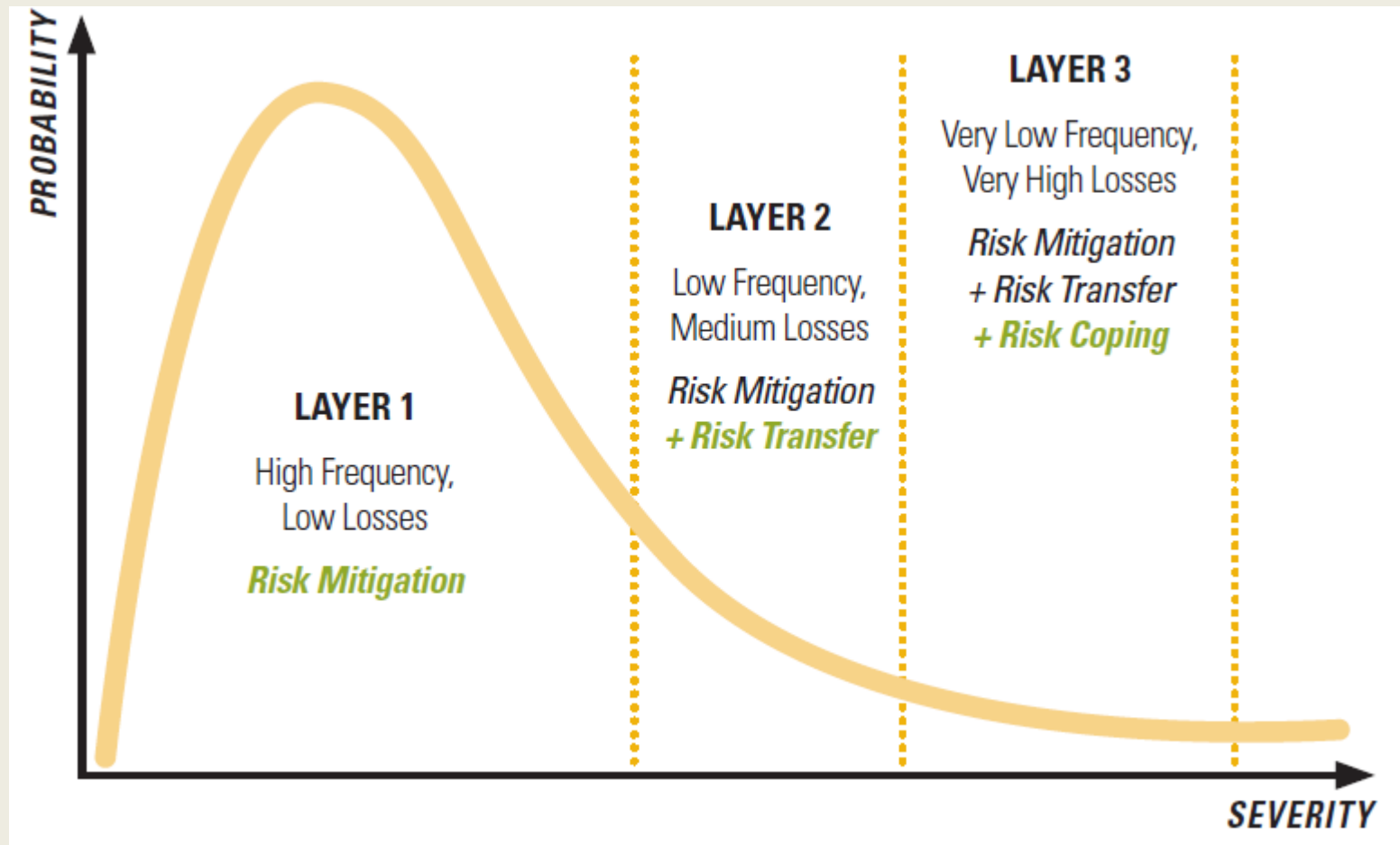


Agricultural Risks

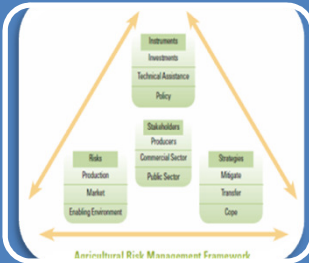
ARMT's Risk Management Framework



Risk Layering



ARMT's Product Offering's



Risk Assessment and Management

- Agricultural sector risk assessment and management (Niger)
- Supply chain risk assessment and management (Cocoa in Ghana)
- Weather risk assessment and management



Capacity Transfer

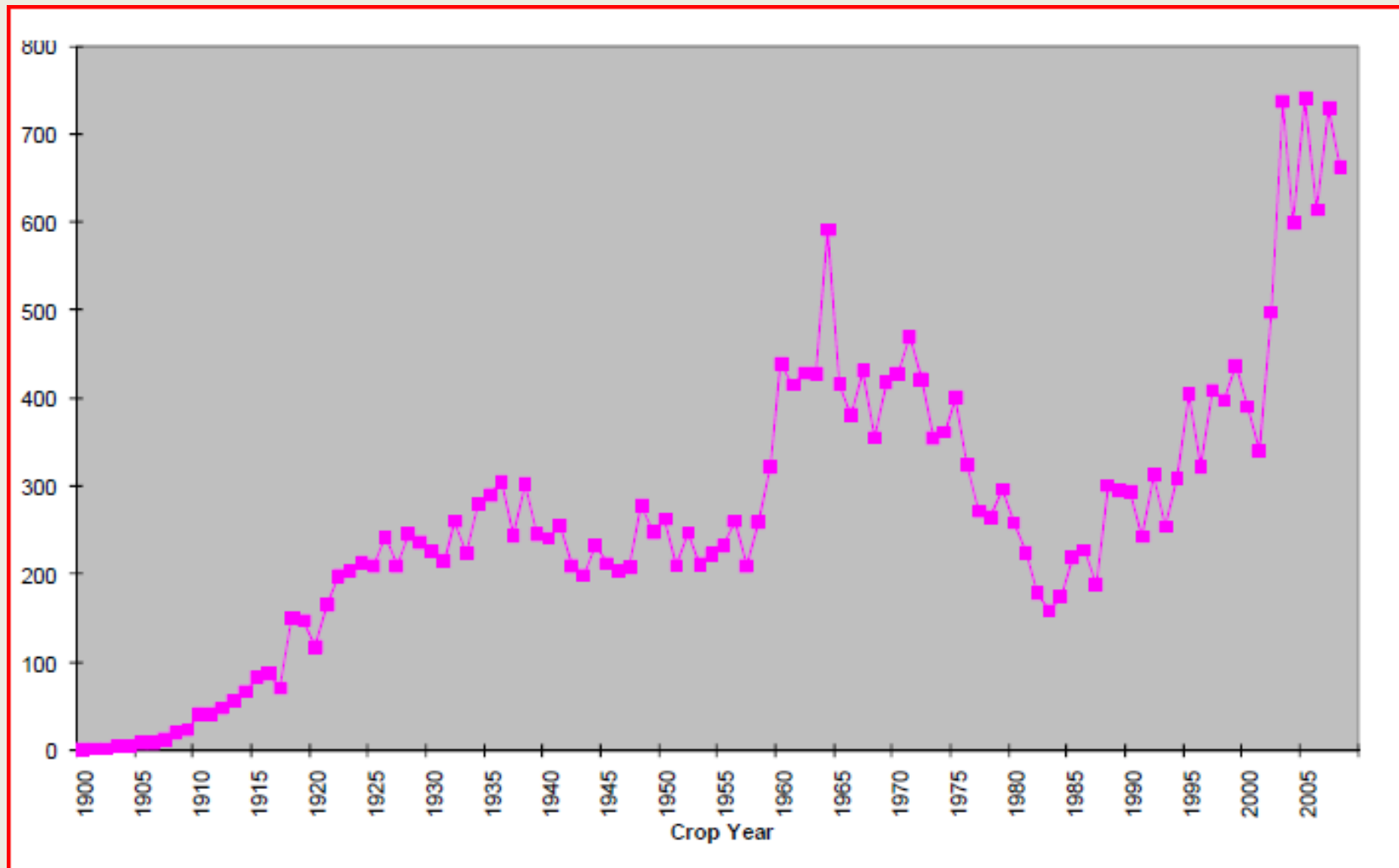
- Capacity transfer and trainings (coffee price risk management, cocoa price risk management, cotton price risk management, weather index insurance etc.)



Knowledge and Network

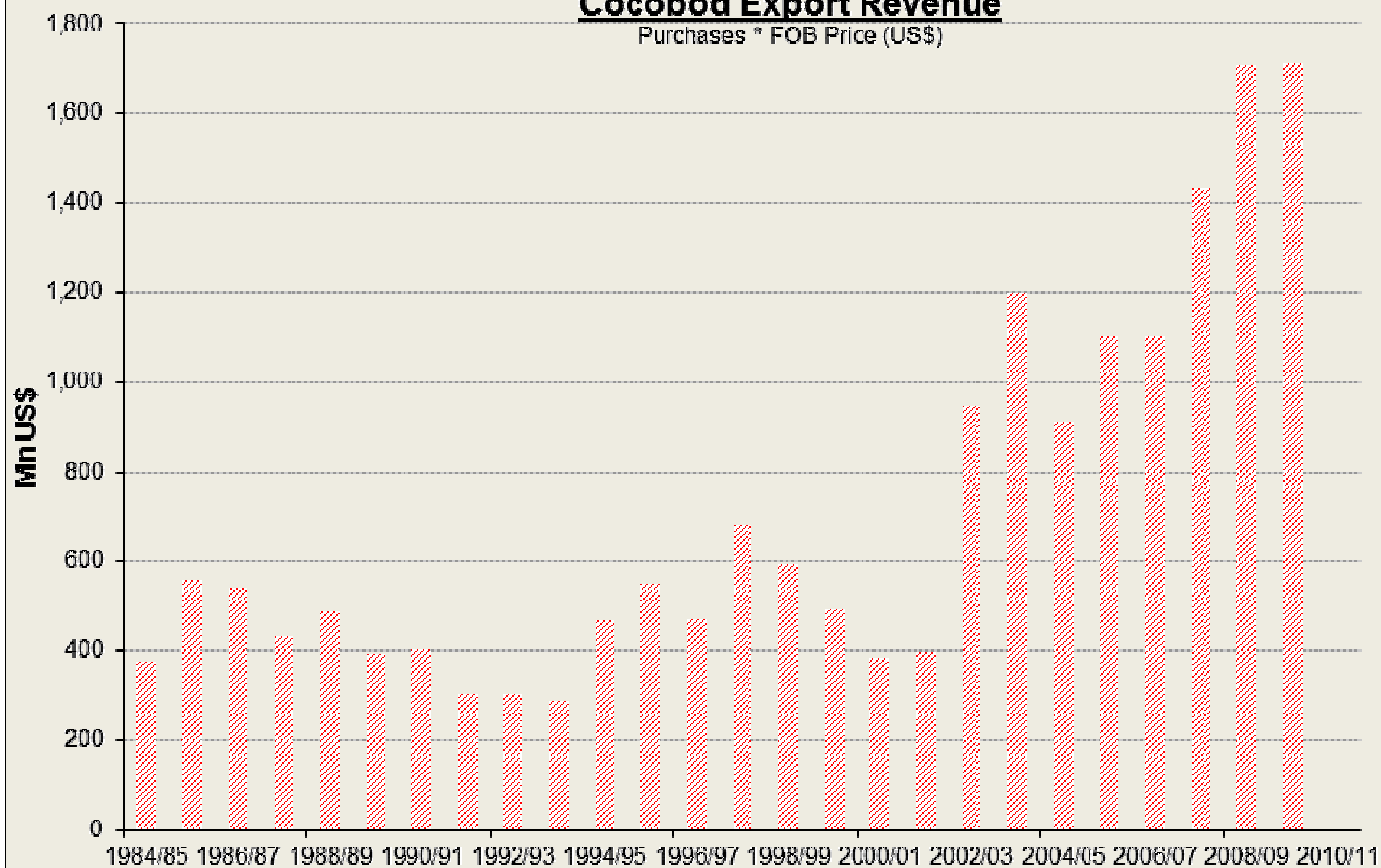
- FARMD
- Risk in rice in Asia conference
- Paradigm shift in Ag. Risk Mgmt (KP)
- Risk and finance in coffee sector

Ghana cocoa production 1900-2008

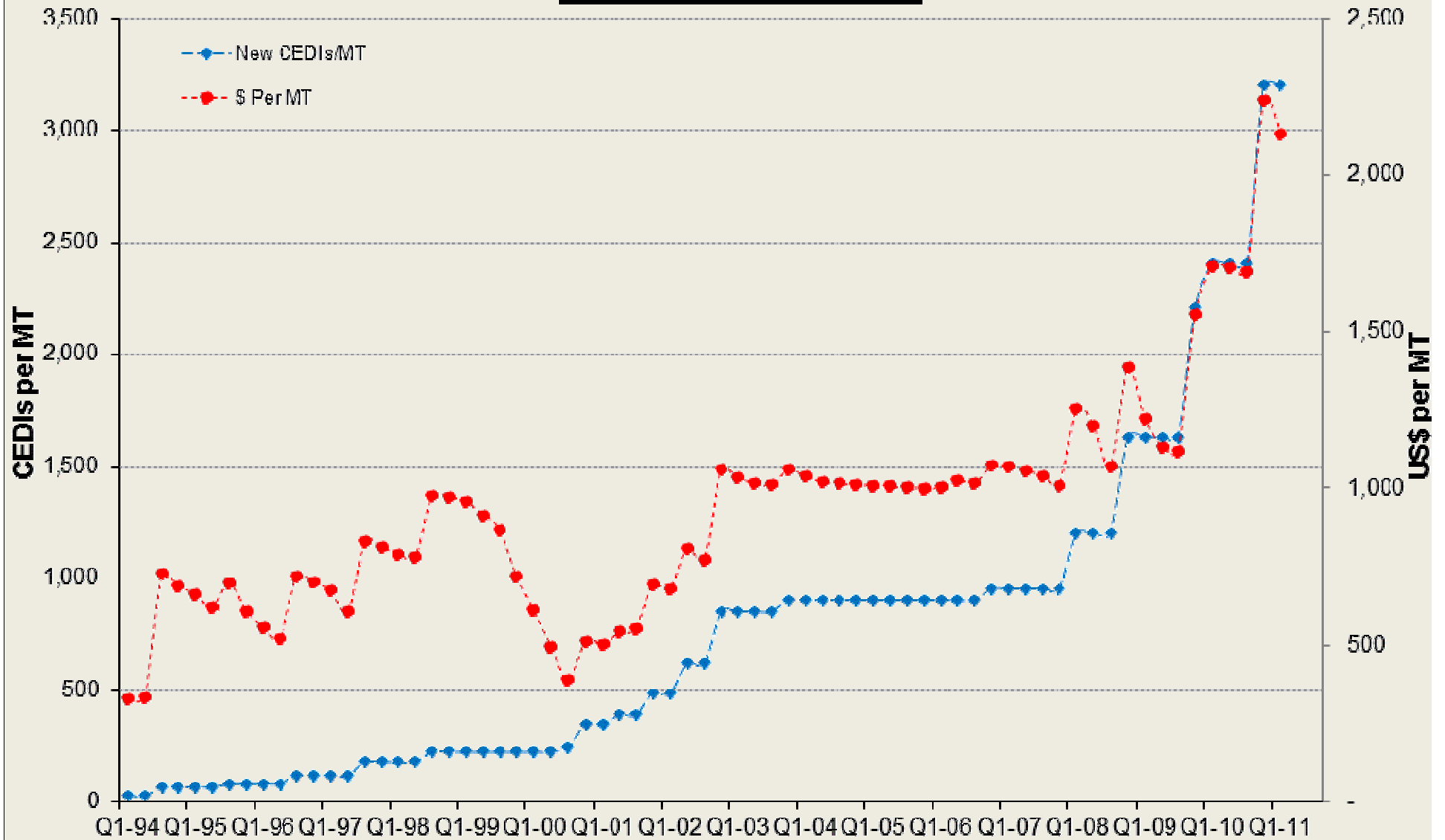


Cocobod Export Revenue

Purchases * FOB Price (US\$)



Cocobod Farmer Price



GHANA:Cocoa Supply Chain Risks

Production risks	Stakeholders most affected
Swollen shoot virus	Farmers
Black pod	Farmers
Capsid	Farmers
Other pest, diseases, and weeds	Farmers
Drought/ dry spell	Farmers
Cocoa acreage loss (deforestation, mining, urbanization, etc.)	Entire supply chain
Bush fire	Farmers
Market risks	
Cocoa price volatility	CMC
Input price volatility	Farmers, input suppliers, and COCOBOD
Counterparty risk	LBCs
Exchange rate volatility	CMC
Interest rate volatility	CMC
Enabling Environment risks	
Smuggling / cross border trade	CMC and Govt. of Ghana
Misappropriation of funds	LBCs
Logistics breakdown/ congestion	LBCs
Market regulation risks (social, env., quality, residue levels, etc.)	CMC
Policy risks (input policy, domestic processing policy, cocoa sourcing policy, land use policy, infrastructure policy, etc.)	The entire supply chain

Cost of Black Pod Infestation

TABLE 4.3 - CODAPEC ESTIMATES FOR BLACK POD INFESTATION

Year	Acreage Infested (in Ha, est.)	Acreage Sprayed (in Ha)	(p)+	Crop Loss* (in MT)	Price (US\$/MT)	Loss/Gain (in US\$)
2008	1,039,725	976,332	0.94	117,593	\$2,104	\$247,415,456
2009	1,113,503	1,020,432	0.92	125,937	\$2,400	\$302,249,254
2010	1,156,622	1,156,622	0.9	130,814	\$2,702	\$353,459,227

SOURCE: CODAPEC Annual Report, 2009/10; Authors' calculations

+ 'p' is a gross estimate of the proportion of estimated hectareage infested in relation to hectares actually sprayed. Since multiple applications could (and should) take place, the value can be >1. The low values for black pod spraying suggest that considerable under-dosage is taking place.

*Nominal potential loss @ 30% with an average yield of 377 kg/ha.

Cost of MIRID/CAPSID

TABLE 4.4 - CODAPEC ESTIMATES FOR MIRID/CAPSID INFESTATION

Year	Acreage Infested (in Ha, est.)	Acreage Sprayed (in Ha)	(p)+	Crop Loss* (in MT)	Price (US\$/MT)	Loss/Gain (in US\$)
2008	1,705,115	1,660,998	0.97	64,283	\$2,104	\$135,251,086
2009	1,708,815	2,106,929	1.23	64,442	\$2,400	\$154,613,581
2010	2,212,200	2,185,255	0.99	83,400	\$2,702	\$225,346,638

SOURCE: CODAPEC Annual Report, 2009/10

*Nominal potential loss @ 10% with an average yield of 377 kg/ha.

+ 'p' is a gross estimate of the proportion of estimated hectareage infested in relation to hectares actually sprayed. Since multiple applications could (and should) take place, the value can be >1. While some infested areas get recommended doses of spraying, some receive less than optimal and some might not receive any spraying at all. The low values for spraying suggest that considerable under-dosage is taking place.

Cost of Cocoa Swollen Shoot Virus

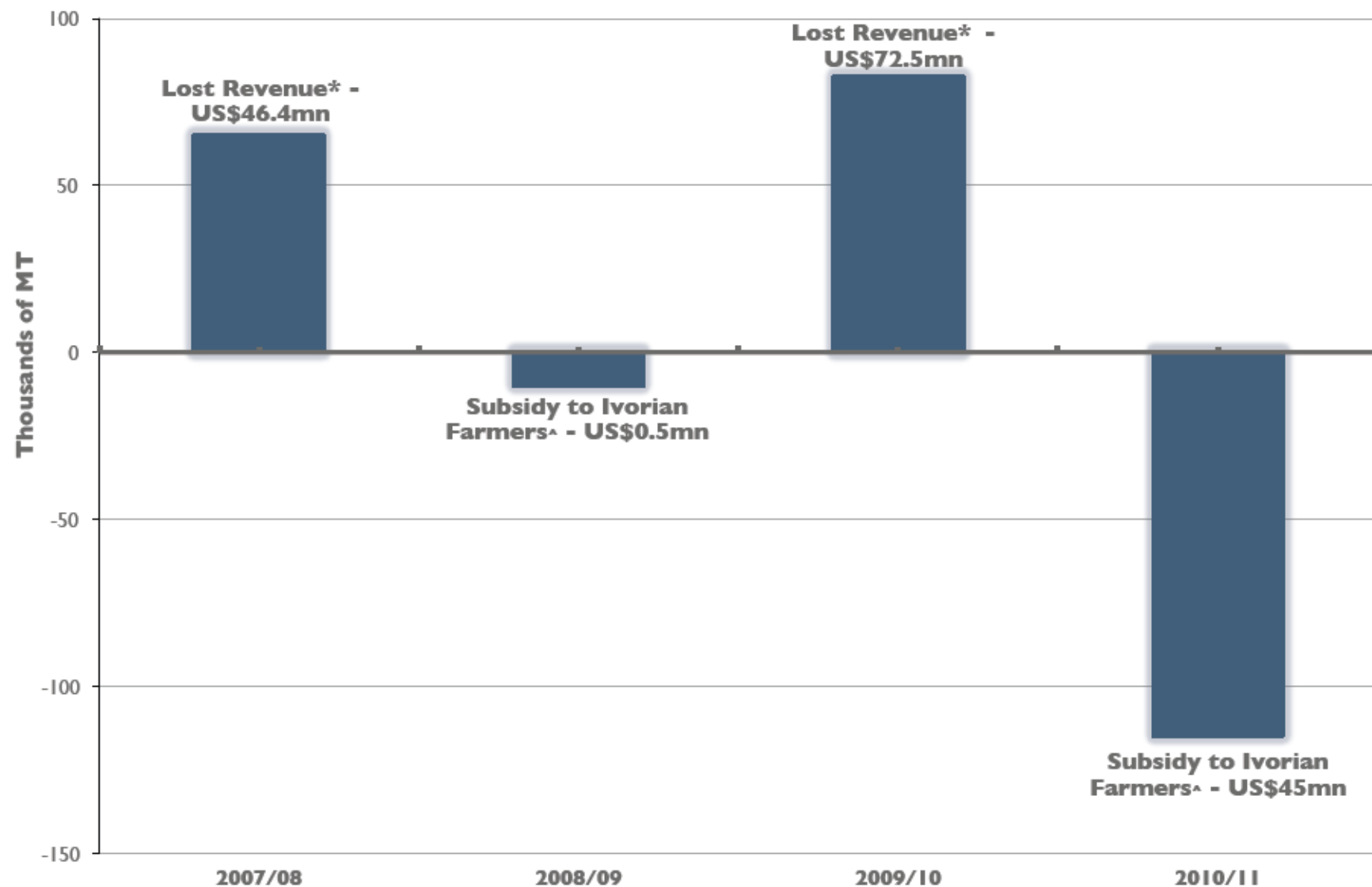
TABLE 4.6 - CSSVDU OUTBREAK ESTIMATES

Year	Outbreak Area (in Ha)	Crop Loss+ (in MT)	Price (US\$/MT)	Loss/Gain (in US\$)	Ex-gratia payments to farmers (in US\$)
2007	14,898	5,617	1,790	\$10,054,430	\$264,780
2008	40,849	15,400	2,104	\$32,401,600	\$527,480
2009	23,844	8,989	2,400	\$21,573,600	\$1,131,050
2010	20,452	7,710	2,702	\$20,832,420	N/A

SOURCE: Cocobod Annual Reports

+Loss assumes average production of 377 MT/ha, and 100% crop loss due to removal of trees.

FIGURE 4.15 – AVERAGE MARKET VALUE OF COCOA OUTFLOWS, 2007/08-2010/11



SOURCE: Industry Sources; Cocobod Annual Reports

* Calculated based on 29% of FOB price multiplied by estimated volumes smuggled (in MT). See Annex A1.

^ Calculated based on differential between Ghana farmer price and average CDI farmer price multiplied by volumes smuggled (in MT).

Expected Loss Ranking

Probability of Event		Negligible	Moderate	Considerable	Critical	Catastrophic
	Highly probable			Capsids Cocoa price risk	Black pod	
	Probable	Cocoa acreage loss Misappropriation of funds	Exchange rate Other pests, diseases, weeds, etc. Input price volatility Counterparty risk (i.e., Input supplier, farmer, LBCs) Logistics breakdown	Smuggling	Swollen shoot virus	
	Occasional	Interest rate	Dry spell Policy risk Market regulation risk			
	Remote		Bush fire Counterparty risk (i.e., CMC/buyers)			

Constraints

- Aging trees
- Aging farmers
- No credit at farmer level
- Limited availability of affordable inputs (i.e., chemicals and fertilizers)
- Limited availability of land
- Insufficient physical infrastructure
- Limited farm extension support
- Land tenure/share-cropping arrangements

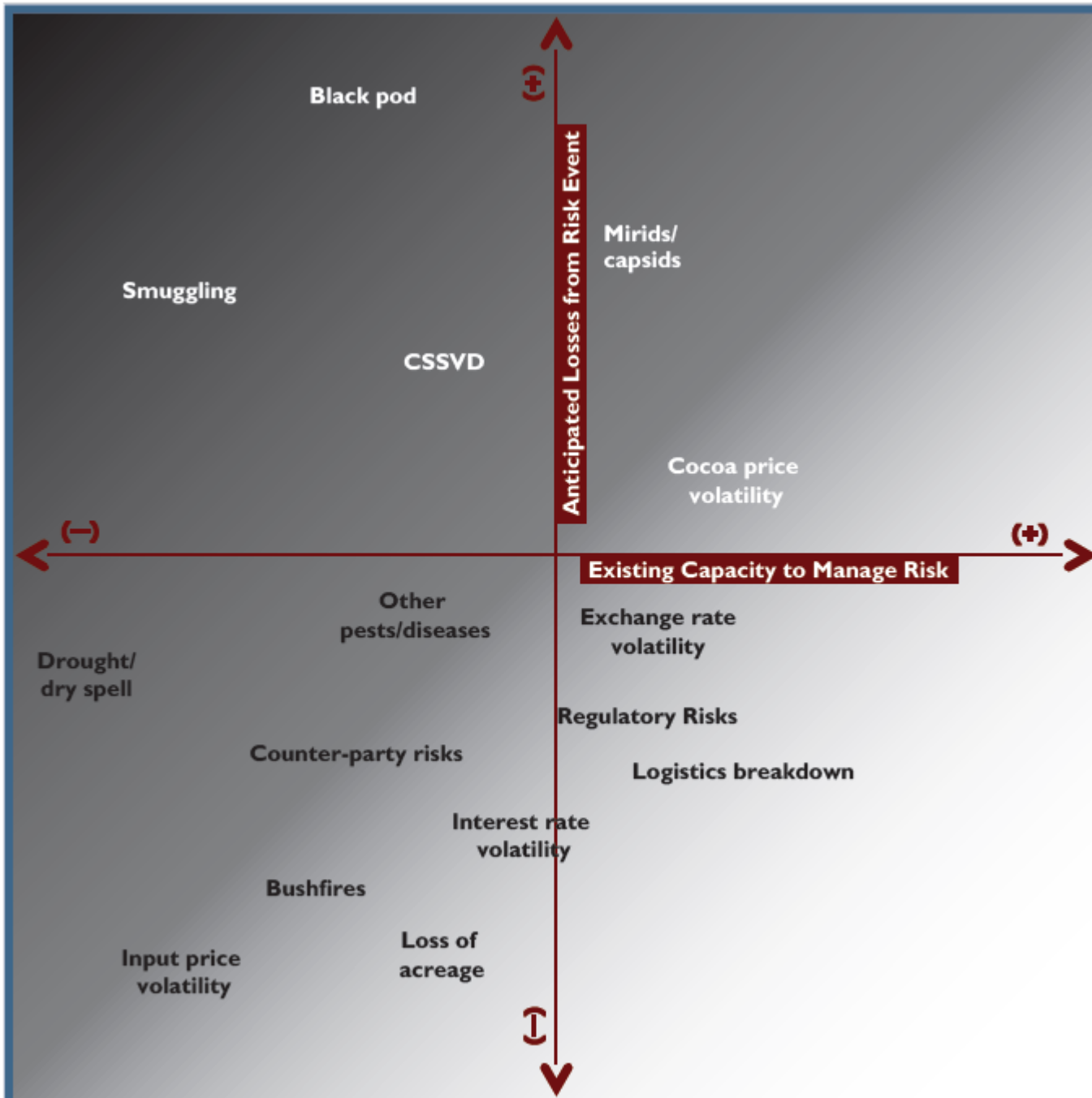
Potential Threats

- Invasive alien species (e.g. Frosty-pod, witches broom, cocoa pod borer, vascular streak dieback (VSD))
- Shipment rejection due to pesticide residue/mycotoxins
- Loss of ability to sell forward
- Dutch disease and appreciation of cedi
- Climate change





TABLE 5.1 - MEASURE OF RISK VULNERABILITY



Priority Measures for Risk Management

Identified Risks	Proposed Mitigation	Proposed Risk Transfer Tools	Proposed Risk Coping
Swollen shoot virus	<ul style="list-style-type: none"> • Better agronomic practices • Real time communication system for farmers to notify CCSVD about the outbreak • Collaborate with international / domestic commercial tracking teams • Make the current system of tree cutting and ex-gratia payment more transparent, credible, efficient, and timely. • Mass campaign / awareness building 		<ul style="list-style-type: none"> • Make the current system of tree cutting and ex-gratia payment more transparent, efficient. credible and timely
Black pod	<ul style="list-style-type: none"> • Better agronomic practices (e.g. especially reduction of tree heights, opening of canopy, better pruning) • Farm level rather than top-down decision making about fungicide application • Use private sector distribution channel for open sale of fungicide to improve availability • Strengthen their extension mechanism • Timely delivery of Not-for-Sale fungicide to farmers • More efficient spraying techniques 		<ul style="list-style-type: none"> • Better agronomic practices • Efficient application of fungicide and spraying techniques • Timely delivery of Not-for-Sale fungicide

Priority Measures for Risk Management

Identified Risks	Proposed Mitigation	Proposed Risk Transfer Tools	Proposed Risk Coping
Capsids	<ul style="list-style-type: none"> • Better agronomic practices • Strengthen the extension mechanism • More efficient spraying techniques • Availability approved compounds in open market • Approve a range of compounds in each chemical group for better resistance management and coping with changing regulations in consumer markets • Awareness campaigns (PPP) to promote use of approved products • More effective oversight and regulation enforcement of the existing products in the market 		<ul style="list-style-type: none"> • Better agronomic practices • Efficient application of fungicide and spraying techniques
Smuggling	<ul style="list-style-type: none"> • Inward : Use of options in anticipation of increased volumes in a falling a market • Acknowledge the problem and engage with Ivorian counterparts • Investment in smuggling control/ policing for inward volume flow • Outward : Improved investment for policing/ smuggling control • Dialogue with Ivorian counterparts 		<ul style="list-style-type: none"> •

Priority Measures for Risk Management

Identified Risks	Proposed Mitigation	Proposed Risk Transfer Tools	Proposed Risk Coping
Cocoa price volatility	<ul style="list-style-type: none">- More precise crop forecast (incorporating cross - border informal trade)- Increase share of specialty market- Increase share of forwards contracts	<ul style="list-style-type: none">- Explore the use of futures contracts to combat liquidity constraints- Explore the use of options to protect unsold crop	<ul style="list-style-type: none">- Professional management of existing COCOBOD's price stabilization fund

Next steps for risk management

- Discuss and share
- Build consensus
- Develop an implementation plan
- Coordinate and collaborate
- Generate and/or allocate resources
- Execute the plan