

Emergency Humanitarian Food Reserves

**Feasibility Study, Cost-Benefit Analysis
and Proposal for Pilot Programme**

14 September 2011

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List of Acronyms and Abbreviations

AFCR	African Food Crisis Task Force
AfDB	African Development Bank
AGRHYMET	Regional Training Centre for Agro-meteorology and Operational Hydrology
AERR	ASEAN Emergency Rice Reserve
AMIS	Agriculture Market Information System
ARC	African Risk Capacity
ASEAN	Association of South-East Asian Nations
AU	African Union
BOAD	West African Bank of Development
CAADP	Comprehensive Africa Agriculture Development Programme
CFSAM	Crop and Food Supply Assessment Mission
CILSS	Permanent Inter-State Committee for Drought Control in the Sahel
CSB	Corn-Soy Blend
CTCPSA	Food Security Policy Coordination Technical Committee (Mali)
EAERR	East Asia Emergency Rice Reserve
EBID	ECOWAS Bank of Investment and Development
ECOWAP	Economic Community of West African States' Agricultural Policy
ECOWAS	Economic Community of West African States
EFSR	Emergency Food Security Reserve (Ethiopia)
EU	European Union
FAO	Food and Agriculture Organisation
FPF	Forward Purchasing Facility
FEWSNET	Famine Early Warning Systems Network
GAO	General Accountability Office
GIEWS	Global Information and Early Warning System
HEWS	Humanitarian Early Warning Service
IDA	International Development Association
IFPRI	International Food Policy Research Institute
IMF	International Monetary Fund
IPC	Integrated Food Security Phase Classification
LDC	Least Developed Country
LIFDC	Low-Income Food Deficit Countries
M&E	Monitoring & Evaluation
MT	Metric Ton(s)
NEPAD	New Partnership for Africa's Development
NEXQ	Nonparametric Extreme Quantile Model
NGO	Non-Governmental Organisation
NOAA	National Ocean and Atmosphere Administration
OECD	Organisation for Economic Co-operation and Development
OPAM	Agricultural Products Office of Mali
PREGEC	Crisis Prevention and Management Network
PREPARE	Pre-Positioning for Predictable Access and Resilience
PRMC	Mali Programme for Restructuring the Cereal Market
RCF	Rapid Credit Facility
RESIMAO	West Africa Market Information Network (Réseau des Systèmes d'Information des Marchés en Afrique de l'Ouest)

RESOGEST	Stocks Offices Management Network
ROPPA	Farmers and Producers Organizations Network
SAARC	South Asian Association for Regional Cooperation
SADC	Southern African Development Community
SCF	Standby Credit Facility
SDR	Special Drawing Rights
SWAC	Sahel and West Africa Club
UAE	United Arab Emirates
UEMOA	West African Economic and Monetary Union
UN	United Nations
USAID	United States Agency for International Development
USGS	United States Geological Survey
VAM	Vulnerability Analysis and Mapping
WFP	World Food Programme
WTO	World Trade Organisation

I. Executive Summary

This feasibility study, cost-benefit analysis and proposal for a pilot programme for small, targeted emergency humanitarian food reserves in the ECOWAS region of West Africa responds to the request of G20 Agriculture Ministers. Developed through a collaborative process that involved national governments, regional organisations and interested bilateral development partners, it sets out detailed recommendations for the operation, financing and management of a five-year pilot Pre-Positioning for Predictable Access and Resilience (PREPARE) system.

During food crises caused by high and volatile food prices and other shocks, the proposed pilot PREPARE system would give poor food deficit countries rapid access to sufficient physical food for distribution through schemes of targeted assistance, such as safety nets. It would strengthen systems of national and regional resilience, addressing a specific challenge to existing response mechanisms, providing a critical additional line of defence and saving lives in emergencies. The system could be implemented at an estimated initial cost of \$44.3 million and annual recurring costs of \$16.6 million.

The proposed pilot responds to the expressed needs of ECOWAS and its Member States. Under the strong leadership and ownership of ECOWAS and in partnership with bilateral development partners and international organisations, it would:

- Complement and integrate national, regional, continental and global food security mechanisms, strengthening synergies with ongoing initiatives,
- Operate with the active participation of the countries and region concerned, taking into account the aid effectiveness principles,
- Optimise existing instruments and strengthen coherence between national, regional, continental and global mechanisms,
- Build national and regional capacity to manage food stocks and to design and deploy effective safety net systems,
- Prioritise local and regional procurement of food to replenish the reserve, contributing to the goals of national and regional agricultural policies, and
- Benefit from lessons learned and experience gained through other initiatives promoted by the G20.

Consistent with these principles, the feasibility study, cost-benefit analysis and pilot proposal outlines and assesses the feasibility of the major design features of a PREPARE system that would:

- Involve the direct participation of a limited group of low-income food deficit and least developed countries in West Africa,¹ while promoting solidarity and engaging and benefitting the wider region.
- Make maize, millet, sorghum and rice sufficient to meet up to 90 days of projected needs for the most vulnerable available to participating countries through a small physical stock of 67,000 MT and a portfolio of virtual procurement tools.
- Prioritise procurement of food on local and regional markets whenever possible and hold stocks at sites in Burkina Faso, Ghana, Mali and Senegal selected based on their proximity to major trade routes and considering local food preferences and synergies with existing regional initiatives.
- Sell or lend food to participating countries when clear, transparent and pre-determined trigger criteria have been met. The trigger criteria are linked to early warning systems and objective measures of national need and extreme price volatility.
- Release food from the reserve for distribution through national safety net programmes, based on plans and schedules prepared by national governments in partnership with civil society, bilateral development partners and international organisations.
- Operate under a streamlined and transparent public governance structure, leveraging existing regional institutions wherever possible. An Executive Board chaired by the President of the ECOWAS Commission would provide overall policy guidance, strategic coordination and operational and financial oversight.
- Meet the estimated initial and recurring costs of the system through appropriate burden sharing by all interested stakeholders. Resources and other assistance could come from regional organisations, participating countries, bilateral development partners and multilateral and regional development banks.

A detailed cost-benefit analysis finds that the proposed pilot PREPARE system is a cost-effective and efficient solution that demonstrates clear advantages and value-added in terms of cost, speed, availability and sustainability over other potential alternative instruments, including expanding the current system of community granaries or national reserves, establishing a regional cash reserve facility or providing emergency food aid.

Operational rules and procedures of the proposed pilot PREPARE system would be elaborated further during the implementation phase.

¹ Target countries are Benin, Burkina Faso, The Gambia, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Senegal, Sierra Leone and Togo.

II. Introduction

This document responds to the request of the G20 Agriculture Ministers for a feasibility study, cost-benefit analysis and proposal for a pilot programme for a small, targeted regional emergency humanitarian food reserve. It proposes and assesses the feasibility and cost-effectiveness of a five-year pilot Pre-Positioning for Predictable Access and Resilience (PREPARE) system in West Africa.

During food crises caused by high and extremely volatile food prices and other shocks, a PREPARE system organised and operated with the active participation and ownership of the Economic Community of West African States (ECOWAS) and its participating Member States could give poor food deficit countries in West Africa rapid access to sufficient physical food for distribution to their most vulnerable populations through schemes of targeted food assistance, such as safety nets.

By aggregating buying power and capitalising on economies of scale to procure food at market prices on local, regional and global markets, the proposed pilot PREPARE system could help to address food access challenges vulnerable countries can face during periods of high and volatile food prices and other shocks. It could save lives, time and resources in emergencies and deliver clear advantages and strong value added over other instruments by buying time between the emergence of supply gaps and acute hunger and malnutrition, better enabling participating countries to provide temporary support to the most vulnerable through safety nets, and building national capacity to manage food reserves and develop, deploy and manage safety net systems, complementing existing programmes.

The proposed system would respond to the expressed needs of ECOWAS and its Member States and operate with their active participation, ownership and partnership. Developed with strong support and critical contributions from regional organisations, including ECOWAS, the Permanent Inter-State Committee for Drought Control in the Sahel (CILSS) and the West African Economic and Monetary Union (UEMOA), the PREPARE system would complement and strengthen synergies with national food reserves and ongoing regional initiatives. ECOWAS and its Member States have prioritised assistance to develop a regional food reserve in their regional and national food security plans and have established the Stocks Offices Management Network (RESOGEST), a network of companies and offices responsible for inventory management of food security in the Sahel and West Africa.

PREPARE would satisfy the criteria in Annex 2 to the World Trade Organisation (WTO) Agreement on Agriculture and operate in a clear and transparent manner according to objective, arms-length trigger criteria. Unlike large-scale buffer stocks that attempt to offset price movements and act as universal subsidies, the proposed system would operate on a cost recovery basis according to market principles and sound business management practices. It would not fill commercial gaps or release stocks for the purpose of altering market prices.

This feasibility study, cost-benefit analysis and proposal for a PREPARE pilot was developed through a collaborative process guided by the G20 Agriculture Ministerial Declaration and *Action Plan on Food Price Volatility and Agriculture*. The process involved a wide array of stakeholders. The study, analysis and proposal were developed with advice from the private sector and civil society organisations and with the support of a Working Group that includes representatives of the countries and organisations identified in the box at the right. It benefitted from consideration at a 12-13 September High-Level Stakeholder Workshop hosted by the World Food Programme (WFP). The workshop brought together senior officials from West African national governments, regional organizations (ECOWAS, UEMOA and CILSS), multilateral development banks and others to discuss financing and implementation of the proposed pilot. It confirmed the strong and coordinated ownership of this initiative by ECOWAS.

Working Group Membership		
The Working Group includes representatives of the following countries and organisations:		
Australia	Brazil	Canada
European Union	France	Germany
Indonesia	Italy	Korea
Japan	Russia	South Africa
Spain	Turkey	UAE
United Kingdom	United States	
African Union	CILSS	ECOWAS
NEPAD	UEMOA	
FAO	IFPRI	OECD
WFP	World Bank	

The following sections provide: an explanation of the **challenge** of high and volatile food prices for West Africa that a PREPARE pilot could address (Section III); a description of the **context** for a food reserve in West Africa, including complementarity with ongoing work by ECOWAS and its Member States on national and regional food reserves, lessons learned based on existing reserves and major advantages and risks (Section IV); an **overview** of the proposed PREPARE system and why it is the most appropriate and cost-effective option (Section V); an explanation of the system’s **design** and assessment of its **feasibility** (Section VI); an **implementation timeline** with major milestones (Section VII); and a detailed **cost-benefit analysis** (Section VIII).

III. The Challenge

In West Africa and elsewhere across the developing world, high and volatile food prices are adding to the ranks of the hungry and limiting the ability of poor food-deficit countries with little resilience to external shocks to quickly secure a predictable supply of sufficient food to respond to the humanitarian needs of their most vulnerable populations, including through safety net programmes. A combination of high and volatile prices and tight supplies triggered catastrophic food shortfalls for resilience mechanisms during the 2008 food crisis, exposing critical weaknesses in global and national food security structures. The risk of extreme price volatility and higher real prices is likely to persist into the future.

1. Risk and Volatility

Most agricultural commodity markets are characterised by a certain amount of volatility. The production of many cereals depends on a single annual harvest, making supply highly inelastic in the short run and vulnerable to even small shocks. Staples

such as maize and rice are thinly traded on a global scale,² limiting new supply flows to markets in response to post-harvest price changes (Headey and Fan, 2010, pg. 10).

However, the period since 2006 has been characterised by extraordinary food price volatility and high food prices. Recent food price spikes and volatility have been widely studied and a long list of causal factors identified, including falling global stocks, population growth, increased fuel and fertiliser prices, the changing consumption patterns of the developing world's emerging middle class, diversion of food to biofuels, climate change, long-term underinvestment in agriculture and the "financialisation" of agriculture markets (Baffes and Haniotis, 2010, pg. 3-5).

High and volatile prices, driven in part by falling stocks, have contributed to a significant increase in food insecurity worldwide and pushed the number of hungry people on the planet to more than one billion (Demeke et al., 2011, pg. 556). Between March 2007 and March 2008, global food prices increased an average of 43 percent, according to the International Monetary Fund (IMF). During that same period, maize prices increased by 41 percent (United States Agency for International Development [USAID], 2009). Rice prices doubled within the first five months of 2008 (Baffes and Haniotis, 2010, pg. 2). In 2008 more than 60 food riots occurred worldwide in 30 different countries (Lagi et al, 2011 pg. 4).

This year, reduced cereal stocks are once again driving prices higher, spreading hunger and under-nutrition among the most vulnerable and challenging the capacity of nations and humanitarian agencies to quickly access a sufficient supply of food for relief mechanisms. Although prices began to fall sharply in the second half of 2008 as global cereal stocks improved, market tensions re-emerged in 2010 and food prices again rose sharply. By early 2011, the United Nations (UN) Food and Agriculture Organisation (FAO) food price index was again at the level reached at the peak of the crisis in 2008, which coincided with large scale social unrest in several middle-east and north african countries. Recent research on the link between food prices and political instability suggest that social unrest of the kind witnessed in 2011 does not arise from long-standing failings of political systems, but rather from sudden perceived failures of such systems to provide essential food security to the population (Lagi et al, 2011 pg. 2).

Tight supplies, higher real prices and risk of increased volatility are likely to persist into the future. Global cereal utilization could reach record levels in 2011, according to FAO's World Food Situation Update (FAO, July 2011). At the same time, major coarse grain exporters' stock-to-disappearance ratio is forecast to plunge to a 30-year low of just eight percent, and cereal production is set to decline for the second year in a row (FAO, June 2011, pg. 19).

2. Impact on West Africa

High and volatile prices have had a devastating impact on West Africa, which already is one of the poorest regions in the world and relies heavily on imports of rice and other commodities to meet food needs. Overall, approximately 20 percent of West Africa's food needs are now met by imported rice and other cereals.

² Roughly 12 percent of world maize production and six percent of rice production is exported annually.

In many countries across the region, families spend up to three-quarters of their income on basic food commodities (Demeke et al., 2011, pg. 11). Poor urban populations are particularly vulnerable to rapid price increases. High prices increased acute under-nutrition in countries across the region by eroding purchasing power of net food purchasers and forcing vulnerable households to sell productive assets, cut meals and reduce their caloric intake (Oxfam, 2008, pg. 3; Mousseau, 2011, pg. 19-20). High prices and food shortages sparked unrest in capitals across West Africa, with large-scale riots in Burkina Faso, Guinea, Senegal and elsewhere (Aker et al., 2011, pg. 11).

High and volatile prices have affected coastal and interior countries alike. Coastal countries like The Gambia, Guinea, Guinea-Bissau, Liberia, Senegal and Sierra Leone depend more on imported rice and other commodities to meet basic food needs and are highly vulnerable to food price shocks. Their landlocked neighbours, including Burkina Faso, Mali and Niger, rely more on regional trade and consume a greater proportion of coarse grains like millet, maize and sorghum.

However, both groups rely directly or indirectly on international trade to help assure food security (Staatz et al., 2008, pg. 2). Regional supply is no longer determined only by domestic production, but to a large extent by trade flows (Mousseau, 2011, pg. 15). When the regional market is functioning well, it can greatly improve food security. In 2010, for example, a bumper crop in Benin helped ensure food was available at affordable prices in Niger despite a poor harvest (Mousseau, 2011, pg. 19). Nigeria plays a particularly significant regional role in production and trade.

High and volatile import prices can also drive up the cost of local staples. A 2011 report by the Centre for Global Development found rising rice prices in 2008 were positively correlated with higher local rice and millet costs in multiple West African countries. As import prices climbed, consumers shifted to millet and other alternatives, driving up the cost of those commodities. Maize also saw rapid increases on both global and local markets in 2008. Between January and February, Burkina Faso saw a 44-percent increase in the price of maize, one of its main staples (Ouattara and Sandstrom, 2010, pg. 20). At the same time, rapidly increasing oil and fertilizer prices also put upward pressure on local and international food prices by raising transportation and input costs through the supply chain.

While some West African countries are seeing strong gains in crop production, the region's reliance on imported food is likely to continue to grow as demographic changes add pressure on regional supplies. Regional rice imports already have grown to 5.2 million metric tons (MT) annually from just 1.7 million in the early 1990s (CILSS, et al, 2011, pg. 1), and West Africa's population is expected to rise from 318 million today to more than 400 million by 2020 (Mousseau, 2011, pg. 15).

Conflicts, pest infestations and increasing weather-related shocks often exacerbate challenges associated with high and volatile prices – escalating food import needs and creating dangerous gaps in commodity pipelines that can threaten national and regional stability and undermine trust in market-mediated food security. West Africa regularly experiences irregular rainfall, drought, flooding and other weather-related challenges as well as periodic locust invasions that devastate crops throughout the Sahel.

3. Limiting Access to Food for the Most Vulnerable

As lower-volume buyers with weak infrastructure located in difficult regions of the world, poor food-deficit countries face higher transportation costs and stiff competition for limited global supplies even in the best of times (Murphy, 2010, pg. 4-6). But during periods of high and volatile food prices when needs are often greatest, these countries are sometimes unable to secure predictable access to sufficient food to respond rapidly to the humanitarian needs of their most vulnerable population groups, including through safety net programmes. Based on available evidence from the 2008 food price crisis and interviews with current and former West African government officials and grain traders in Europe and North America, this is the result of a combination of factors.

In 2007 and 2008, export bans imposed by a number of West African countries eliminated traditional sources of supply for certain commodities and drove neighbouring countries onto global markets, where supplies were also limited due to low stocks and export bans imposed by some major producing nations (CILSS, et al., June, 2011, pg. 6-7). As the *Financial Times* put it at the time, “the price of food is often not the prime concern. Instead, the curb on agricultural exports... raised the spectre of importers not being able to lay their hands on produce at all” (*Financial Times*, 2008).

On global markets, poor food-deficit countries in West Africa faced very high prices as the small number of traders serving the region sought to capitalise on strong demand and scarce supplies. Traders typically seek to price commodities based on the market availability and the perceived need of the customer (Mousseau, 2006, pg 22), but price increases in remote regions can be significant. For example, the ongoing famine in the Horn of Africa has driven maize prices in Kenya to levels that are 60 to 70 percent above the world average (Hildebrand, 2011).

Poor countries faced even higher prices on world markets because of limited competition to supply their needs, weak direct relationships with major exporters and information asymmetry. The majority of grain imports to the ECOWAS region are arranged through a handful of trading firms that are able to charge higher prices because of weak competition, poor transparency and superior market knowledge. In many cases, the purchasing country only deals with one or two middlemen and lacks the capacity to collect up-to-date market information or the expertise to adopt more advanced trading techniques.

As prices rose, poor countries also faced greater risk premiums that further limited purchasing power and in some cases prevented sales. During 2007 and 2008, premiums charged for currency, payment, logistics or political risks may have added as much as 33.5 percentage points to the cost of food that landlocked African countries paid relative to their coastal neighbours (Headey and Fan, 2010, pg. 66). Traders use risk premiums just as banks use credit ratings. During the global financial crisis, banks tightened credit availability and raised risk premiums for their average clients. Those considered “sub-prime” were not extended credit at all. According to one grain trader, “the only difference between the two is that the global grain trade is far less transparent than credit markets... Countries with the highest risk premiums are simply removed from vendors’ lists in favour of more reliable clients that enjoy longer-term relationships.”

Several West African countries sought to accumulate food stocks for the purpose of assisting the most vulnerable and needy (CILSS, et. al, June 2011, pg 11) during the 2008 food price crisis. However, they were at times unable to secure predictable access to food supplies on global markets for their most vulnerable populations. And when they were, very high prices often meant they bought less, further limiting their purchasing power, raising unit costs and making it more difficult to secure shipping. These concerns only added to delays typically associated with executing a global tender and securing delivery of food, which can take between two and four months depending on the country.

4. Existing Risk Mitigation Measures

In the face of these challenges, West African countries have taken a variety of measures to improve food security for their most vulnerable populations. Some of these measures represent essential longer-term initiatives. But risk mitigation measures taken in the midst of a large crisis or that are vulnerable themselves to periods of high and volatile prices and other shocks are not always able to adequately address urgent needs.

For example, many ECOWAS Member States responded to supply disruptions related to high and volatile food prices by cutting tariffs and taxes on imported cereals. The threat of food riots and increasing social instability added further incentive to support these policies, which tended to favour urban dwellers. In the past, such measures successfully buffered consumers from international market price fluctuations. However, the dramatic surge in international prices during 2007/2008 undermined the potential benefits of tariff and tax cuts – costing governments dearly and offering little relief to consumers. Prices rose far higher than any savings from lower tariffs and traders had few incentives to pass the benefits of cuts along to markets (Aker et al., 2011, pg. 19-21).

In recent years, ECOWAS and its Member States also have rightly prioritised food security and agricultural production within their regional and national planning. Increasing agricultural production and productivity is a critical longer-term objective, and the region is already beginning to realise important gains in farm production, including for maize and rice. However, periods of food price volatility can frustrate production gains and deter producers from making necessary investments to increase productivity. Volatility causes large income fluctuations and underinvestment that small farmers typically have little ability to hedge through savings or insurance.

Short-term measures to address the impact of high and volatile food prices and other shocks could help to create the conditions necessary to secure longer-term gains.

IV. The Context

The proposed pilot PREPARE system would address the challenges outlined in Section III. It would respond to the expressed needs of ECOWAS and its Member States and complement existing instruments and mechanisms. By building on lessons learned, it would provide clear advantages to a wide array of stakeholders and mitigate major risks traditionally associated with food reserves.

1. Responding to Expressed Needs

Piloting a targeted emergency humanitarian food reserve system in West Africa would respond to the expressed needs of ECOWAS and its Member States, while complementing and strengthening synergies with ongoing national and regional initiatives.

As part of a broader vision for agricultural development and food security, ECOWAS and its Member States have prioritised assistance for the development of reserves and promoting safety nets for vulnerable populations in their regional and national food security plans. ECOWAS is the only regional economic community in Africa that has prepared a regional agriculture and food security compact and investment plan under the Comprehensive Africa Agriculture Development Programme (CAADP). The compact calls for “a regulatory framework that will encourage the development of ... a regional system ... of food security stocks.” The investment plan seeks establishment of a regional food security stock, as well as support to Member States to establish or strengthen policies on food security stocks. Several ECOWAS Member States that do not already have national food reserves have requested assistance to establish such systems in their national CAADP investment plans, including The Gambia, Guinea, Liberia and Sierra Leone.

The priority that ECOWAS and its Member States place on a regional food reserve is based on extensive study. Following the 2003 African Union (AU) Summit in Maputo, Mozambique, where Member States from West Africa and elsewhere across the continent resolved to “ensure the establishment of regional food reserve systems, including food stocks, linked to Africa’s own production,” ECOWAS initiated research on the possibility of establishing a food reserve and options for putting such a system in place. Work on the design and feasibility of a regional reserve continues in partnership with UEMOA, CILSS and other regional organisations. A constitution for RESOGEST was adopted during a meeting of experts in Dakar in February 2010. Regional cooperation on food stocks was a key topic at the December 2010 Sahel and West Africa Club (SWAC) Forum in Accra, which brought together key stakeholders to facilitate the establishment of a regional food stock in West Africa.

ECOWAS’ interest in a regional food reserve is grounded in a well-coordinated regional agriculture policy. At their January 2005 meeting in Accra, West African Heads of State adopted the Economic Community of West African States’ Agricultural Policy (ECOWAP) as a single, unified framework for planning and intervention in the agriculture sector. Major objectives of ECOWAP are to “reduce dependency in a perspective of food sovereignty” and to “reduce vulnerability of West African economies by limiting factors that lead to regional instability and insecurity.” The regional agricultural policy also calls for coordination in the establishment of food stocks and a regional fund to support those stocks. To carry forward this policy, ECOWAS has established mechanisms for institutional coordination and financing, including a Regional Technical Agency for Agriculture and a Regional Fund for Agriculture and Food. A Network for Prevention and Management of Food Crises (CSPN) provides a platform for dialogue between regional stakeholders and international partners.

Through implementation of ECOWAP and CAADP, the region is also increasingly considering the role that safety net programmes can play in addressing hunger and malnutrition. It is mobilising programmes to reduce food vulnerability and promote sustainable access to food, including safety nets for at risk populations. During the food price crisis of 2008, ECOWAS initiated a Regional Offensive for Food Production and Against Hunger to mitigate the effects of rising prices on food security. Among other things, that Offensive focused on establishing safety nets and other measures to strengthen the food and nutritional security of vulnerable communities (Joint Initiative of the European Union [EU] and ECOWAS, 2008).

2. Complementing and Optimising Existing Mechanisms

The proposed pilot PREPARE system would complement and strengthen synergies with ongoing national and regional initiatives, including existing food reserves. It could connect the skills, capabilities and resources of a wide array of stakeholders, optimising and strengthening the contribution of existing mechanisms to local, national and regional food security.

2.1. Complementing existing mechanisms

The proposed pilot PREPARE system would complement and strengthen existing food security mechanisms and structures in West Africa, including local, national and emerging regional food reserves. By ensuring predictable and rapid access to food during periods of high and volatile food prices when other mechanisms may prove insufficient, it would provide a critical additional line of defence and contribute to the implementation of comprehensive and integrated national and regional food storage strategies for the prevention and management of food crises.

Food reserves play a critical role in approaches by ECOWAS and its Member States to food crisis prevention and management. During weather and pest-related disasters that are confined to a single country and limited in magnitude, national food reserves play an important part in ensuring poor and vulnerable households have access to sufficient food. They have proven particularly valuable in the Sahel region, where varying agricultural output means food surplus areas coexist with deficit areas practically every year. Countries in the Sahel region with emergency food stocks (Burkina Faso, Mali and Niger) regularly use those stocks to respond to shortfalls following natural disasters and other shocks.

However, some West African countries do not have national reserves (Benin, The Gambia, Guinea, Guinea-Bissau, Liberia, Senegal, Sierra Leone and Togo), and food crises caused by natural and pest-related disasters can prove more severe than domestic structures can manage alone. To address these situations and to strengthen regional solidarity in the management of food crises, West African governments are constituting a regional system to share national stocks. Under the leadership of CILSS, they have formed the RESOGEST network of food stocks boards. Through this network, countries with national reserves would contribute five percent of their domestic stocks to a regional system.

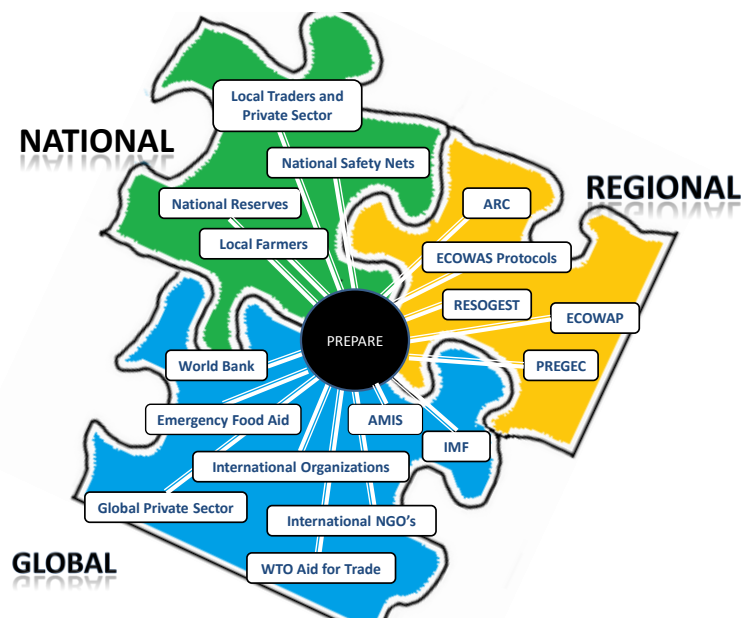
National food reserves and regional stock sharing systems can respond well to natural and pest-related disasters that are confined to a single country or to a small group of countries. However, they may prove insufficient in addressing covariate shocks such as high and volatile food prices, particularly where such shocks are frequent, severe or occur in combination with natural and pest-related disasters. Food price shocks can overwhelm the capacity of national reserves and make it very difficult to replenish stocks. As recent experience with export bans has shown, they can also challenge regional solidarity and the ability of countries to share stocks.

The proposed pilot PREPARE system would complement national and emerging regional food reserve systems in West Africa by ensuring predictable and rapid access to food during periods of high and volatile food prices when existing national or emerging regional tools are not sufficient or do not respond as expected. It would fill a critical gap, helping to meet the essential food needs of vulnerable populations while strengthening and reinforcing regional solidarity.

2.2. Optimising existing instruments

As illustrated at Figure 1 below, the proposed pilot PREPARE system would connect the capabilities and programmes of a wide array of stakeholders at the national, regional and global level – optimising and adding value to existing instruments and benefitting from other initiatives promoted by the G20.

Figure 1: Connecting National, Regional and Global Stakeholders



2.2.1. National level

The proposed pilot PREPARE system would complement national initiatives to boost agricultural production, promote safety nets and further strengthen the operation of food reserves, while better enabling the system to stock, replenish and distribute food. For example, it could connect and contribute to:

- Emerging **national contingency plans** for food crisis prevention and management. ECOWAS Member States are working to strengthen food crisis prevention and management through the development of new institutions and mechanisms, including information and early warning systems, vulnerability analysis, and consultation and coordination mechanisms. Contingency plans already include national food reserves, and the proposed pilot PREPARE system could be a critical complement to existing tools.
- **National agriculture and food security plans** aimed at boosting agricultural productivity. Through NEPAD and national CAADP investment plans, ECOWAS Member States have committed to comprehensive agricultural reform and to increasing public investment in agriculture by at least ten percent, with a view to achieving an average annual growth rate of six percent in agriculture by 2015. By procuring food locally and regionally, the proposed pilot PREPARE system could contribute to the goals of national agriculture and food security plans – helping to stimulate agricultural production and strengthen local markets.
- Existing **national safety net programmes**. Countries throughout West Africa are promoting safety nets to address structural vulnerability in rural and urban areas. Safety net programmes already in place can provide a foundation for effective systems to distribute food from a pilot PREPARE system during periods of high and volatile prices. Participation in a pilot system could also help countries develop and deploy strong national safety net systems with the support and expertise of international partners.
- **National food reserves** in Burkina Faso, Mali, Niger and Nigeria. As one means of securing access to virtual stocks, the proposed pilot PREPARE system would seek to secure drawdown agreements on a portion of national food reserves in target countries and in the wider region. It would work to develop national and regional capacity to manage food reserves and promote transparency of national stockholding. Providing drawdown agreements on national stocks could give reserve managers an additional option to rotate food, helping to lower the cost and strengthen the efficient operation of national systems.

2.2.2. Regional level

At the regional level, the proposed pilot PREPARE system could complement and strengthen initiatives to boost agricultural trade, promote regional integration and cooperation on food security, mobilise early warning systems, promote regional institutions and build resilience. These programmes could be leveraged to support the free movement of food assistance, information systems, and procurement. For example, the proposed pilot could connect to and complement:

- **ECOWAS protocols**. Existing ECOWAS protocols on trade liberalisation and the free movement of goods would form part of the essential legal foundation necessary to ensure timely transportation of food to and from the proposed pilot PREPARE system. Participants in the system would commit to certain steps necessary to ensure the smooth flow of food to and from the reserve. These steps

would be consistent with the protocols, helping to strengthen and advance ongoing regional integration initiatives.

- **ECOWAS Agricultural Policy (ECOWAP).** The ECOWAP provides a strong policy foundation for the operation of the proposed pilot PREPARE system and an essential framework for regional cooperation. The proposed pilot reflects and reinforces many key ECOWAP goals. Among other things, it could help further facilitate trade, promote safety nets and strengthen local and regional agricultural production.
- **Regional early warning systems.** Under the leadership of CILSS, West African governments and partner organisations have established a regional Crisis Prevention and Management Network (PREGEC) that can harmonise and strengthen existing national and regional food security information and monitoring systems. While work is still ongoing, PREGEC has already successfully developed a harmonized framework for the identification and analysis of areas of risk and of vulnerable groups within the region. By considering PREGEC as a country-level trigger mechanism once it is operational, the proposed pilot PREPARE system could bring further momentum to this valuable regionally owned and led project.
- **RESOGEST.** Advanced work on the RESOGEST system of regional stock sharing provides a strong foundation for drawdown agreements on national reserves that would form part of the proposed pilot PREPARE system's portfolio of virtual procurement options. By offering participating countries certainty of supply during periods of high and volatile food prices and other shocks, PREPARE could also give national governments the confidence to share stocks knowing additional food is available if needed.
- **African Risk Capacity (ARC) Disaster Risk Pool.** The AU is working to develop a pan-African disaster risk pool called African Risk Capacity (ARC), which would make financial resources available to participating Member States in the event of a severe drought. ARC could be operational as early as September 2012, with an initial capital base of USD \$300 million. The proposed pilot PREPARE system would complement ARC during times of extreme food price volatility. While ARC would provide reliable financing for countries facing a drought, PREPARE could give many of the same countries the certainty that they would be able to procure physical food during periods of high and volatile food prices.

2.2.3. Global level

At the global level, the proposed pilot PREPARE system could connect the skills, capabilities and resources of a wide range of programmes maintained by international organisations, international financial institutions and multilateral development banks, including initiatives spearheaded by the G20. These programmes could be leveraged to support procurement, information systems, the free movement of food assistance, safety net systems and financing. For example, a pilot PREPARE system could connect to and complement:

- **IMF facilities** that can help countries cover the cost of procuring food from the reserve, when necessary. The IMF Rapid Credit Facility (RCF) provides rapid concessional financial assistance to low-income countries facing urgent balance of payments needs, without the need for program-based conditionality. It can provide flexible support in a wide variety of circumstances, including shocks, natural disasters, and emergencies resulting from fragility. Similarly, The Standby Credit Facility (SCF) provides financial assistance to low-income countries with short-term balance of payments needs and can be used on a precautionary basis. The proposed pilot PREPARE system could complement the RCF and SCF during times of extreme food price volatility by giving participating countries that choose to access these facilities the certainty that they will be able to use resources to procure physical food.
- **WFP food procurement tools and expertise.** WFP could lend valuable expertise to a pilot PREPARE system based on its experience with initiatives designed to improve the operational effectiveness, efficiency and timeliness of food aid, such as the Forward Purchasing Facility (FPF). The FPF aims to speed up deliveries of food to beneficiaries and exploit favourable market conditions – both objectives the proposed pilot PREPARE system would also seek to achieve. The FPF could also make WFP a more predictable partner in the rotation of PREPARE stocks with food assistance organisations, by giving the agency greater flexibility to plan food assistance purchases.
- **Agricultural Market Information System (AMIS).** An initiative supported by the G20 and led by FAO, AMIS seeks to strengthen confidence in markets and provide a more level playing field for poor countries by improving collaboration and dialogue among major food producing, exporting and importing countries, commercial enterprises and international organizations. It will disseminate timely, reliable, high-quality and comparable food market information. Once operational, AMIS could help to provide vital information for the management of regional stocks and eventually could provide complementary indicators for the assessment of shocks that can trigger release of food from a PREPARE reserve.
- **WTO Aid for Trade.** Launched in December 2005 at the WTO Hong Kong Ministerial Conference, Aid for Trade aims to help developing countries build the trade-related skills and infrastructure necessary to implement and benefit from WTO agreements. One of the current objectives of the Aid for Trade work program is to reinforce regional integration. The proposed pilot PREPARE system may offer a strategic investment opportunity for Aid for Trade, and Aid for Trade could be leveraged to support the development of rules and procedures designed to ensure the free movement of food to and from PREPARE warehouses.
- **World Bank International Development Association (IDA).** Participating countries could access resources to cover certain initial and recurring costs associated with the proposed pilot PREPARE system through the World Bank's regional IDA programme, providing a potential new investment opportunity for these resources. Funds managed by the World Bank could also be leveraged to further support the capacity of participating countries to develop and deploy

national safety net systems. Over the last decade, the Bank has significantly increased global funding for social safety nets and has financed several West African countries, including Burkina Faso, Liberia, Niger, Senegal and Sierra Leone.

3. Benefitting from Lessons Learned

The proposed pilot PREPARE system reflects lessons learned from existing national and regional food reserve systems in Africa and Asia, and specifically food reserves operating in Burkina Faso, Ethiopia, Mali and Niger, as well as the East Asia Emergency Rice Reserve (EAERR). An analysis of these lessons learned finds that well-functioning reserves:

- **Are limited in size.** Large reserves are expensive to operate and increase the risk that food releases will crowd out private stocks and depress market prices. Indeed, a January 2011 study by the International Food Policy Research Institute (IFPRI) found that a plan to more than triple the size of a national food reserve in East Africa could increase the price-depressing effects of releases through safety net programmes from as little as 1.48 percent to more than 37 percent, depending on the frequency of food distribution and the elasticity of prices. Moreover, a large reserve may be unnecessary to meet anticipated needs, given improvements in trade and transportation infrastructure and considering past experience. For example, reserves can sometimes overestimate how much grain is actually needed in an emergency by assuming people facing hunger eat the same way they do during normal times. In fact, they tend to eat less and to eat different foods that are cheaper. If the price of rice goes up, for example, other foods, such as cassava, are likely to make up some of the shortfall (Murphy, 2009, pg. 8). In West Africa, past experience with the utilisation of food security stocks has also shown that relatively small quantities are actually withdrawn from national reserve in times of acknowledged food emergencies. At least before 2004, the maximum quantity drawn down was in Burkina Faso in 2003, and that amounted to just 12,050 MT (WFP and NEPAD), March/April 2004, pg. 37). By making full use of modern information and communications technology, early warning systems and procurement tools, the proposed PREPARE pilot system would hold a very limited supply of physical food (an amount equivalent to just 17 percent of Ethiopia's Emergency Food Security Reserve [EFSR]) to meet urgent needs.
- **Have a clearly defined objective.** Reserves have faced challenges stemming from policy confusion and many competing objectives. While most explicitly or implicitly have the goal of making food available to the poorest and most vulnerable populations, some seek to maintain stable prices in the market. Others attempt to address both emergency situations and chronic food insecurity. They seek to help develop local or regional markets where the private sector is under-capitalised or otherwise not sufficiently engaged. They work to compensate for shortfalls in foreign currency reserves. Too often, trying to use one instrument to serve many purposes leads to failure. The proposed pilot PREPARE system is designed for the essential purpose of giving poor food deficit countries predictable and rapid access to sufficient food to meet the humanitarian needs of their vulnerable population

groups through safety nets and other targeted food assistance programmes during periods of high and volatile food prices and other shocks.

- **Enjoy strong national or regional ownership.** Reserves prove less effective and sustainable over time when the country or countries involved do not have a strong commitment to the reserve or do not play an active role in its governance and financing. In two of the most successful reserves included in this analysis – Ethiopia’s EFSR and the Mali Programme for Restructuring the Cereal Market (PRMC) – national authorities play an active role in governance, management and financing of the reserve (Rashid and Lemma, 2011). In the case of Mali, the national government has been participating in the financing of the PRMC since 1999 and its share of costs reached 70 percent in 2004 (versus 30 percent for donors) (WFP and NEPAD, March/April 2004, pg.7). Reserves in which governments have played no role in financing have faced challenges when traditional donors have discontinued support and new sources of revenue needed to be found quickly. This has been the case, for example, in Burkina Faso, where donors covered all costs associated with the operation of the reserve (WFP and NEPAD, March/April 2004, pg.7). The PREPARE pilot programme recommends appropriate burden sharing among stakeholders, with participating countries playing a key role in governance and financing.
- **Have a streamlined, accountable governance structure.** Complex (or non-existent) governance structures – in which there are conflicts of interest, poorly defined roles and overlapping responsibilities – can enable interference, limit operational effectiveness, and contribute to waste and mismanagement. For these reasons, the food reserves included in this analysis generally have streamlined public governance structures that separate governance from the reserve’s day-to-day management and ensure clearly defined roles and accountability. For example, Mali’s PRMC is governed by a formal national management structure Food Security Policy Coordination Technical Committee (CTCPSA) and donor management committee that set policies, oversee activities and monitor the use of funds. However, the national cereal board, the Agricultural Products Office of Mali (OPAM), is responsible for the day-to-day operation of the reserve (WFP and NEPAD, March/April 2004, pg. 7-9). Likewise, in Ethiopia, a board composed of key government Ministers and a technical committee of donors, international organisations and non-governmental organisations (NGOs) oversee the work of a general manager with day-to-day operational authority (Rashid and Lemma, 2011, pg. 4-5). The PREPARE pilot proposal recommends establishing an Executive Board to oversee the system and granting authority for the operation of the system to an independent manager.
- **Include outside parties in governance.** The involvement of outside parties in the governance and management of reserves has proven helpful to limit potential interference, ensure that clear operational and financial rules and controls are established and followed, build trust among stakeholders and promote transparency. All of the national food reserves included in the analysis involve the participation of donors, international organisations, NGOs and the private sector. Establishing a regional reserve as a separate (“outside”) party from participating countries can also help to promote trust. Regional food reserves typically have been

proposed and established as mechanisms to share existing national food stocks among participating countries. For example, under the original Association of South-East Asian Nations (ASEAN) Emergency Rice Reserve (AERR) established by AESEAN in 1979, participating countries were obligated to negotiate emergency food bilaterally with other participating countries to access the reserve. Such an arrangement can place countries in an awkward position with their neighbours and, during periods of high and volatile food prices when the risk of sudden export bans is greater, cannot ensure predictable access to supplies. This arrangement is often cited as a reason why the AERR was never used (Dano and Peria, 2006, pg. 9). The proposal for a PREPARE pilot recommends establishing a regional emergency humanitarian food reserve system as a separate legal entity governed with the participation of the countries and regional organisations concerned, donors, international organisations, civil society and the private sector. It also recommends a system that would hold and manage a separate stock to ensure predictable access to participating countries, while accessing stocks held in existing national reserves as part of a “virtual” pipeline.

4. Offering Critical Advantages

A regional emergency humanitarian food reserve system would offer critical advantages to a wide array of stakeholders in West Africa – from ECOWAS, its Member States and their vulnerable populations to national food reserve managers to farmers and traders. Specifically, it would:

- Ensure **predictable access to food** during periods of high and volatile prices and other shocks. A pilot PREPARE system would store a fixed amount of food for each participating country, guaranteeing access to food regardless of global market conditions. This certainty of access is key for countries that may have exhausted their national stocks.
- Provide **rapid access to food** prepositioned in the region and buy time between the emergence of supply gaps and acute hunger and malnutrition. A regional reserve would enable participating countries to respond faster to the needs of vulnerable populations during sudden shocks and before families are forced to resort to negative coping strategies, buying time for international food assistance to arrive, if necessary. It can take up to four months to take delivery of food after executing a tender on global markets. Securing food locally from a pilot PREPARE system could cut that time dramatically. According to a May 2009 U.S. General Accountability Office (GAO) study, local and regional procurement shortened delivery times by as much as 112 days (GAO, 2009, pg. 21).
- **Reduce the human and economic impact of external shocks** by targeting food to the most vulnerable through safety nets. Well-managed reserves linked to safety nets and other targeted food assistance programmes can significantly lower the impact of supply shocks on people and economies. Droughts that occurred before Ethiopia’s EFSR became operational caused the deaths of nearly one million people and cost up to seven percent of GDP. But since the EFSR has been in place, deaths from drought have dropped to zero and the impact on GDP has been negligible.

- Better **enable participating countries** to provide temporary support to the most vulnerable through safety nets by building national and regional capacity to develop, deploy and manage safety net systems, complementing existing programmes. By engaging in safety net capacity development programmes as part of their support for a regional reserve, participating countries can strengthen their ability to invest, manage and respond to food insecurity through win-win partnerships.
- **Stimulate agricultural production and strengthen local markets** through local and regional purchases to stock and replenish the reserve. By buying directly from local traders and accessing stocks through existing national reserves that secure food from domestic farmers, the pilot PREPARE system could also promote the efficient distribution of food from surplus to deficit areas. Recent studies have found that local and regional procurement of food assistance has had a positive impact on export trade, raised the quality of grain offered for local consumption and led to investment in improved practices among traders. (Walker *et al.*, 2005).
- **Give national food reserve managers additional options to rotate stocks** through drawdown agreements with a regional reserve and build capacity to manage food reserve systems through training programmes and opportunities to work directly with the regional reserve Management Agent. By guaranteeing access to food during periods of high and volatile food prices and other shocks, a successful regional reserve may even give national managers the flexibility to hold less food in the national reserve.
- **Empower the region to better manage food crises** by addressing logistical and legal barriers to the free movement of food assistance before a crisis occurs. Pre-negotiated agreements and procedures that build on and complement existing ECOWAS protocols could reduce unnecessary transportation delays and speed delivery of food to beneficiaries.
- **Strengthen regional integration** and food security cooperation while complementing other emerging regional food security initiatives. By providing reliable access to food, a pilot PREPARE system could limit panic responses to sudden price rises, build trust and promote commerce and collaboration between participant countries.
- **Build and promote existing institutions**. By leveraging existing West African institutions, structures and systems wherever possible, the proposed pilot PREPARE system could avoid costly duplication, help to simplify the regional institutional landscape, contribute to the efficient, flexible and transparent operation of the system and ensure sustainability beyond the pilot phase.

The proposed pilot PREPARE system would also **support regional partnership and solidarity**, involving all ECOWAS Member States and offering critical advantages to participating countries and the wider region. Countries like Ghana and Nigeria that are not targeted for participation in a pilot could nevertheless realise important benefits. In

these and other countries, national food reserve managers could gain new options to rotate stocks by offering drawdown agreements to a regional system. Farmers and traders could benefit from local and regional procurement. Private sector businesses in countries that host regional stocks could see opportunities to provide port, warehouse, land transportation and logistics services to the system. Addressing logistical and legal barriers to the free movement of food assistance could enable the entire region to better manage food crises.

5. Mitigating Risks

The design of the pilot PREPARE system also addresses and seeks to mitigate potential risks associated with the governance, financing and operation of food reserves, and with a regional reserve in particular, drawing on lessons learned from existing national and regional systems. Key risks are identified and described in the following table (Table 1), along with a summary of measures designed to mitigate those risks or limit their impact. While many of these risks cannot be completely eliminated, the design of the proposed pilot system seeks to anticipate and address them to the extent possible.

Table 1: Key Risks and Mitigation Measures of the Regional Food Reserve

RISK	DESCRIPTION	MITIGATING MEASURES
GOVERNANCE		
Interference	Historically, certain national food reserves have been subject to interference and corruption. In some cases, food has been released for political purposes and to benefit favoured constituencies. Interference undermines trust in reserve systems and could weaken financial viability over time.	<ul style="list-style-type: none"> • Establish clear, transparent and arms-length rules and trigger criteria that release food on the basis of clearly defined criteria related to nutritional objectives. • Separate governance from management functions and ensure participation of outside parties in governance structures. • Monitor releases from the reserve to ensure they are directed to intended beneficiaries through safety nets or other targeted food assistance programmes. • Ensure process of stock accumulation and disposal is financially transparent. Publish annual financial reports and make information relevant to purchases and drawdowns available to public.
Ineffective Oversight	Weak or ineffective management or governance oversight could undermine the financial viability and operational effectiveness of the reserve and invite fraud, waste and abuse.	<ul style="list-style-type: none"> • Establish sound governance and management structure with clear rules and accountability at each level. • Retain a professional Management Agent with experience managing food stocks. • Require regular financial and operational reporting to governing body by Management Agent. • Ensure process of stock accumulation and disposal is financially transparent. Publish annual financial reports and make information relevant to purchases and drawdowns available to public.

RISK	DESCRIPTION	MITIGATING MEASURES
Poor coordination	Lack of coordination between PREPARE and existing systems can lead to contradictory decisions and inefficiency.	<ul style="list-style-type: none"> • Ensure complementarity and policy coherence are prioritized. • Identify existing regional and national bodies to play key roles in governance model under the overall leadership of ECOWAS . • Align system with established national and regional strategies.
FINANCING		
Default	Participating countries that borrow food from the reserve may fail to repay that loan in full during the agreed time period, potentially undermining the financial stability of the reserve and limiting food availability.	<ul style="list-style-type: none"> • Establish a separate allocation within reserve for each participating country, so default by one will not limit access to food for others. • Only allow participating countries to withdraw food beyond their allotment at the approval of governing body. • Where possible, require particular countries to present a financial assurance that is valid, legally binding and enforceable.
Sustainability	Countless development projects are successfully implemented but fail to continue beyond the duration of the pilot.	<ul style="list-style-type: none"> • Ensure appropriate burden-sharing is undertaken by all stakeholders in order to strengthen commitments and sense of partnership. • Pursue multiple avenues of financing so that the system is not dependent upon a single donor or instrument. • Undertake successful capacity building efforts to enhance the skills and knowledge of organizations within the region. • Align with regional priorities in order to leverage complementary programs
Moral Hazard	A food reserve that requires participating countries to borrow or buy food may create a moral hazard. Rather than paying for food, participating countries could choose to wait until a crisis escalates and then seek free food aid from donors through international organisations.	<ul style="list-style-type: none"> • Provide predictable and rapid access to fixed amount of food, offering advantage over imported food aid in terms of time and certainty. • Ensure appropriate burden sharing by all parties involved. If participating countries have a financial stake in system, they may be more likely to use it. • Make stock available to each country transparent and public, promoting accountability and raising stakes for governments to delay action.
National Resource Limitations	Participating countries at times may not have the resources to buy food from the reserve, limiting its value and impact. While agricultural production is increasing in West Africa, smaller countries with	<ul style="list-style-type: none"> • Select eligible countries from among those qualified to receive assistance from multilateral institutions to buy food during shocks. • Provide range of payment options by allowing participating countries to buy or borrow food from reserve.

RISK	DESCRIPTION	MITIGATING MEASURES
	limited production may not be able to repay loans from the reserve in a timely manner.	<ul style="list-style-type: none"> Establish allocations from reserve by country, with generally lower allocations for smaller countries and producers. Do not require participating countries to draw a certain minimum quantity of food from reserve.
OPERATION		
Damage to Local Markets	Food purchases and releases could disrupt local markets and put pressure on prices.	<ul style="list-style-type: none"> Leverage early warning systems and the Agriculture Market Information System (AMIS) as well as RESIMAO (West Africa Market Information Network) to inform food purchasers and limit impact on local and regional markets. Keep reserve relatively small to limit impact of purchases and releases on local and regional markets. Release food through safety nets and other targeted food assistance programmes, directing food to beneficiaries that would not be able to purchase on local markets.
Fraud	The reserve stock could suffer fraud and inventory shrinkage while stored in warehouses, limiting the availability of food and undermining the financial sustainability of the reserve over time.	<ul style="list-style-type: none"> Put in place strong information technology systems and inventory control measures. Make use of modern inventory tracking technologies. Retain professional Management Agent with experience managing food stocks. Hold food in bonded warehouses and maintain sufficient insurance to cover potential losses from theft or natural calamities. Store food in a few centralised locations, as smaller, more scattered storage units are more likely to be targets for theft.
Geopolitical Risk	Tensions between or internal unrest in participating countries could unexpectedly interrupt the prompt movement of food to or from warehouse locations, contribute to the loss of food in transit or held at warehouse locations, and increase costs.	<ul style="list-style-type: none"> Hold food in multiple locations to ensure alternative sources of supply in the event of unexpected supply chain disruptions. Hold food in countries where geopolitical risk is relatively lower, where possible, also considering logistical and cost considerations. Require Management Agent to conduct pre-incident planning to prepare for unexpected supply chain disruptions. Hold food in bonded warehouses and maintain sufficient insurance to cover potential losses from theft or trade disruption.
Safety Net Capacity	While safety net programmes do exist or have been used in the	<ul style="list-style-type: none"> Hold limited amount of food in reserve to take into account potential distribution challenges.

RISK	DESCRIPTION	MITIGATING MEASURES
	<p>ECOWAS region, they often take the form of temporary food-for-work programmes and/or have limited coverage. Limited safety net capacity could be a barrier to effectively releasing stocks from the reserve for the purpose intended.</p>	<ul style="list-style-type: none"> • Make participation in safety net capacity-building programmes a key criterion for participation in reserve system. • Prioritise capacity building for safety nets as a first step and as other steps are being taken to establish and stock the reserve. • Allow release of stocks through other targeted food assistance programmes.
<p>Trade Barriers</p>	<p>If a country in which reserve stocks are held imposes an export ban on cereals of the kind held by the reserve, it could prevent the reserve from offering food from that location. The imposition or maintenance of export bans or failure to implement and abide by the provisions of the ECOWAS Protocol on Free Movement of Persons, Goods and Services could also prevent the timely transit of food to or from the reserve through third countries.</p>	<ul style="list-style-type: none"> • Require countries as condition for participation to agree not to impose or maintain export bans or other trade barriers on food shipped to or from reserve locations. • Hold food in multiple locations, which ensures other options are available in cases of non-compliance. • Hold food in countries that do not currently maintain export bans or other restrictive trade barriers on food commodities.
<p>Unwillingness to Share National Stocks</p>	<p>Countries may at times be unwilling to fulfill drawdown agreements on national reserves, either because of bilateral tensions or domestic food security concerns – limiting access to food through “virtual” stocks.</p>	<ul style="list-style-type: none"> • Establish regional reserve with own physical stock to ensure access to supply for participating countries. • Establish drawdown agreements between regional reserve and national reserves rather than between participating countries and national reserves in neighbouring countries. • Consider drawdown rights on national reserves as one part of a portfolio of “virtual” options, limiting reliance on any one option.

V. PREPARE Pilot Overview

The following section (Section VI., *Pilot Design and Feasibility*) proposes and assesses the feasibility of a pilot PREPARE programme that would establish a targeted, cost-effective emergency humanitarian food reserve system with small, regionally prepositioned stocks, to be organised and operated with the active participation of the countries and region concerned. Designed to help poor nations in West Africa that choose to participate ensure rapid access to sufficient food for the most vulnerable through safety nets during periods of high and volatile food prices, a pilot PREPARE system could begin full operation as early as the first quarter of 2014 (see Section VII, *Implementation Timeline*).

The estimated \$44.3 million initial cost to stock the system and \$16.6 million in annual recurring costs for ongoing management and operation could be met from a variety of sources and through appropriate burden sharing by all parties involved. A detailed cost-benefit analysis (see Section VIII) finds that the proposed pilot PREPARE system is a cost-effective option that delivers superior benefits relative to other alternatives on measures of availability of supply, speed of implementation and delivery, sustainability and capacity development.

1. Key Design Features and Feasibility

Section VI outlines the major design features of the proposed system, assesses their feasibility, and compares them to other options. Specifically, the proposed PREPARE pilot would:

- **Benefit the entire region**, while targeting a limited group of the poorest and most vulnerable countries in the ECOWAS region, selected from among Low-Income Food Deficit Countries (LIFDCs), as determined by FAO, and Least Developed Countries (LDCs), as defined by the UN General Assembly.
- **Prioritize local and regional procurement** in order to encourage markets and support agricultural production.
- **Capitalize on existing structures** in order to leverage resources and ensure coherence and complementarity with existing national, regional and continental mechanisms.
- **Establish a small regional food stock** corresponding to pre-determined targets related solely to food security. It would hold a small amount of rapidly deployable physical stock for each participating country and additional supply through virtual procurement tools.
- Aggregate buying power and capitalise on economies of scale to **procure food at market prices on global, regional and local markets**, helping to address food access challenges vulnerable countries can face during periods of high and volatile prices and other shocks.

- **Locate food stocks strategically** in four locations (Burkina Faso, Ghana, Mali and Senegal), based on logistical and cost considerations.
- Release food to participating countries for sale or loan according to **pre-determined and arms-length trigger criteria** linked to early warning systems. A participating country could access food if there is transparent and objective evidence of an external shock at the global level and an existing or emerging food shortage at the national or local level.
- Ensure **integration with schemes of targeted assistance to the most vulnerable**. Participating countries would release food to vulnerable populations through safety nets or other targeted food assistance programmes according to clearly defined criteria related to nutritional objectives.
- **Develop national and regional capacity** to operate the PREPARE system, manage national food reserves and develop, deploy and manage safety net systems for the most vulnerable. This cross-cutting focus which would actively seek to enhance the capabilities of governments and regional organizations in all aspects of the system through knowledge transfer and technical assistance for safety nets and the management of food stocks.
- Establish a **transparent and streamlined public governance** structure with strong national and regional ownership, clear accountability and participation by international organisations and other outside partners and stakeholders.

2. Implementation Timeline

Section VII sets out an implementation timeline and describes major implementation milestones and success factors. It recommends launching initial steps to implement the PREPARE system in late 2011 with ECOWAS Member States that choose to participate. Work to implement the system would focus first on capacity development and establishment of a strong governance structure, financial and operational rules, monitoring systems and internal controls. A Management Agent selected in the first quarter of 2013 would initiate steps to secure warehouse space, procure food for the system, and test trigger mechanisms and other systems. On the basis of these steps, the system could be fully operational during the first quarter of 2014.

Based on evaluation criteria determined by the PREPARE Executive Board and information provided by the Management Agent or drawn from other sources, an in-depth review of the performance and cost-effectiveness of the system could be conducted at the end of a five-year pilot period to capture lessons learned and to assess the cost, feasibility and appropriateness of extending the system to other countries and regions.

3. Cost-Benefit Analysis

Section VIII contains a detailed cost-benefit analysis of the pilot PREPARE system, as well as alternative options to achieve the same goal of enabling poor food-deficit countries to access a sufficient supply of food for their vulnerable populations during

periods of high and volatile food prices. Those alternative options include expanding the current system of national food reserves or community granaries in West Africa, directing similar resources to traditional emergency food aid or establishing a regional insurance facility or cash reserve.

The cost-benefit analysis evaluates the pilot PREPARE system and the four alternative options on the basis of speed of delivery, availability of food, sustainability and cost. It finds that PREPARE is a cost effective option that delivers superior benefits relative to other alternatives on measures of availability of supply, speed of implementation and delivery, sustainability and capacity development.

VI. Pilot Design and Feasibility

A. PARTICIPATION

The proposed PREPARE system would engage the entire ECOWAS region and target up to eleven countries for assistance as part of the pilot. Countries that choose to participate would agree to take certain steps outlined below to support the sustainable and effective operation of the system.

1. Pilot with a Limited Group of Target Countries

For the purposes of a pilot, the proposed PREPARE system would target the following eleven countries that are both LIFDCs and LDCs: Benin, Burkina Faso, The Gambia, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Senegal, Sierra Leone and Togo. Participation in the reserve system would be voluntary and at the discretion of individual countries. Further discussions with these countries will be necessary to determine which wish to participate in the system. This feasibility study, cost-benefit analysis and proposal for a pilot assumes all eleven countries would participate. Countries that opt into the system at the inception of the pilot would be able to borrow or purchase food from PREPARE stocks when the terms discussed in Section VI.D, *Triggers*, and Section VI.E, *Release Terms*, are met, but would not be required to do so.

2. Benefiting the Entire Region

The proposed pilot would reinforce solidarity within West Africa. While certain countries are targeted for participation, the system would engage and provide advantages to all members of ECOWAS. Through local and regional procurement, capacity building and other design features, the system would provide important advantages to the entire region.

3. Supporting the Sustainable and Effective Operation of the System

Ethiopia's EFSR was a helpful model for considering the steps countries that wish to participate in the proposed pilot PREPARE system would need to take to support its

At a Glance: Participation

- 11 ECOWAS countries are targeted for PREPARE based on their status as both LIFDCs and LDCs
- Countries would choose to participate on a voluntary basis.
- Participating countries would agree to take certain actions to support the sustainable and effective operation of the system

sustainable and effective operation. It is an example of a national reserve that is managed by the government and is used by third-party organizations.³ The EFSR has strict rules for drawdowns. Organizations that wish to receive food from the reserve must meet eligibility standards (officially recognized organization, repaid all previous food loans), formally submit a request and meet certain criteria for each withdrawal. Those criteria are:

- The grain requested should be exclusively used for emergency relief interventions, productive safety net programmes or food-for-work programmes;
- The formal request must state the amount of grain needed and the intended use, including locations and number of beneficiaries;
- The distribution plan should disclose existing stock levels in the borrowing organization's warehouses;
- The borrower covers all costs related to loading and unloading of the grain, both when withdrawing and when reimbursing the loan; and
- The borrower should replace the grain borrowed in kind with an acceptable quality standard grain, upon prior notification and agreement from EFSR regarding time and place of the repayment.

3.1. Participation agreements

Based on this model and to sustain the effective operation of the proposed pilot PREPARE system, each eligible country that wishes to participate in the reserve would agree to take certain basic actions and any steps necessary to implement those actions. Those actions are:

- **Disclose stocks held by national food reserves.** To ensure coherence, and ready access to virtual stocks held by national reserves, the proposed pilot PREPARE system would need reliable and up-to-date information about the quantity, composition, location and quality of those stocks.
- **Do not maintain export bans on food moving to or from PREPARE locations.** Participating countries would agree not to impose or maintain export bans or other restrictions or prohibitions on the cross-border or in-transit movement of food to or from PREPARE warehouses. Such restrictions or prohibitions would disrupt the operation and could add significantly to the cost of the reserve.
- **Comply with release and replenishment terms.** As discussed in Section VI.D, *Triggers*, and Section VI.E, *Release Terms*, the proposed pilot PREPARE system is built on transparent and pre-determined rules governing release and replenishment. Compliance with those rules is essential to ensuring that participating countries have rapid and reliable access to food stored in the reserve.
- **Distribute food through safety nets and other targeted programmes.** Participating countries would agree to distribute food borrowed or purchased from the pilot PREPARE system through safety nets or other targeted food assistance programmes. They would submit a schedule of safety nets and

³ Burkina Faso's national food reserve has also begun to experiment in recent years with allowing third party agencies (UN, NGOs) to purchase commodities from the reserve. However, this approach remains to be mainstreamed within the operation of the reserve.

monitoring plan for approval by the governing body before the system is operational.

- **Participate in safety net capacity-building programmes.** In connection with PREPARE, participating countries would continue to work with development partners to strengthen existing safety net and social protection systems to fully integrate safety nets designed to support food consumption by the poorest and most vulnerable to food insecurity.
- **Share in initial and recurring costs.** Participating countries would agree to share appropriately in the financing necessary to establish and maintain a PREPARE system, as discussed in Section VI.H, *Financing*.
- **Facilitate monitoring of commitments.** Participating countries would agree to facilitate the monitoring of commitments.

3.2. *Monitoring and enforcement*

As discussed in Section VI.G, *Governance and Transparency*, the governing body of the proposed pilot PREPARE system would establish formal monitoring and enforcement procedures for these agreements, based on recommendations from implementing partners. Those procedures would be based on plans submitted by participating countries. The procedures would specify penalties for failure to comply with the participation agreement.

B. SIZING and COMPOSITION

A key challenge in designing a cost-effective food reserve system is to ensure that a sufficient quantity of food is available to meet anticipated needs, while also keeping costs low by minimising the amount of physical stock under management. Given its purpose of assisting countries to temporarily bridge supply gaps during periods of high and volatile food prices and other shocks, the proposed pilot PREPARE

system is designed to provide food for up to 90 days. This allows enough time for governments to access other sources of food, if needed. Because it is unlikely that all eligible countries will require this amount of food at the same time, the regional reserve will be able to hold smaller stocks than would be required to cover each country for 90 days.

As outlined below, PREPARE would hold a mix of physical and virtual stocks, with an initial 30-day physical stock estimated to be 67,000 MT. In the case of both physical and virtual stocks, PREPARE would hold a cost-efficient and flexible mix of commodities determined by local consumption patterns and operational requirements. The sizing and composition methodology are based on an examination of historical food supply and demand during normal and peak years, with special reference to the 2008 food crisis.

1. Sizing

<p>At a Glance: <i>Sizing and Composition</i></p> <ul style="list-style-type: none"> • PREPARE able to make available a 90-day supply of food, providing time for countries to access other sources of supply if needed • Reserve would include 30 days of physical stock and 60 days of virtual stock
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The proposed pilot PREPARE system is designed to provide food for up to 90 days, which is the approximate amount of time needed to execute an international procurement action from tender to delivery.⁴ Based on WFP experience, a 30-day physical stock would be necessary to meet needs until virtual stocks can be delivered. Thus, the reserve is planned for 30 days of physical stock and 60 days of virtual stock to cover the full 90-day period.

1.1. Proposed design

The volume of stocks held by a pilot PREPARE system would correspond to pre-determined targets related solely to food security. Specifically, the PREPARE reserve would be sized to meet the estimated needs of people who are likely to become vulnerable or more vulnerable in the event of a price-related shock. The key drivers of reserve size include the number of countries that opt into the system (assumed to be all eleven countries), additional unmet consumption needs of populations during a shock, and the 90-day time period split into 30 days' worth of physical stock and 60 days' worth of virtual stock.

The proposed size of a pilot PREPARE system was based on an analysis of the food balance sheet for each country, which gives a comprehensive view of grain supply and demand dynamics on the national level and for the ECOWAS region as a whole.⁵ An analysis of historical food balance sheets shows annual swings in per-capita grain supply and demand around a baseline level. Changes in per-capita supply and demand levels can be attributed to changes in local and international supply conditions. They can be used to estimate the magnitude of food shocks, as well as how countries coped with them. The historical impact of those shocks can then be used as an estimate of the impact of the future shocks that a pilot PREPARE system would attempt to mitigate. A regional approach, where risk is shared across countries, can be employed to calculate a reserve size that balances preparedness with cost considerations.

In detail, the food balance sheet methodology used to calculate the size of the reserve was as follows:

- Grain demand and supply per capita was calculated for each country over the period 2001-2010 based on FAO's national food balance sheets. National amounts then were added together to get a combined total for the eligible countries.
- A 10-year average of per-capita demand and supply was then calculated for the eligible countries and the region as a whole, and this was considered as the

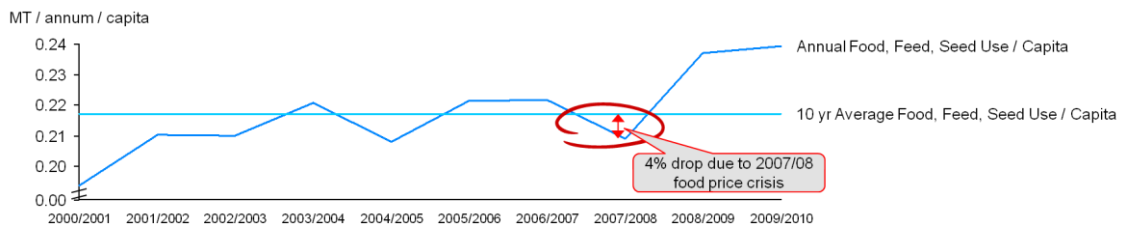
⁴ The Southern African Development Community's (SADC's) planned Regional Food Reserve Facility is sized for 90 days of "anticipated consumption by those member states likely to experience a shortfall in their domestic supplies" (SADC, 2007). Ninety days is more conservative than the coverage period of 120 days used as the basis of Ethiopia's coverage.

⁵ A food balance sheet presents a comprehensive picture of the pattern of a country's food supply during a specified reference period. The total quantity of specified foodstuffs produced in a country added to the total quantity imported and adjusted to any change in stocks that may have occurred since the beginning of the reference period gives the supply available during that period. On the utilization side, a distinction is made between the quantities exported, fed to livestock, used for seed, put to manufacture for food use and non-food uses, losses during storage and transportation, and food supplies available for human consumption (FAO).

“baseline” level of per-capita demand and consumption in a typical period. On the demand side, three components of grain demand – food use, feed use and seed use – were considered to constitute the total food demand for each country. The continuity of all three uses during a crisis is critical to ensuring that vulnerable populations do not engage in survival mechanisms that would damage their longer-term development prospects.

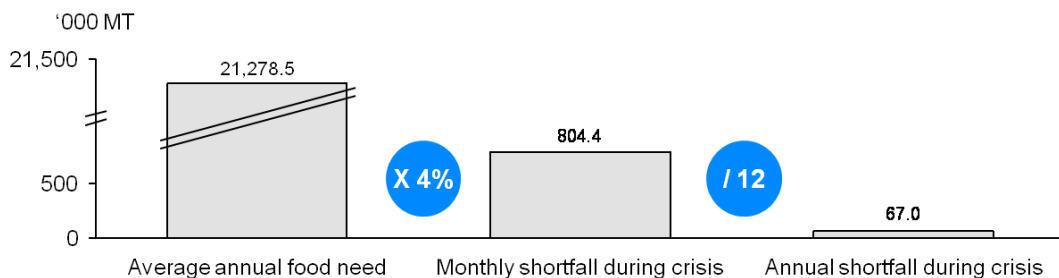
- Individual years were compared to the average to calculate the percentage movement away from the average in any given year. Movements below the average were considered as “shocks.” All years were analysed, but the movement observed in 2007/08 was used as the primary case, as these years represented precisely the kind of scenario that PREPARE seeks to address.
- The methodology also reflects the intended regional logic of the reserve. Under this principle, risk of a shock is pooled across the participating countries under the assumption that in any given year, some countries may experience drops while others experience normal or increased years of supply and demand. These national differences smooth each other out when viewed at a regional level and lead to a smaller reserve size. However, the regional approach still allows for the possibility of a region-wide shock, as was seen in historical data.
- On a regional level, ECOWAS countries experienced a four-percent drop in food supply and demand in 2007/08 compared to the 10-year average for the region, as shown in Figure below. As 2007/08 is widely acknowledged as a worse-case situation, this drop is seen as a suitable proxy for sizing the reserve, assuming the assistance mechanisms that were deployed in 2007/08 will a similar aggregate impact in the future.

Figure 2: Per-Capita Food Use, Annual versus 10-Year Average



- As illustrated in Figure below, converting a four-percent drop in per-capita food use into absolute terms equates to a regional shortage of 804,000 MT of grains in a worst-case shock year, based on a total regional food use of more than 21 million MT of grains across nearly 100 million people. This annual shortage translates into 67,000 MT per month, the amount to be held in physical stocks by the reserve.

Figure 3: Calculation of Monthly Grain Need during Crisis



- At a typical WFP monthly ration of 15 kilograms of grain/person, this reserve size would be sufficient to meet the cereal requirements of approximately 4.5 million people for one month, which is approximately five percent of the population of the ECOWAS region and 20 percent of the estimated vulnerable population during a shock.
- The regional logic of the proposed pilot PREPARE system and its focused objective allow it to hold much smaller stocks. The proposed physical stock size is 17 percent of the size of Ethiopia's EFSR and only nine percent the size of the ASEAN +3 EAERR.

1.2. Other options considered

As discussed below, several other approaches to sizing the reserve were considered, including methodologies based on vulnerability and national import needs. Sizing methodologies and experiences from existing national reserves in Africa and the Asia regional reserve also were reviewed for key lessons. Ultimately, the food balance sheet approach was selected because of the comprehensive view of the impact of food shocks it provided, the availability of solid data from FAO, and the close fit between this approach and PREPARE's purpose of cost-effectively mitigating the impact of high and volatile food prices on vulnerable populations. The other options include:

- **National-level analysis approach.** The food balance sheets could be used to calculate the reserve size based on the needs of countries rather than the need of the region – ignoring regional risk pooling. The calculations would be similar to the food balance sheet method chosen, except the food needs arising from a shock first would have been calculated for each country and then summed to a regional total. Without regional risk pooling, the expected size of the reserve would be 91,000 MT. This figure would imply participating countries always experience shocks at the same time.
- **Historical food aid approach.** This approach is based on WFP data on historical levels of food aid in each of the participating countries, as well as ECOWAS data on historical levels of domestic food distribution through safety nets. It determines historical baseline food distribution levels, as well as historical food aid and safety net needs during shocks. The differential in needs during a baseline period and needs during a shock would then be taken as the total food needed in the event of a shock. However, this approach was not practically feasible due to limited data availability. It also was not directly compatible with PREPARE's purpose of addressing the impact of high and volatile food prices on the most vulnerable.
- **Import needs approach.** Based on the assumption that import breaks are the key issue during a price-related food shock, this method uses historical levels of grain imports in the participating countries to estimate the amount of food needed due to an import break. Although data to support such a calculation was possible to obtain, the changes seen in food balance sheets during shocks were clearly more comprehensive in capturing the multiple moving pieces of food supply and demand during a shock.

- **Approaches used by existing national reserves in Africa.** We considered approaches used by existing national food reserve systems in Mali, Niger and Ethiopia as alternatives for sizing a pilot PREPARE system. In these countries, the reserve size is set by multiplying the vulnerable population by an estimated amount of food needed per person for a certain period of time. As PREPARE is intended to provide only short-term protection and scale up of safety net programs, rather than provide enough food to meet the full needs of the entire vulnerable population, adopting this methodology could result in an overestimation of the stocks required.

1.3. Drawdown allocations

To ensure sufficient food is available to meet the needs of every participating country during periods of high and volatile prices, a pilot PREPARE system would establish a pre-approved maximum allocation for each participating country based on historical needs over the last decade. When the trigger criteria are met, participating countries could secure food from the reserve up to the limit of that allocation. The recommended allocations, based on a total reserve size of 201,000 MT (67,000 MT of physical stock and a possible additional 134,000 MT through virtual tools) are listed in Table 2 below.

Table 2: Allocation of the Regional Food Stock among Eligible Countries

COUNTRY	TONNAGE (,000 MT)
Benin	4.5
Burkina Faso	33.9
Gambia, The	2.4
Guinea	9.9
Guinea-Bissau	2.1
Liberia	4.2
Mali	48.3
Niger	47.1
Senegal	33.9
Sierra Leone	8.7
Togo	6.0
Total	201.0

If a targeted country wishes to access more than 100 percent of its maximum allocation, it could seek approval from the governing body of the pilot PREPARE system (Executive Board). That body would take a decision on the basis of recommendations from an Advisory Committee.

2. Composition

A pilot PREPARE system would hold a cost-efficient and flexible mix of four commodities in physical and virtual stocks (maize, millet, rice and sorghum). Cereal consumption needs, particularly in the first 30 days, have been targeted to meet critical food needs while avoiding the complexity that would come from stocking a more

complete food basket for the reserve. However, the system could also consider access to specialised nutritional products through virtual stocks.

The share of each commodity in the overall composition would be variable over time, within ranges suggested below. These ranges are based on local consumption patterns as well as PREPARE operational requirements. The composition ranges presented here are based on local consumption patterns and potential operational limitations.

2.1. Local-consumption patterns

The starting point for calculating the composition ranges was the historical grain consumption patterns for each country. These patterns were analysed and the commodity breakdown was applied to the expected amounts to be held in the reserves.⁶ This gave a reserve composition of ~50 percent millet & sorghum, ~30 percent rice, and ~20 percent maize. As wheat was less than four percent of consumption in the ECOWAS region, and no more than 12 percent in any given country, it was excluded to reduce operational complexity. The tonnage allocated to wheat was then redistributed across the remaining four commodities.

2.2. Potential operational limitations

While it is preferable to maintain the composition outlined above, it may not always be possible to replenish the reserve with large amounts of locally-sourced commodities during food shocks that may include local production failures. To take account of this constraint, PREPARE could establish a flexible set of ranges for each commodity.

WFP experience shows that rice and maize could be procured from a range of local, regional and international procurement options. Millet and sorghum procurement would be limited to local and some regional markets. Thus, changes in the local markets for commodities could necessitate holding a higher share of rice and maize, in the event that millet and sorghum were unavailable or prohibitively expensive on local markets. Further, the large market-based turnover of rice and maize in West Africa suggests that both commodities could be easily rotated in the region.

Local consumption preferences were still considered in this calculation, but were expanded to include beneficiary willingness to trade between commodity types, based on WFP operational experience in the ECOWAS region. This analysis indicated that maize and rice are the two most preferred commodities in the region and substitution into these commodities would be largely acceptable to populations in all countries. Thus, it would be possible to hold higher shares of rice and maize if necessitated by operational conditions. A commodity composition in this scenario could reach ~60 percent rice, ~25 percent maize and ~15 percent millet / sorghum.

⁶ Consumption data from the U.S. Department of Agriculture's Foreign Agricultural Service was used for this initial analysis.

Based on the calculations discussed above, an initial set of potential composition ranges would be:

Table 3: Possible Range of Commodity Compositions

Possible Composition	
Maize	20-25%
Millet /Sorghum	15-50%
Rice	30-60%

At least initially, PREPARE would hold the commodities proposed above and not hold specialised nutritional products such as corn-soy blend (CSB) and CSB+ in its physical stocks, given the very short shelf life of specialised products and uncertain demand from participating countries. However, the reserve could hold specialised nutritional products through virtual stocks with qualified suppliers. This remains an option pending further consultations with participating countries and private sector suppliers.

C. PROCUREMENT, LOGISTICS and STOCK ROTATION

To ensure predictable access to a sufficient supply of food at the lowest cost, a PREPARE system would employ a diverse range of tools to buy food commodities from unrelated parties through transparent, arms-length transactions at prevailing market prices. This section covers the supply chain process for physical stocks from the procurement of the commodity to its release from a PREPARE warehouse. The supply chain takes into consideration lead times, availability and costs. Active engagement by participating ECOWAS Member States in the design and development of a pilot PREPARE system can ensure regulatory obstacles are addressed and resolved before the system is operational.

1. Procurement (including through virtual commitments)

At a Glance: Procurement, Logistics and Stock Rotation
<ul style="list-style-type: none"> • Commodity procurement to be a combination of local, regional and international purchases • PREPARE warehouses to be located in four countries that serve as regional clusters: Burkina Faso, Mali, Senegal and Ghana. • Two PREPARE warehouses to be located at ports to receive international purchases and tranship grains: Dakar Port in Senegal and Tema Port in Accra, Ghana • Virtual stock arrangements with governments and suppliers

The proposed pilot PREPARE system would procure maize, millet, rice and sorghum (see Section VI.B.2, *Composition*, above) efficiently at affordable prices through competitive tenders and hold transportation costs low by purchasing food locally whenever possible without harming national and regional markets. To do this, the system would utilise a range of procurement tools and methods designed to maintain an optimal balance of physical and virtual stocks at any given time.

1.1. Sourcing locations

A PREPARE system, would prioritise local and regional procurement whenever possible. It would source millet and sorghum locally and regionally. Among eligible countries, these cereals are produced mainly in Burkina Faso, Mali and Niger, but are not traded on international markets. Maize also would be sourced locally and regionally whenever possible. Several West African countries produce maize, including Benin and Burkina Faso. If maize is not available on local or regional markets, supply could be secured in South Africa. Rice is not produced in sufficient quantities in West Africa to meet local demand. While local and regional procurement is still prioritized, most rice is likely to be procured internationally, with producers in Asia being the major suppliers.

1.2. Securing physical stocks

Physical stocks would be secured in kind during the initial stocking phase only and then through optimised spot purchasing for ongoing rotations and replenishments. Based on the regional pooling of needs and flexibility in reserve composition, the reserve management would take advantage of bulk purchases, relative commodity pricing, local, regional and international sourcing, and seasonal price movements (i.e., post-harvest price lulls) to stock and maintain the system at the lowest cost possible.

1.3. Securing virtual stocks

A portfolio of procurement tools is required to secure a dependable virtual commodity stock, to be converted to physical stocks when needed. Such an approach could leverage procurement tools that allow the reserve to secure supplies quickly without affecting local or international market prices and to manage stock rotation or drawdown needs over time. These tools include:

- **Arrangements with private traders.** PREPARE could develop medium to long-term agreements with private traders to maintain additional commodity inventory over which PREPARE would hold first refusal purchase rights. In these agreements, private traders would integrate increased storage capacity into their normal pipeline for grain trading activities. The extra storage would be used to hold an amount of grain agreed with PREPARE. This grain would be owned by the trader but guaranteed to be available for PREPARE's purchase at any time at PREPARE's request. Grain traders would incur additional costs related to the storage of additional grain, which might then be partially or fully charged onwards to the PREPARE system. However, initial conversations with major grain traders suggest that costs are likely to be shared or even waived, making this an attractive option for virtual stocks of grain to be utilized by PREPARE in times of crisis. Such arrangements could be utilized throughout the 60 day period for which virtual reserves are intended to be used, but would be particularly useful for rapid access in the period immediately following the depletion of the PREPARE's 30 day physical stocks.
- **Drawdown agreements with national reserves.** PREPARE could secure access to virtual reserves by leveraging the stocks already held by national reserves in participating and nearby countries. Under this approach, a national reserve

system would agree to make available for purchase (or loan) a certain volume of stock from their system. In times of elevated need within the PREPARE participating countries, PREPARE would be able to draw from the national reserves up to the pre-agreed amount, as long as national needs do not conflict. Thus, PREPARE would likely draw earmarks from countries in the region unaffected by a crisis, in order to provide stocks to an affected country. This approach to virtual stocks would be free of cost to the system, but also carries an elevated risk profile due to the possibility of stock unavailability if conflicting national food security needs prevent PREPARE withdrawals from national reserves. National reserves could be utilized throughout the 60 day period for which virtual reserves are intended to be used.⁷

- **Quick-disbursal cash.** Cash could be used to carry out spot purchases of readily available food stocks. Such purchases would be triggered when crisis is expected to be longer lasting, thus requiring PREPARE's full 90 day capacity. The ability to immediately contract grain purchases upon confirmation of need is critical, and prevents the delays that could be caused by PREPARE needing to raise and receive funds from participating countries or donors in order to execute a purchase or those caused by a country not being able to find willing counterparts to a tender request. PREPARE has the ability to aggregate buying power to build credibility and strong contacts in the commodities markets, allowing it to purchase quickly if cash is already on hand. Quick-disbursal cash would likely be utilized later in the 60 day period for which virtual reserves are intended to be used.
- **Forward or average contracts.** PREPARE could enter forward contracts with suppliers, including farmer cooperatives located in partner regions and Long Term Agreements with commercial traders. Under such agreements, PREPARE would commit to certain level of purchases throughout the year and would receive a volume discount based on the aggregate volume of purchases. Although the utilization of PREPARE stocks for crisis is likely to vary across years, there will be a steady need for stocks to support rotation needs. This steady need would form the basis for forward contracts. However, it is recommended that this modality only be activated after the PREPARE management has begun to build experience and consistency in stock rotations.

The use of virtual stocks does carry some inherent risk. Specifically there is a risk of counterparty default when the virtual stock is to be converted into physical stock. There also is a risk that securing virtual stock through and transporting it from the counterparty to a PREPARE warehouse could take more than the 30 days covered by physical stocks, causing a break in the PREPARE distribution pipeline. These risks vary across the tools discussed. Therefore, a mix of virtual procurement tools is essential to spread default and delivery risk across a range of counterparties and approaches, as is a skilled and proactive reserve manager to minimise risk through advance planning.

⁷ One potential partner could be the Nigerian National Food Reserve Agency, which currently has 300,000 MT of food reserves under management.

Regardless of the physical or virtual procurement approach taken, caution needs to be exercised so that local markets are not harmed by indiscriminate purchases. Local markets need to be monitored closely for their sensitivity to large purchases and virtual stock contracting. PREPARE would take advantage of existing early warning and food security monitoring systems, as well as AMIS and RESIMAO, to enable its managers to understand trends in production and prices. Food security information systems that analyze and share data on food production, consumption and stocks at national and regional levels will be critical for effective operation of the system. Local capacity building to support information initiatives will be important to ensure adequate information flows.

At the time of this draft, the virtual stock procurement tools mentioned above are being examined further for their applicability to the PREPARE system. Applicable tools and a more complete explanation of their feasibility will be incorporated into subsequent versions of this document.

1.4. Other options considered

Several alternative options have been considered for PREPARE's procurement approach. These options included a single-modality approach rather than a portfolio, and several alternative virtual stock procurement tools.

A single-modality approach would consist of relying on only one of the approaches described in the previous section. However, a portfolio approach was determined to be more effective in securing affordable and dependable supplies of commodities. For example, procuring physical stocks solely through local sources or solely through international sources would limit the reserve's ability to optimize spot purchasing – buying at the lowest costs possible when market conditions are favourable while not upsetting local market prices. Further, relying on any one of the virtual stock modalities would expose PREPARE to higher levels of counterparty risk.

Several alternative virtual stock procurement tools were considered for inclusion in the portfolio of tools available, including:

- **Financial hedging** through derivative contracts was considered as an option for managing the cost of PREPARE's food stocks. However, some of the commodities to be held by a PREPARE pilot in ECOWAS are not openly traded on derivatives markets, making financial hedging difficult. In addition, such hedging would require a sophisticated level of trading knowledge and market intelligence, which might be difficult to finance and sustain.
- **Physical call options** on commodities held by the private sector in the ECOWAS region. Although physical call options would serve the purpose of securing virtual stocks for the reserve, the primary concern was that the costs of such call options made it an unrealistic response for a virtual stock. Based on previous work done by the World Bank, it was estimated that physical calls could cost up to 20 percent of the commodity value on an annual basis, which was much more expensive than other, equally effective virtual stock tools.

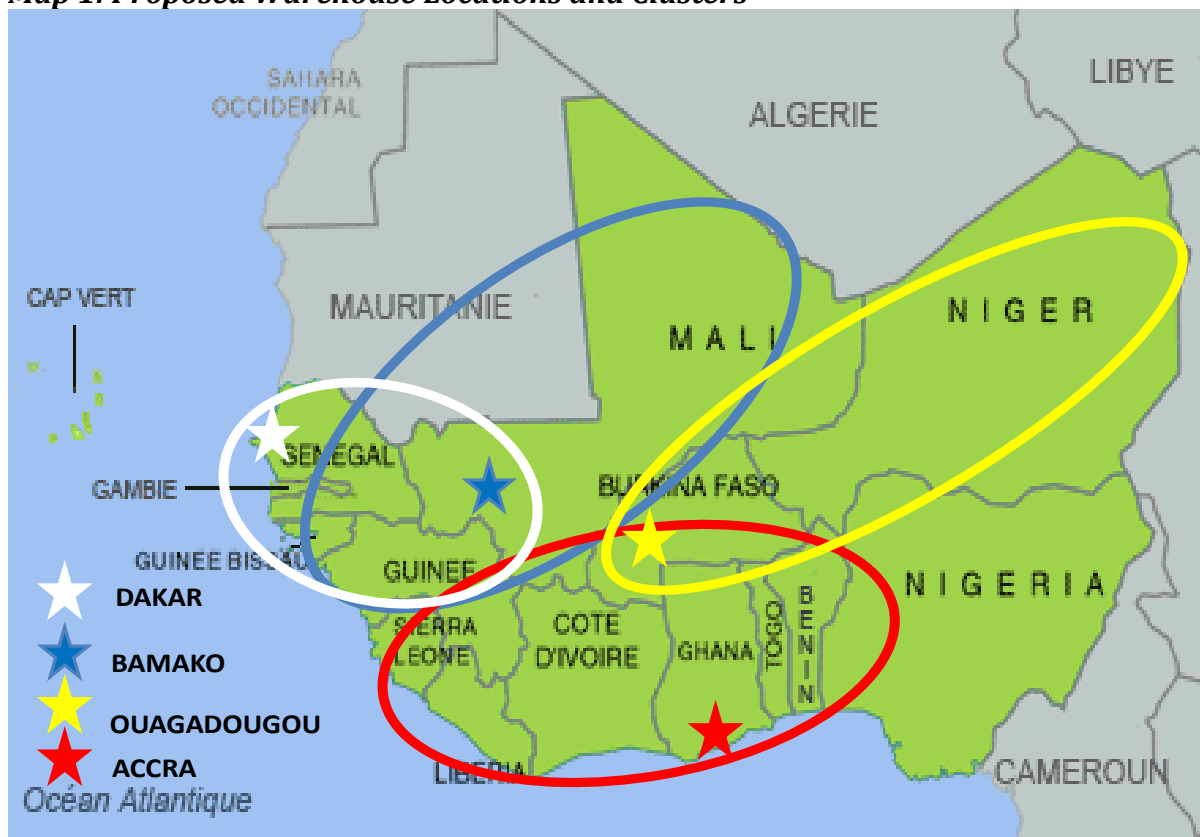
2. Stock-Holding Locations

A pilot PREPARE system would not store food in each participating country, but rather locate food strategically based on logistical and cost considerations. The proposed quantity and location of each stockholding location proposed below drew on best practices from national reserves in Burkina Faso, Mali and Niger.

2.1. Proposed locations

A pilot system would hold grain in four locations that could serve as clusters for the region: 1) Ouagadougou, **Burkina Faso** (for Burkina Faso and Niger); 2) Bamako, **Mali** (for The Gambia, Guinea, Guinea-Bissau, Mali and Senegal); 3) Dakar, **Senegal** (also for The Gambia, Guinea, Guinea-Bissau, Mali and Senegal); and 4) Tema Port in Accra, **Ghana** (for Benin, Liberia, Sierra Leone and Togo). No cluster would be limited to providing stock only to the countries assigned, and access to another PREPARE warehouse is possible through existing transportation networks to support all countries within the four clusters. Map 1 below shows the proposed PREPARE warehouse locations and coverage of eligible countries.

Map 1: Proposed Warehouse Locations and Clusters



The estimated quantity of grain that would be held at each location is detailed in Table 4 below. Initial estimates of the quantity to be stored at each location is based on the sizing and composition estimate described above (see Section VI.B *Sizing and Composition*), with the individual country requirements consolidated to determine the amount needed for each of the four clusters of countries.

Table 4: Storage Quantity and Composition by Location

PREPARE WAREHOUSE COMMODITY (‘000 MT)	Senegal DAKAR	Mali BAMA KO	Burkina Faso OUAGADOUGOU	Ghana ACCRA	Total
TOTAL	~20	~12	~14-27	~8-22	67,000

The number of warehouses at each location would be limited to the greatest extent possible, and would depend on the warehouse capacity available at the time of implementation. All warehouses in a particular location would be located in a single compound.

2.2. Feasibility analysis

A limited number of centralized locations are proposed to store food held by a pilot PREPARE system to cut costs, reduce risk and facilitate swift access and effective inventory management. Storing food in just one or two locations could significantly delay and increase the cost of food distribution. Conflict or unexpected regulatory barriers such as export bans in a few locations could limit access for all. Holding food in many widely dispersed locations would shorten distribution lead times and limit the impact of regulatory barriers, but also could increase the risk of fraud and theft.

The four stockholding locations proposed above were identified based on an objective analysis that considered all ECOWAS Member States. The analysis took into consideration the complete supply chain process. It considered local, regional and international procurement options. Specifically, it looked at:

- **Transport networks and infrastructure.** The port in Dakar, Senegal, would be used for the PREPARE warehouses in Mali. Grain then would be transported by rail to Bamako. Storing food in Ghana for eligible countries along the southern coast (Benin, Liberia, Sierra Leone and Togo) would make it possible for those countries to take delivery and ship that food by sea when roads are impassable during the rainy season. These four proposed locations are also strategically sited at each end of two major regional trade corridors, the western corridor between Senegal and Mali and the central corridor between Ghana and Burkina Faso (Pannhausen and Untied, 2010, pg. 1).
- **Commodity origin and preference.** Bamako and Ouagadougou were selected to facilitate the purchase of local millet and sorghum, which are also dietary staples in the Sahelian region. Rice would most likely be procured or donated from Asia and transported by sea. The most suitable locations for the coastwise discharge and dispatch for the north-western and southern regions of West Africa are Dakar and Accra/Tema, and storing rice there is also consistent with local dietary preferences. All internationally procured cereals would be stored at the discharge locations, thereby reducing transport costs.
- **Existing Regional Initiatives.** ECOWAS is also pursuing a Humanitarian Depot to support emergency food relief operations in the region and has signed a

Memorandum of Understanding with the Government of Mali to support such a depot in Bamako. Opportunities for leverage and cooperation between these two initiatives may exist and will be investigated during implementation.

3. Storage and Commodity Management

A pilot PREPARE system would operate according to sound business management practices, utilising standard accounting and quality testing procedures, inventory controls and insurance tools to manage stock rotation and warehouse operations.

3.1. Stock rotation

A pilot PREPARE system would seek to hold as little physical stock as possible. It would employ an appropriate rotation strategy to manage stocks in the event there are extended periods when participating eligible countries do not require particular commodities from reserve sites. To rotate stocks, the system primarily would rely on sales to or commodity exchanges with food assistance organizations, including UN agencies, NGOs and national safety net authorities. Such organizations could either purchase food from the reserve or make withdrawals upon confirmation of incoming supply.

Food purchased or borrowed for rotation could be distributed in targeted countries or outside the region, potentially making pre-positioned food available in West Africa to respond to other shocks, including weather-related disasters. Documentation and stock records will provide information on stock to be rotated. Standard international practices such as First In-First Out would be applied so that the older stock is rotated first. Preventive action such as quality testing will be used to determine the quality of the grain, as well as to mitigate infestation from replenishing stock.

3.2. Warehouse management

Standard warehouse management practices will be applied. Responsibilities of warehouse staff will include segregation of duties, maintenance of premises, off-loading and checking commodities, handling, stacking principles, cleaning the store, inspection of commodities and the store (including measurements of moisture, humidity and temperature), stock rotation, waste disposal, pest control, stacking outdoors, emergency storage, documentation and record-keeping. The grains and PREPARE warehouses will need to be insured either locally or internationally.

3.3. Inventory accounting and inventory tracking protocols

Standard commodity receipt and dispatch systems should be in place, defining the transfer of ownership of the cargo from the supplier/transporter to the PREPARE warehouse. The same is applicable for the uplift of grains. A computerised system of stock movement will be implemented and linked to all PREPARE warehouses in the region, enabling up-to-date information on stocks at any time. This would be supported by stack cards and warehouse ledgers. The system would be compliant with the International Public Sector Accounting Standards. Controls to be implemented may include monthly physical stocktaking to verify the accuracy of records, regular

inspections, established procedures for loss/damages/reconstitution/destruction of grains, and a reporting mechanism.

D. TRIGGERS

Clear trigger criteria are essential to ensuring participating countries have predictable and timely access to food through the pilot PREPARE system when needed to bridge supply gaps during periods of high and volatile prices. The trigger is designed around three key concepts: 1) transparency; 2) linkages to objective measures of extreme price volatility; and 3) identification of countries based on need. As discussed in detail in this section, a pilot PREPARE system would have a two-level sequential trigger composed of: 1) a global trigger linked to extreme price volatility and 2) a country-level trigger that identifies needs based on a national early warning mechanism.

**At a Glance:
Triggers**

- Two-step trigger mechanism links extreme global price volatility with country-level needs
- Global trigger is based on IFPRI's NEXQ tool that provides an objective measure of volatility
- Country-level trigger uses FEWSNET to prioritise needs among countries
- Trigger at country level could later be replaced by a regional early warning mechanism being developed by CILSS when fully operational

The two-step trigger directly links extreme price volatility at the global level with needs at the country level. Specifically, a participating country could draw down a limited amount of commodities from the reserve (see Section VI.B, *Sizing and Composition*) to meet the humanitarian needs of vulnerable populations through safety nets and other targeted food assistance programmes if it requests food from the reserve and the following sequential triggers are met:

- **Trigger at the global level:** PREPARE will trigger when there is transparent and objective evidence of a period of extreme price volatility identified by the Nonparametric Extreme Quantile Model (NEXQ), a tool developed and launched by IFPRI. NEXQ's key advantage is that it provides an instrument to measure through consistent metric periods of extreme price variability characterized by an unusually high number of occurrences of extreme values of returns in a timely and transparent way. It also is updated daily. NEXQ currently works with hard and soft wheat, maize and soybeans, although it can be used for any other commodity with daily data of returns. IFPRI currently is working to include rice.
- **Trigger at the country level:** Once the global trigger is active, the country-level trigger will identify countries based on an existing or emerging food shortage indicated by a national early warning mechanism, specifically whether the Famine Early Warning Systems Network (FEWSNET) has determined that food insecurity exists in a participating country at Phase 2 (stressed) Phase 3 (crisis), Phase 4 (emergency) or Phase 5 (catastrophe). FEWSNET's country outlooks currently provide the most detailed and targeted analysis of food security by incorporating micro-level geography and income distribution effects. However, the country-level trigger could transition to a regional early warning system that is being developed by CILSS when that system is fully operational. CILSS and FEWSNET use similar phase classification systems.

1. Global Trigger

The country-level trigger criteria would be considered to have been met when there is transparent and objective evidence of a period of extreme price volatility identified by NEXQ.

1.1. Methodology

NEXQ is a tool developed by IFPRI to analyze the dynamic evolution of returns⁸ over time that combines extreme value theory to identify extreme values of returns and provides early warning of periods of extreme price variability. Details of the model can be found at www.foodsecurityportal.org/excessive-food-price-variability-early-warning-system-launched and in Martins-Filho, Torero, and Yao 2010.⁹

NEXQ is composed of three sequential steps. First it estimates a model of the dynamic evolution of daily returns based on historical data going back to 1954. This model is then combined with extreme value theory to estimate higher-order quantiles¹⁰ of the return series, allowing for classification of any particular realized return (that is, effective return in the futures market) as extremely high or not. One or two such returns do not necessarily indicate a period of extreme volatility. Third, periods of extreme volatility are identified based on a statistical test applied to the number of times the extreme value occurs in a window of 60 consecutive days. Ultimately, the results of periods of extreme volatility for each commodity (soft wheat, hard wheat, maize and soybeans) are combined. On a daily basis, the system will provide information regarding whether or not that particular day belongs to a period of extreme price volatility.

Step One: Any model that tries to explain the evolution of returns over time has to be flexible enough to incorporate all of the salient characteristics of the time series of returns that we observe. So first, we construct a very flexible, fully nonparametric location scale model that explains the evolution of returns through time. This model has two important characteristics. The first is that the mean and the variance of returns through time can vary with time because they are functions of past returns and other important variables that condition the mean and the variance. The second important characteristic of this model is that these functions that describe the mean and the variance for the process are not specified as belonging to any specific parametric class of functions; that is why we call this a nonparametric model. This is important because it allows the data to speak freely about the structure of these functions.

⁸ Let P_t be the price of an agricultural commodity in time period t (t can represent days, months, etc.) The return in time period t is defined as $R_t = R_t = (P_t - P_{t-1})/P_{t-1}$.

⁹ Volatility is a measure of price variation from period $t - 1$ to time period t . If there is a large price variation from period $t - 1$ to t then R_t is large (without regard to whether it is positive or negative) and we speak of large returns or large volatility. Hence, extreme values for returns reflect extreme price variation (volatility) and vice versa. Clearly, if there is no price variation over time (volatility) $P_t - P_{t-1} = 0$ and $R_t = 0$. Note, that a period of sustained price increases (or decreases) may be characterized by low or high volatility.

¹⁰ The quantile is the specific value of a variable that divides the distribution into two parts: those values greater than the quantile value and those values that are less. For instance, p percent of the values are less than the p th quantile. A higher-order quantile is, for example, the 95 or 99 percent quantile—that is, a value of return that has a low probability (five percent or one percent) of being exceeded.

Step Two: The second part is to devise a consistent way of defining what extreme values of returns are, i.e., what extreme price variability is. The way this is done is by combining our nonparametric estimation of the model with extreme value theory. To do this, we need to approximate the tails of the distribution of the model we estimated in the first step. “Tails” refer to the part of the distribution that is associated with very high or low levels of the variable of interest. Taking advantage of the fact that the tails of any distribution can be approximated by a function called Generalized Pareto Function or Pareto Distribution, we combine the nonparametric location scale model estimation in the first step with the Generalized Pareto Distribution approximation of the tails to estimate this high order conditional distribution of the quantiles. This allows us to determine what level of return will give us probabilities of exceedences that are above that value that occur with very low probability (i.e., five percent, two percent or one percent). In summary, what this allows us to do is to estimate quantiles of the return series, which allows us to classify any particular daily return as being exceedingly high. We can choose any quantile, but we have selected 95 percent quantile, i.e., any daily return that exceeds our estimated quantile is classified as a very high return. It is important to note that the identification of any particular high return does not allow for identifying a period characterized by very high price volatility or an unusually high number of occurrences of high price volatility.

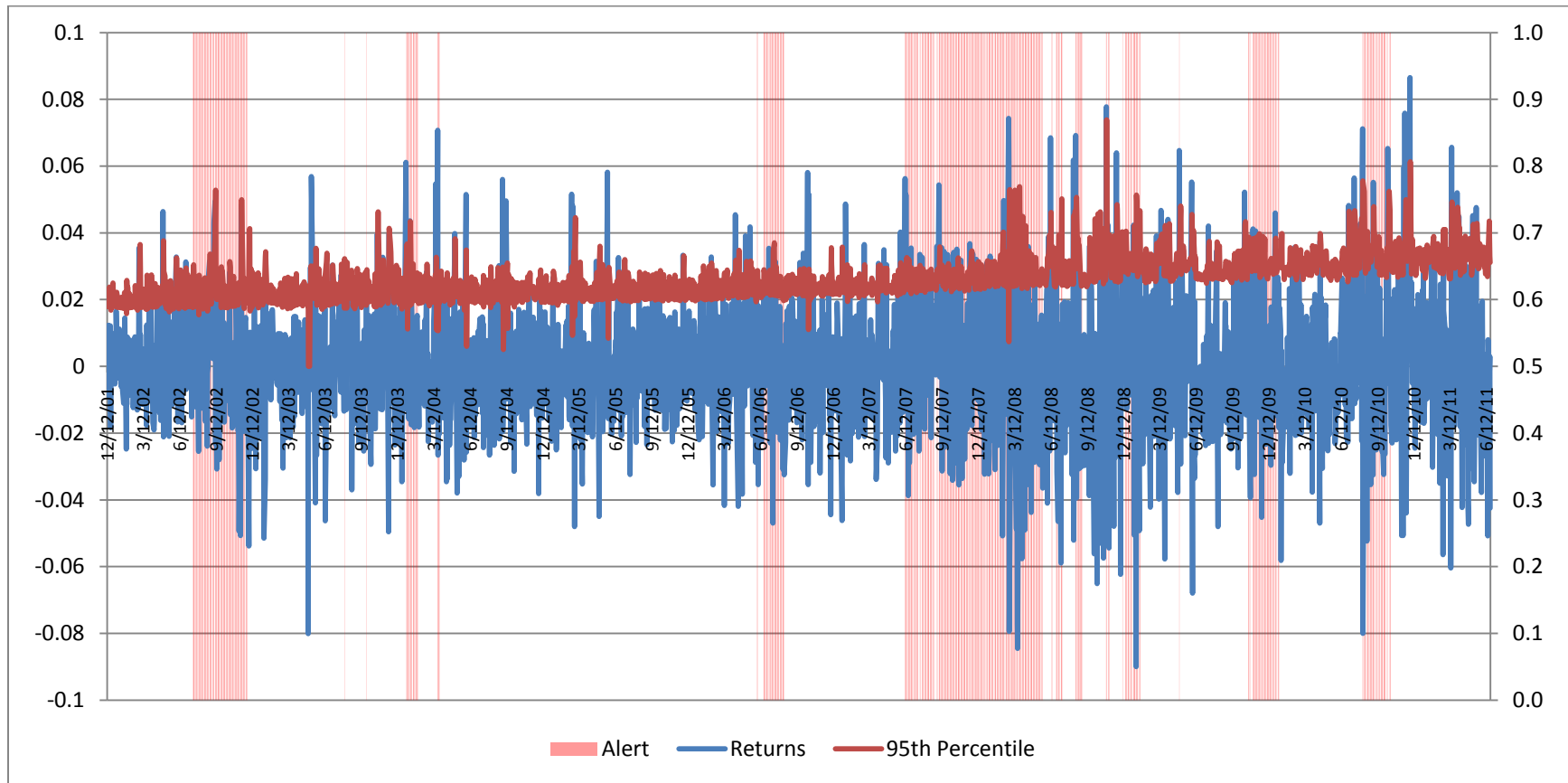
Step Three: The third part of the model tries to resolve this by using a statistical test that identifies periods of increased price variability. This is done retrospectively, i.e., for any particular day we observe a return, we look at the previous 60 trading days; within that period of time, we have an estimated number of returns that exceeds the quantile that we estimate with our model. Then we compare that count of the number of returns that exceed the quantile with the expected number of returns that should have exceeded it. A statistical test is then developed to verify whether the discrepancy between the count we have of the exceedences over the quantile and the expected number of exceedences is high. If it is statistically significantly high, we characterize that particular day as a day belonging to a period of extreme volatility. We then move this 60-day window through the entire past history of returns and construct the red bands seen in Figure that follows, which is an example of the proposed approach for hard wheat. In the figure, any realized return (black line) that exceeds the 95 percent quantile (the higher-order return estimated by the model, shown by the red line) is classified as a large or abnormal return. The probability of such a return occurring, relative to what can be forecast based on historical data since 1954, is extremely low (the probability is just five percent). Finally, the areas shaded in red represent periods of extreme price volatility and therefore the periods in which the global trigger would have been activated.

Once the periods of extreme volatility are identified for all the key commodities (currently for wheat, maize and soybeans and eventually also for rice) all those periods are combined and a global trigger of periods of extreme price volatility is defined as shown in Figure , *Global Trigger Scenarios*. It shows the different periods where the trigger will happen when combining different commodities. Given that PREPARE’s objective is to address the problem of access among the most vulnerable, we recommend the most conservative scenario, which is the one that activates the trigger

whenever wheat (hard or soft), maize or soybeans¹¹ fall in a day of extreme price volatility. This very conservative trigger ensures that PREPARE triggers in most of the situations in which global markets could be restricting access for food to the most vulnerable countries.

¹¹NEXQ's main limitation, which relates to availability of data as opposed to the tool itself, is that it requires time series of daily prices, which at this point are only available for wheat (soft and hard), maize, soybeans, and rice (paddy). It will be ideal also to have it for broken rice, for which we are trying to identify an appropriate data source.

Figure 5: Extreme Food Price Variability for Hard Wheat

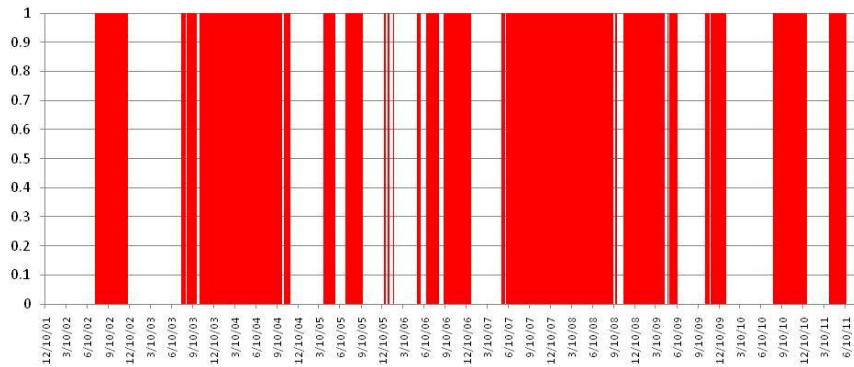


Source: Martins-Filho, Torero, and Yao 2010. See details at <http://www.foodsecurityportal.org/soft-wheat-price-volatility-alert-mechanism>.

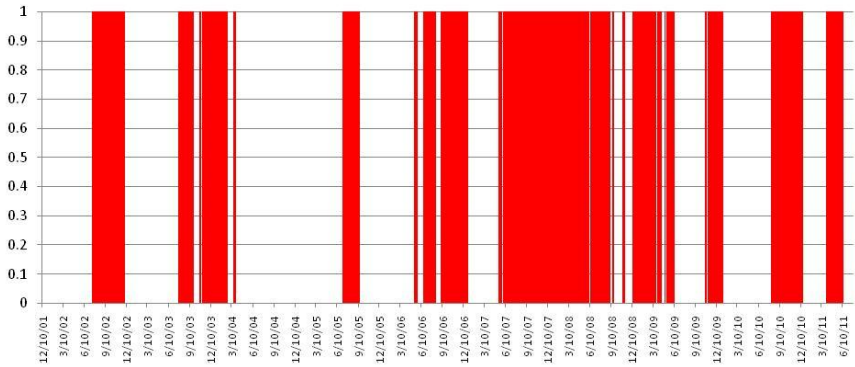
Note: The blue line is a logarithm of the observed daily return (rate of increase of prices from one day to the next) on investment. The red line represents a level below which returns have a 95 percent probability of occurring. When the blue line (return) exceeds the red line (95th percentile), it is characterized as an excessively large return. One or two such returns do not necessarily indicate a period of extreme volatility. Periods of extreme volatility are identified based on a statistical test applied to the number of times the extreme value occurs in a window of 60 consecutive days.

Figure 6: Global Trigger Scenarios

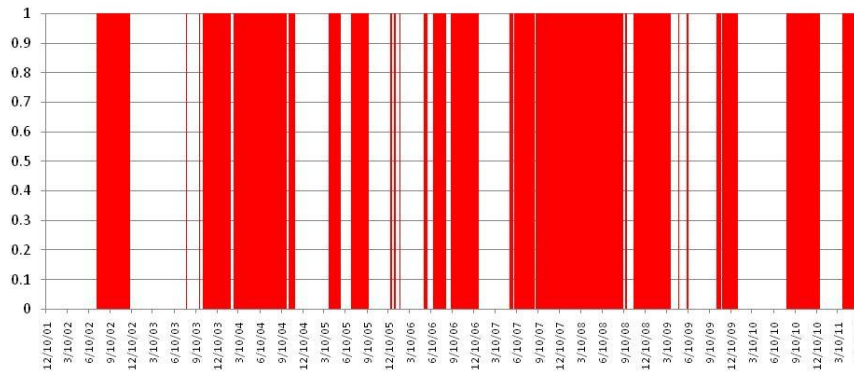
Global Trigger: Shaded red areas represent periods of excessive price volatility for Wheat (hard and soft) OR Maize OR Soybean



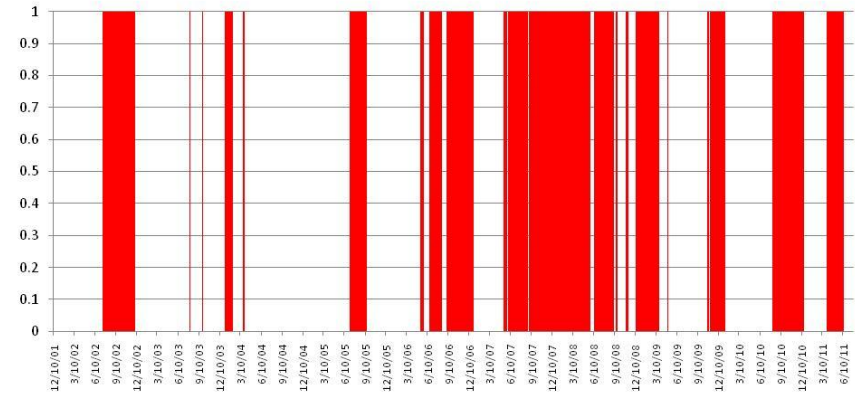
Global Trigger: Shaded red areas represent periods of excessive price volatility for Wheat (hard and soft) OR Maize



Global Trigger: Shaded red areas represent periods of excessive price volatility for Hard Wheat OR Maize OR Soybeans



Global Trigger: Shaded red areas represent periods of excessive price volatility for Hard Wheat OR Maize



Source: Martins-Filho, Torero, and Yao 2010. See details at <http://www.foodsecurityportal.org/soft-wheat-price-volatility-alert-mechanism>.

1.2. Other options considered

The following alternatives to the proposed trigger also were considered as described below.

Participation without a trigger: If eligibility is limited to pre-qualified countries, it may not be necessary to establish trigger criteria beyond a declaration by a participating eligible country to the reserve manager or governance body reporting an urgent need and requesting a specific amount. Examples of existing facilities that operate in this way include the World Bank's Development Policy Loan with Catastrophe Deferred Drawdown Option, which provides a contingent credit line to International Bank for Reconstruction and Development countries in the aftermath of a natural disaster. In this case, the trigger is when the country itself declares a state of emergency (World Bank Treasury, 2010, pg. 1). Likewise, the ASEAN +3 EAERR requires countries to declare their needs and report their requirements. Self-selection could ensure swift access and reduce bottlenecks when delays might lead to a more serious emergency. It could also encourage more active use of the system, strengthening economies of scale, reducing overhead and supporting the sustainable operation of the reserve. It may be a particularly attractive option since participating eligible countries can purchase no more than a defined amount of food and since sales are transacted at market-based prices. However, major caveats are the lack of transparency in the process of delivery; lack of a clear and objective mechanism that will give all eligible countries the same access opportunity; potential moral hazard issues; and use of the reserve for issues not directly linked to price volatility.

Using supply shocks as a trigger: Indicators of supply shocks could also be used as potential triggers for release of food from the reserve. For example, participating eligible countries might be permitted to draw down food from the reserve when they have suffered a shortfall in which production of a cereal or cereals is more than a certain percentage lower than the average production during a previous representative period. A similar criterion is envisioned for a regional food bank established by the members of the South Asian Association for Regional Cooperation (SAARC) (SAARC, 2007, pg. 3). This kind of trigger is appropriate for certain systems. However, for the purposes of a pilot PREPARE system, it is likely to involve many of the same challenges as self-selection. Moreover, it imposes an implicit trigger at the country level and is linked to production shortfalls, which would be extremely costly to monitor and not necessarily representative of the needs of the most vulnerable populations in the respective country.

Price trigger: A price-based trigger could also be considered for a PREPARE system. Based on a statistical model that forecasts return extreme values, this kind of trigger could provide a useful dynamic food price ceiling which, if breached, could serve as the trigger for activating drawdown rights. The benefits of this mechanism are that it is directly linked to food prices. However, it does not take into consideration the specific situation of the regions or countries. In addition, it does not include the concept of extreme price volatility as a direct link to accessing PREPARE.

2. Country-Level Trigger

The country-level trigger criteria would be considered to have been met when FEWSNET has determined that there exists in a participating country acute food insecurity classified as Phase 2 (stressed), Phase 3 (crisis), Phase 4 (emergency) or Phase 5 (catastrophe). A regional early warning system in development by CILSS and others could be evaluated as an alternative to FEWSNET in determining when the country-level trigger criteria are met once that system is fully operational. The CILSS system uses a similar phase classification system to FEWSNET.

2.1. Methodology

The global trigger described above sets up an early warning for periods of extreme price variability during which the reserve system will trigger. In addition, and to be able to specifically target the most vulnerable countries, a country-level trigger mechanism also is needed. After analysis of three existing mechanisms that could serve as the country-level trigger, we recommend initially using USAID's FEWSNET given that its country outlooks provide the most detailed and targeted analysis of food security by incorporating micro-level geography and income distribution effects. FEWSNET's on-site presence allows it to provide continued in-depth monitoring and forecasts in areas of persistent food insecurity. In locations without in-country offices, FEWSNET works through local partners and may increase staff presence as anomalies arise. FEWSNET is able to concentrate its resources on the most food-insecure countries while, at the same time, responding to crises in other countries as needed. This focused and flexible approach makes FEWSNET the most comprehensive system for monitoring and early warning.

FEWSNET's strength lies in its ability to link market data and climate information to the effects on food security at the household level. Through its regional and country centers, USAID monitors agro-climatic conditions, markets and trade, and livelihoods for 31 countries in the developing world. In West Africa, the CILSS Regional Training Centre for Agro-meteorology and Operational Hydrology (AGRHYMET) Regional Center (Niamey) and national agricultural, meteorological and hydrological services provide satellite (National Ocean and Atmosphere Administration [NOAA] and Meteosat images) and ground data to FEWSNET. Table 5 below shows FEWSNET's country coverage.

Table 5: FEWSNET Country Coverage (Countries Eligible for PREPARE Pilot in Bold)

West Africa	Burkina Faso , Chad, Liberia , Mali , Mauritania, Niger , Nigeria, Senegal , Sierra Leone
East Africa	Burundi, Djibouti, Ethiopia, Kenya, Rwanda, Somalia, South Sudan, Sudan, Tanzania, Uganda
Southern Africa	Malawi, Mozambique, Zambia, Zimbabwe
Central America	El Salvador, Guatemala, Honduras, Nicaragua
Caribbean	Haiti
Central Asia & Middle East	Afghanistan, Tajikistan, Yemen

In conjunction with NOAA and the United States Geological Survey (USGS), FEWSNET monitors estimated rainfall and maintains indices for normalized differences in vegetation and water requirement satisfaction. FEWSNET also tracks the inter-tropical convergence zone and provides estimates of food insecurity for current and subsequent

quarters. Food security estimates are based on criteria set forth in the Integrated Food Security Phase Classification's (IPC's) food insecurity reference table for household groups (see Figure 7 below). The Livelihoods section focuses on household economy and the use of coping mechanisms to survive food crises – for example, people selling off assets or burning wood for charcoal to supplement their income. By collecting data, FEWSNET is able to build profiles of which sectors account for the income of the poor and baseline estimates of the options available to them to meet basic survival needs in the case of crisis.

Figure 7: FEWSNET Integrated Food Security Phase Classification System¹²

IPC Acute Food Insecurity Reference Table for Household Groups					
	Phase 1: No Acute Food Insecurity	Phase 2: Stressed	Phase 3: Crisis	Phase 4: Emergency	Phase 5: Catastrophe
Summary Description	Household groups do not experience short term instability; -OR- Household groups experience short term instability but are able to meet basic food needs without atypical coping strategies	Household group experiences short term instability; -AND- Household group food consumption is reduced but minimally adequate without having to engage in irreversible coping strategies	Household group experiences short term instability; -AND- Household group has significant food consumption gaps with high or above usual acute malnutrition; -OR- Household group is marginally able to meet minimum food needs only with irreversible coping strategies such as liquidating livelihood assets or diverting expenses from essential nonfood items	Household group experiences short term instability; -AND- Household group has extreme food consumption gaps resulting in very high acute malnutrition or excess mortality; -OR- Household group has extreme loss of livelihood assets that will likely lead to food consumption gaps	Household group experiences short term instability; -AND- Household group has near complete lack of food and/or other basic needs where starvation, death, and destitution are evident
	Phase 1: No Acute Food Insecurity	Phase 2: Stressed	Phase 3: Crisis	Phase 4: Emergency	Phase 5: Catastrophe

The Markets and Trade section looks at the broader structures affecting food availability and market access. The section provides monthly price bulletins for the countries followed and highlights areas of high food price inflation in a monthly price watch. Production and market flow maps track intra-country trade flows and the locations of retailers and wholesalers of grain. FEWSNET also provides monthly food security updates, regular food security outlooks and alerts. The food security outlooks may be country specific or regional and draw on previously collected information to make projections of food security for a given time period (short and medium term). The approach seeks to make clear assumptions so forecasts can be adjusted as more information becomes available. First, the current situation is assessed. Then assumptions are made regarding likely shocks to the food supply, as well as factors that affect food security which are expected to behave normally. From those assumptions, the direct and indirect effects of likely shocks are inferred. Indirect effects look to connect the direct effects to the household and may depend on the timing, location and supply chain effects of a disturbance. They then assess household response options based on livelihood baseline figures and other assumptions. From this, they generate a final food security outcome and speculate possible events that may alter the outcome.

The main limitation of FEWSNET is that it only operates in certain countries. Similarly, while FEWSNET can accurately diagnose problems, more work needs to be done on recommendations for how those problems may be alleviated in the short or long term.

¹² <http://www.fews.net/ml/en/info/pages/scale.aspx>

2.2. Other options considered

The following alternatives to FEWSNET also were considered as described below.

CILSS/ Crisis Prevention and Management Network: Under the leadership of CILSS, ECOWAS Member States and partner organizations have made a strong commitment to harmonize and strengthen existing food security information and monitoring systems in West Africa. The process is ongoing, but notable milestones have been achieved. A Regional Technical Steering Committee composed of participating institutions has been established to develop a harmonized framework that could be used for the identification and analysis of areas of risk and of vulnerable groups within the region. In doing so, the process has agreed on indicators for evaluating food insecurity and established a five-phase classification system as shown in Table 6 below.

Table 6: CILSS Food Insecurity Classification System

	Phase	General Description
1	General Food Security	Access to food generally adequate and stable (Equivalent to 3 meals a day taken regularly)
2	Moderate Food Insecurity	Limited access to adequate food; risk of situation deteriorating (equivalent to between 2-3 meals per day on average)
3	Critical/Acute Food Insecurity	Insufficient access to adequate food; depletion of assets related to livelihoods at risk (equivalent to between 1-2 meals per day on average)
4	Emergency/ Extreme Food Insecurity	Serious shortcomings in access to food coupled with excessive mortality, high malnutrition and a loss of productive assets (equivalent to less than 1 meal per day on average)
5	Famine	Total lack of access to food, serious social disruption and massive displacement of population and depletion of assets related to livelihoods (equivalent to less than 1 meal a day on average)

Country-level validation tests have been conducted for Burkina Faso, Mali and Niger, and significant strides are being made toward integrating existing vulnerability analysis and early warning systems, including those supported by FAO, FEWSNET and WFP's regional Vulnerability Analysis and Mapping (VAM) unit. The system is able to work with national early warning systems to paint a picture of the overall food security situation in the region. However, it is not yet able to provide standardized maps of individual countries similar to FEWSNET. The CILSS system could be substituted for FEWSNET for purposes of determining when the country-level trigger criteria are met once that system is fully operational.

Global Information and Early Warning System (GIEWS): GIEWS continuously reviews the world food supply and demand situation. It monitors changes in food policy and maintains a database of food prices, which includes 1056 monthly domestic, retail and wholesale price series of major foods consumed in 78 countries, as well as 24 international cereal export price series, covering a total of 20 different food commodity categories. GIEWS provides regular country briefs for the current agricultural season, detailing price trends, policy developments and recent weather, which it uses to

forecast the coming harvest and livestock situation. For country briefs, GIEWS does not operate on site and makes forecasts based on publicly available information. GIEWS also releases monthly reports on global food prices. The quarterly publication *Crop Prospects and Food Situation* provides food production projections and highlights countries that require external assistance for food. The biannual *Food Outlook* contains an overview of global production, utilization and trade. When there is reason to believe that a country will face greater food insecurity in the coming months, GIEWS will perform a Crop and Food Supply Assessment Mission (CFSAM). A mission takes two-four months to complete. GIEWS is effective as an aggregator and interpreter of news bulletins affecting food security from around the world. It provides estimates of overall stocks and prices but may neglect detailed analysis of incomes and food access, except in the case of CFSAMs.

GIEWS covers all 190 FAO member states as well as the EU. Special attention is given to countries with high and persistent food security risk. There currently are briefs for the following countries (Table 7).

Table 7: GIEWS Country Coverage (Possible PREPARE Pilot Countries in Bold)

North Africa	Algeria, Egypt, Libyan Arab Jamahiriya, Morocco, Tunisia
West Africa	Benin, Burkina Faso , Cape Verde, Chad, Cote d'Ivoire, The Gambia , Ghana, Guinea, Guinea-Bissau, Liberia, Mali , Mauritania, Niger , Nigeria, Senegal, Sierra Leone, Togo
Central Africa	Cameroon, Central African Republic, Congo, Democratic Republic of Congo, Equatorial Guinea, Gabon
East Africa	Burundi, Djibouti, Eritrea, Ethiopia, Kenya, Rwanda, Somalia, Sudan, Uganda, United Republic of Tanzania
Southern Africa	Angola, Botswana, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Zambia, Zimbabwe
Commonwealth of Independent States	Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan
Far East	Bangladesh, Bhutan, Cambodia, China, Democratic People's Republic of Korea, India, Indonesia, Japan, Lao People's Democratic Republic, Malaysia, Mongolia, Myanmar, Nepal, Pakistan, Philippines, Republic of Korea, Sri Lanka, Thailand, Timor-Leste, Viet Nam
Near East	Afghanistan, Iran (Islamic Republic of), Iraq, Lebanon, Saudi Arabia, Syrian Arab Republic, Turkey, Yemen
Caribbean	Cuba, Dominican Republic, Haiti
Central America	Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama
South America	Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Uruguay, Venezuela
Europe	Belarus, Republic of Moldova, Russian Federation, Ukraine

Humanitarian Early Warning Service (HEWS): HEWS tracks global natural disasters and other hazards reported by a number of specialized institutions. Its goal is to compile credible early warning information and make it accessible so that humanitarian groups may plan accordingly. HEWS has an interactive map of the world, which shows the location of floods, tropical storms and hurricanes, locusts, volcanoes and seismic activity. It also follows average rainfall for the past 30 days. HEWS is put together by the Interagency Standing Committee, a consortium of UN and other humanitarian partners including FAO, UNICEF, WFP and WHO. They also have several technical partners, including the Dartmouth Flood Observatory, USGS and the Smithsonian Institution. HEWS covers the entire world. The extensive partnerships of HEWS allows it to provide

reliable specialized information on a broad scale of natural disasters. However, there are no economic, social or political indicators that would give insight into the human element of a crisis and help prioritize humanitarian activity. Natural disasters will be much more severe where infrastructure and government is too weak to mount an effective response. HEWS also has a tendency to report potentially erroneous information – for example, floods in Antarctica. The sole focus on hazard events may be too narrow to accurately assess a food or humanitarian crisis.

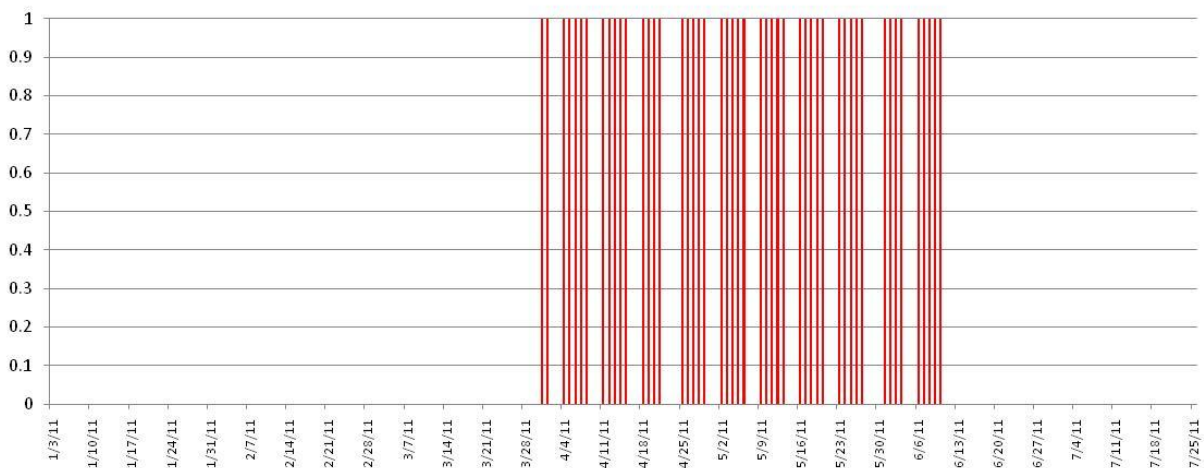
3. Simulation of Two-Step Trigger

Following the steps detailed above, participating countries would be able to draw down stocks from a pilot PREPARE system if both the global and country-level trigger criteria are met. If the global trigger indicates a period of extreme food price volatility, then countries exhibiting food insecurity levels of Phase 2, 3, 4 or 5 according to the FEWSNET system would automatically be able to borrow or purchase stock from the reserve if they chose to do so.

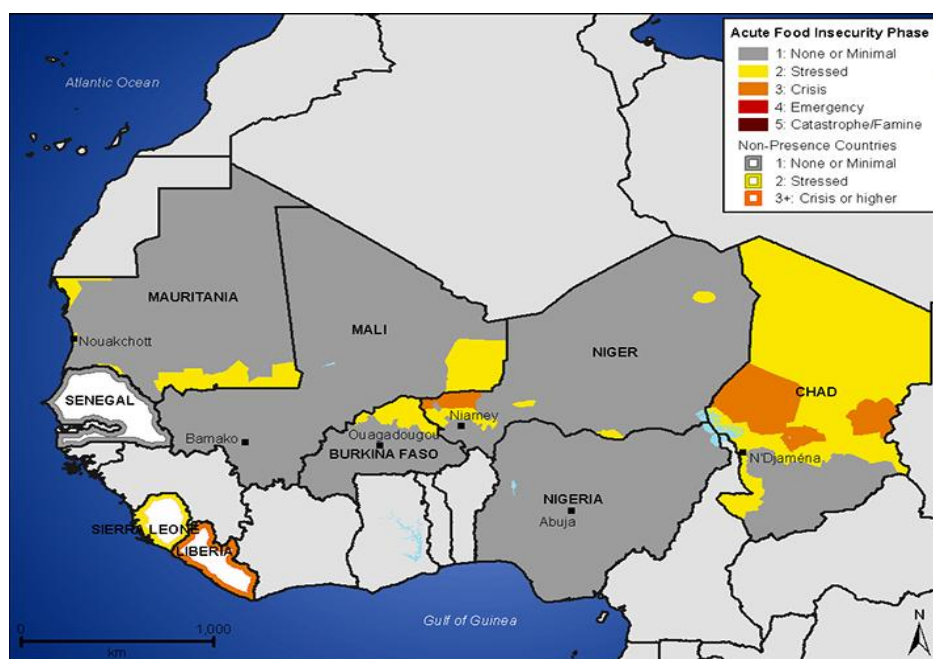
As an example, a simulation of this trigger for 2011 shows that the trigger results would be as follows: The global trigger would have been activated between 31 March 2011 to 10 June 2011 as shown in Figure 8 – allowing Burkina Faso, Liberia, Mali, Niger and Sierra Leone to make purchases from the system as shown in Map 2 that follows.

Figure 8: Global Trigger for 2011

Global Trigger: Shaded red areas represent periods of excessive price volatility for Wheat (hard and soft) OR Maize OR Soybean



Map 2: Estimated Food Security Conditions in West Africa, Quarter 3 2011



E. RELEASE TERMS

When the trigger criteria are met, the PREPARE system would automatically be opened and a targeted country could draw down an amount of physical food from the reserve up to the limit of its allocation for distribution through national safety nets or other targeted food assistance programmes.

To further ensure participating countries have effective access to food in times of crisis and to enable the proposed pilot PREPARE system to contribute to wider responses to severe supply shocks, a participating country could assign its allocation from the system to a food assistance organisation¹³ for distribution in that country when the trigger criteria are met. In such circumstances, the organization involved would act as the counterparty to the transaction and would assume responsibility for replenishing or covering the cost of the food withdrawn. In addition, as explained further in Section IV.G., *Governance*, a participating country could petition the Executive Board of the proposed pilot PREPARE system to access its allocation when the country-level trigger criterion is met but the global-level criterion is not. All other terms and conditions of release, drawdown and distribution would remain in force.

At a Glance: Release Terms

- When trigger criteria are met, countries could borrow up to a 30-day supply of food, then replenish it in kind
- Countries could buy up to their maximum 90-day allotment at the market-based cost of replenishment
- Loans and sales would require binding financial assurances

To ensure cost-efficient and sustainable operation, the system would either loan physical stocks to targeted countries against an obligation to replenish them with

¹³ Food assistance organizations include UN agencies, NGOs and national safety net authorities.

commodities of comparable type and quality within a specified time period, or would sell food to participating countries at the market-based cost of replenishment. In either case, financial assurances could guarantee payment and manage default risk.

1. Borrowing Food

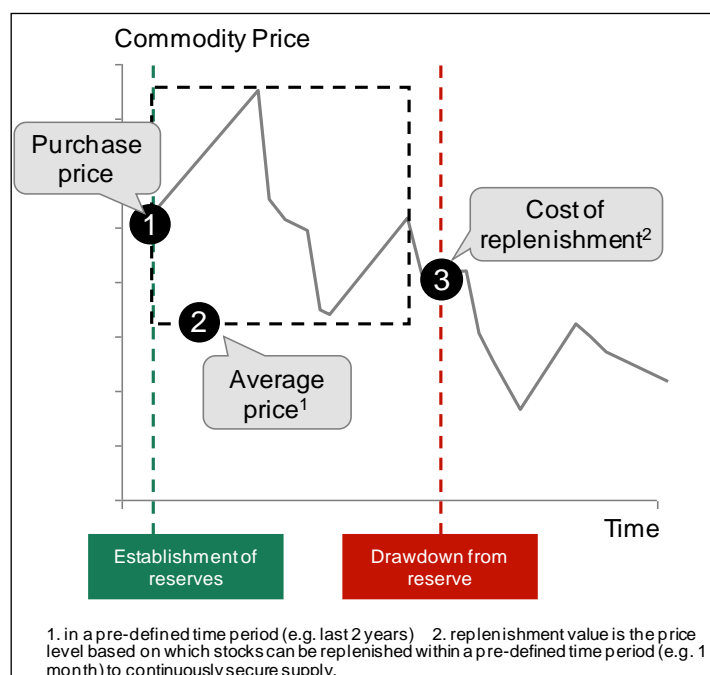
Participating countries could borrow up to one third of their maximum allocation from PREPARE stocks (a 30-day supply) and then replenish it with commodities of comparable type and quality at the next harvest. Participating countries could also borrow beyond that limit if their request is approved by the PREPARE Executive Board (see Section VI.G, *Governance and Transparency*). The borrower would be responsible for all costs associated with transporting the food from a reserve location to the point of delivery to beneficiaries.

This option is likely to be the preferred choice for most countries. Discussions underway within the ECOWAS region toward the establishment of a regional food reserve system envision participating countries borrowing from national reserves held by neighbouring countries. Interviews with national food reserve managers in West Africa indicate such transactions are already taking place. Ethiopia's EFSR works in a similar manner, with all draw downs and repayments registered in metric tons of food. Southern African Development Community's (SADC's) proposed regional food reserve facility also foresees that member countries could replenish reserves they draw down in kind.

In-kind commodity lending gives participating countries more flexibility and may help promote local and regional sourcing. However, uncertainties associated with quality and timing, as well as the fact that lending could cut into any minimum stock reserve requirements during the period between drawdown and replenishment, mean this option must be limited to stocks already held in the reserve.

2. Purchasing Food

Targeted countries could purchase up to 100 percent of their maximum allocation from PREPARE stocks (up to a 90-day supply) at the market-based cost of replenishment. They could also purchase food beyond that maximum allocation if their request is approved by the PREPARE Executive Board (see Section VI.G., *Governance and Transparency*). The buyer would be responsible for all costs associated with transporting the food from a reserve location to the point of delivery to beneficiaries. A variety of options for pricing commodities purchased from the reserve were considered before selecting replenishment cost. Those options are identified in Figure 9 that follows, with each described further below. Of these, replenishment cost was selected to ensure the reserve, once stocked, would be financially self-sustaining.

Figure 9: Pricing Options for Access to Reserve System (illustration only)

Option 1: The price at which the stocks to be sold were originally purchased. Selling commodities at the purchase price would provide the buyer a relative advantage when prices are increasing, but would eliminate any incentive to buy when prices are moving lower. The reserve could therefore be left with commodities that are priced much higher than current market price.

Option 2: The average purchase price over a pre-defined historical period (e.g., 12-24 months). This would provide the buyer with a relative advantage when market prices are higher than recent years because the average price would be lower. However, the converse could also occur. If prices are trending downwards, the average historical price could exceed the current market price. This model has the advantage of greater predictability of prices for purchasers, and would serve to flatten price spikes for reserve commodities (both upward and downward).

Option 3: Replenishment cost. In this model, the price charged for reserve commodities would equal the cost of replenishing the same amount of the commodity in the reserve system during a limited and pre-defined period (e.g., one month). This option ensures that the price of reserve commodities could never exceed current market prices and that reserve operations can be fully self-sustaining. Combined with “smart-sourcing” procurement methods, the actual price of commodities could potentially also be lower than market. Disadvantages of pricing based on replenishment cost include potentially greater volatility for purchasing countries.

Even though purchasing at replenishment rate could incur significant costs, it is also the most feasible and sustainable option out of those considered. While high and volatile prices can have a significant adverse impact on balance of payments for net importers – particularly where rising food costs are covariant with higher fuel prices (IMF African Department, 2008, pg. 1) – interviews with current and former national government

officials in the ECOWAS region suggest nations often have the resources necessary to purchase food, even during times of crisis. They cite access to food and the ability to secure food quickly as the principal challenges, not the ability to pay for it.

Where countries face balance-of-payments challenges that limit their access to food markets, facilities are available from multilateral development banks to help. For example, the IMF Exogenous Shock Facility can help provide quick access to concessional support for low-income countries facing short-term, shock-related financing needs. Modifications of this facility are currently under preparation by IMF staff in order to enable more rapid financing and streamline requirements for access.

Targeted countries may also be able to purchase from a PREPARE system on better terms than may be available on global markets since they would pay the cost of replenishment to the PREPARE system rather than the price they would pay on the market. This could result in a lower cost if PREPARE is subject to a lower risk premium and enjoys better terms than the participating country.

3. Managing Default Risk

Whether a country accesses food from the proposed pilot PREPARE system by borrowing or purchasing, the system needs a way to limit exposure to risk that replacement commodities or payment are not received or not received in full on the agreed schedule. Since countries may only access food from the system up to the limit of their national allocation, the proposed system is structured to reduce the impact of default by any one participating country. The Executive Board could also choose to impose certain penalties for non-payment, including barring countries from accessing additional food from their allocations.

However, structures and rules cannot sufficiently address default risk that could undermine the financial viability and credit-worthiness of the reserve. To further limit risk, the system generally would require participating countries to provide a valid, legally binding and enforceable financial assurance issued by a recognised financial institution, regardless of whether the transaction involves a sale or loan. Such an assurance could be a surety payment bond, letter of credit, insurance policy, stand-by trust or another similar guarantee. While the cost of such assurances from private sector financial institutions may be prohibitive for certain participating countries and unavailable for some others, letters or credit or other guarantees could be obtained on concessional terms from international financial institutions, multilateral development banks or one of two regional development banks – the West African Bank of Development (BOAD) or the ECOWAS Bank for Investment and Development (EBID). Assurances from these sources can carry an annual rate as low as two percent or less, and would help to address the potential risk of moral hazard.

A financial assurance would not be required if a targeted country wished to secure food from the PREPARE system with funds secured for that purpose from a facility maintained by an international financial institution or multilateral development bank under terms that allow direct payment from that institution or bank to the system.

F. SAFETY NETS

The G20 Agriculture Ministers requested a proposal for a pilot emergency humanitarian food reserve system that ensures integration with schemes of targeted food based safety nets, in line with the expressed needs of eligible countries in West Africa. The ECOWAP and ECOWAS regional CAADP investment plan call for assistance to ensure coverage of food needs of vulnerable populations in rural as well as urban areas. The investment plan recognises the need to define a regional approach to safety nets for vulnerable populations, including support for defining a common approach and intervention instruments concerning access to food for the poorest.

At a Glance:

Safety Nets

- Food from PREPARE reserve could be distributed through a wide range of food-based safety nets and other targeted programmes run by governments and development partners
- Participating countries and partners would develop and implement monitoring plans
- PREPARE would support tailored capacity building that assists countries to refine, develop and scale up safety nets

The proposed pilot PREPARE system would make food available to targeted countries to respond rapidly to the humanitarian needs of their most vulnerable populations. Food from the reserve would enable these countries to maintain and scale up safety nets to respond to shocks and mitigate the impact of high and volatile food prices on the hungry poor. Eligible countries have experience implementing particular safety net programmes, and focused capacity-building assistance can help establish well-coordinated systems and appropriate monitoring plans. To ensure the necessary foundation is in place to operate the pilot and help countries respond effectively to shocks before they become crises, participating countries and development partners would identify existing safety nets that are sufficient to distribute food borrowed or purchased from a pilot reserve system and establish a plan to monitor distributions.

1. The Role of Safety Nets in Responding to High and Volatile Prices

Safety nets such as school meals, food for work and nutrition programmes can play a critical role in mitigating the impact of high and volatile food prices on the hungry poor by maintaining their access to food and forestalling increases in poverty (World Bank, 2008, pg. 5-6). A safety net system, comprised of publicly funded, non-contributory transfer programmes targeted to vulnerable populations on either a temporary or permanent basis, can help save lives and strengthen livelihoods. It can reduce malnutrition that has lifelong consequences, prevent depletion of productive assets and reductions in education and health spending, build resilience to sudden shocks and promote longer-term development.

Efficient and effective safety nets are generally recognised to be appropriate to needs and context-specific, adequate to achieve desired objectives in a timely manner, equitable, cost-effective, incentive-compatible, sustainable and dynamic. They form part of a wider social contract embedded in social protection. When directed to food needs they support and underpin comprehensive food security strategies. They are transparent, participatory and open to learning and continued improvement through monitoring and evaluation (M&E). Targeted programmes to support food consumption can provide the building blocks from which governments develop a more integrated

safety net system as part of their broader social protection and food security frameworks.

Critically, however, safety nets must already be in place at the time a shock occurs to achieve their full potential. In the midst of a crisis, it is difficult to construct and deploy effective safety nets. Once in place, these programmes can be scaled up to meet rising needs during periods of high and volatile food prices or in response to other shocks (Compton, Wiggins and Keats, 2010, pg. 23).

2. ECOWAS Experience with Safety Nets

As indicated in Table 8, most eligible ECOWAS Member States respond to shocks through food markets or direct food transfers. These include market-based instruments like subsidies and import tax exemptions to mitigate the impact of high prices, as well as targeted direct transfer programmes like school meals and food for work. Most eligible countries have school feeding programmes, and many also have nutrition and food-for-work initiatives. Some dramatically increased investments in food-based safety nets following the 2008 food crisis. For example, Burkina Faso increased total spending on food transfers, including subsidized targeted food sales, direct food transfers, nutrition and school feeding, by more than 50 percent during 2008 and 2009.

Table 8: Existing Safety Net Programmes in the ECOWAS Region

Country	Existing Social Protection Programs				
	Cash Transfer	Food for Work	Food Ration/Stamp	School Feeding	Community Granaries
Benin				√	
Burkina Faso		√	√	√	√
Gambia, The				√	
Guinea*				√	
Guinea Bissau*				√	
Liberia*	√	√		√	
Mali		√		√	√
Niger**	√	√	√	√	√
Senegal	√	√		√	
Sierra Leone*		√		√	
Togo		√		√	

*Countries also listed in FAO List of Countries in Crisis Requiring External Assistance

** Countries listed by WFP as Highly Vulnerable to Increased Food Commodity and Fuel Prices

Onsite school feeding programmes are implemented in all countries. In Burkina Faso, Guinea, Guinea Bissau, Liberia, Mali, Niger and Senegal, take home rations are also used. Most government-operated programmes use a decentralized model where the budget is allocated and schools purchase food locally. Burkina Faso is the only country to have centrally allocated physical commodities to a school feeding programme. NGOs operate school feeding programmes in West Africa funded by other partners using food aid. WFP has similar operations in all eligible countries except Togo. WFP uses international procurement in The Gambia, Guinea and Niger for rice, in Guinea Bissau and Senegal for

maize and in Liberia and Sierra Leone for bulgar wheat. Local procurement is used in Benin and Burkina Faso for rice and in Burkina Faso and Mali for millet and sorghum. Take home rations using cereals exist in The Gambia (rice), Burkina Faso (maize, sorghum and millet), Liberia (bulgar wheat) and Niger (rice).

Community granaries are an important food-based safety net for some West African countries, including Mali and Niger, and play a role in food deficit areas of Burkina Faso. Together with WFP, the World Bank-financed Community Action Programme in Niger supported the creation of 136 granaries in 48 communes to help strengthen of the food security of vulnerable communities. Granaries are used to smooth consumption, with villagers depositing grain at harvest and drawing down in the lean season. The inter-seasonal variation in cereal prices in Sahelian countries often allows food to be bought at low prices and sold at higher but below-market prices, with enough profit retained for ongoing operation. Community granaries can play a valuable role in smoothing inter-seasonal food consumption, particularly in food deficit areas. However, they are not sustainable in the face of a covariate shock, such as high and volatile food prices, which undermines their ability to purchase stocks – often requiring a fresh infusion of stocks.

Most countries have experience using public works programmes, largely paying in food. These are often used during the lean season, and initiated in response to shocks such as droughts.

3. Leveraging Existing Programmes and Building Capacity

The proposed pilot PREPARE system would allow participating countries to borrow or purchase food for distribution through food-based safety nets or other targeted food assistance programmes when the the terms at in Sections VI.D., *Triggers*, and VI.E., *Release Terms*, are met. Food released from a pilot PREPARE system could be distributed through a wide range of existing programmes, including those maintained by national governments and operated by partner organizations.

School feeding programmes can be scaled up during periods of extreme price volatility and use food available through the proposed pilot PREPARE system. Participating countries could allocate food commodities from the system to schools for their feeding programmes to avoid local purchase by schools tightening the market further. Onsite school feeding can be scaled up by increasing the number of “school years” that benefit when all students are not covered. However, scale up of onsite school feeding is only suitable when these programmes are well targeted to areas where most families are food insecure. Otherwise, there are high inclusion errors.

Take home rations are more suitable in areas where onsite school feeding would generate a high number of inclusion errors due to more differentiation in food security between local households. It is a good way to target specific families with support, reduce inclusion errors and reach families as opposed to just the pupil. However, schools/governments should have lists in advance of the most vulnerable families to facilitate rapid expansion when shocks hit.

Community granaries are one possible mechanism through which food from the proposed pilot PREPARE system could be channeled, making these granaries sustainable in the face of covariate shocks. Public works programmes are an ideal instrument for scale up for able bodied adults when shocks coincide with periods of low work availability. However, to be most effective, they need to be community driven in terms of assets created to ensure ownership and commitment. Integration with local government to ensure ongoing maintenance of the asset and appropriate construction methods is also essential. This points to the need for pre-planning to use this instrument effectively.

Capacity-building assistance will be important to help participating countries establish well-coordinated systems, to identify the appropriate instruments for the right areas and beneficiaries and to develop monitoring plans. Supporting the development of appropriate safety nets to strengthen West African food security is a key aim of both the ECOWAP and ECOWAS regional CAADP investment plan. The national CAADP investment plans of several eligible countries also prioritise safety nets. However, the policy and programmatic framework for safety nets at country level is limited, and most safety nets in place in the region are currently resourced, implemented and managed by partners under broad government oversight.

Capacity development would be tailored by country and focused on how best to refine and maximize the use of the current instruments, introduce new ones where necessary, and scale up into a comprehensive, targeted and well-monitored system that can smooth consumption and protect the vulnerable during food shocks. It would build market analysis capacity to inform programmatic decisions and how targeted assistance complements other instruments for addressing a food price shock.

4. Proposed Design and Feasibility

To ensure that eligible ECOWAS Member States wishing to participate in a pilot PREPARE system are ready and able to support the system and ensure appropriate monitoring of food distributions, participating countries would take the steps outlined in Table 9 before the system begins operation. Capacity-building assistance would continue once the system begins operation and throughout the period of the pilot. The proposed PREPARE system would not deliver that assistance directly, but could help to catalyse and focus support, provide incentives for participation, and facilitate delivery by other partners.

Table 9: Steps Before the System Begins Operation

ACTION	FEASIBILITY
<p>Establish a new or identify an existing committee that brings together key Ministries and partners (donors, international organizations and NGOs) with responsibility and/or expertise in food, agriculture and safety nets and ensures linkages with other strategies, including national food security policies and early warning systems.</p>	<p>Through participation in the CAADP process, eligible countries generally already have appropriate multistakeholder food security committees and structures in place.</p>

<p>Under the leadership of the committee, initiate a review of existing safety nets and expenditures by partner, including:</p> <ul style="list-style-type: none"> • Instruments used; • Groups targeted; • Coverage; and • Programme performance (Grosh et al., 2008). 	<p>The CAADP investment plans of a number of eligible countries already provide certain information relevant to such reviews. The World Bank has spearheaded this type of review with the governments of Burkina Faso, Mali and Niger, and work in other countries could build on recommendations in those reports.</p>
<p>Identify range of existing safety nets sufficient and appropriate to distribute food borrowed or purchased from the pilot PREPARE system and identify gaps, with a view to:</p> <ul style="list-style-type: none"> • Developing a schedule of appropriate safety net programmes; • Defining how those programmes would be targeted to provide temporary support to vulnerable groups; • Determining how food would be delivered; • Developing a monitoring system, including responsible partners; and • Identifying specific needs for ongoing capacity building assistance. 	<p>Support for this work may be available through multilateral development banks. For example, the World Bank supported development of social safety nets with \$11.5 billion in lending over the last decade to a wide array of countries, including Burkina Faso, Liberia, Niger, Senegal and Sierra Leone. The Bank significantly increased lending and grants assistance for social safety nets during and following the 2008 food price crisis, and existing facilities may be available to support ongoing work, including the Rapid Social Response Multi-Donor and Catalytic Trust Funds (Independent Evaluation Group, 2011).</p>
<p>Submit the schedule of safety nets and monitoring plan to the governance body of the PREPARE system for consideration and approval. Once the schedule and plan are approved, the participating country would only need to specify in requests for food from the system the approximate area where the food would be distributed, the likely safety net programme and the partner responsible for monitoring.</p>	<p>Development and overall management of the safety net system would be led by the government, but could be managed and implemented on a day-to-day basis by a partner, especially where new programmes need to be established.</p>
<p>Establish standardized and pre-negotiated procedures for taking delivery of food from the pilot PREPARE system for safety net distribution.</p>	<p>In recent years, many eligible countries increased food stocks for distribution to vulnerable populations. However, such operations were done on an ad-hoc basis. Incorporating these “lessons learned” into formalized plans during periods of stability would allow for a more efficient distribution system during times of crisis. In many cases, these efforts could leverage existing emergency planning work already underway.</p>

5. Cash Transfers

The purpose of the proposed pilot PREPARE system is to help poor countries ensure access to physical food for their most vulnerable populations during periods of high and volatile prices when market supply is unable to or slow to respond to demand. By adding to supply when food is scarce, food-based safety nets are an appropriate response in such circumstances. They are also able to directly address food needs of beneficiaries through inflation-protected transfers during periods of rapidly rising prices. Such safety nets are also more common in West Africa and can be deployed in a wide range of settings, even with limited financial or other infrastructure.

However, nothing in the proposed design of a pilot PREPARE system precludes the use of cash transfers by participating countries or their partners in circumstances when food is available and markets are functioning properly, but vulnerable populations do not have the resources to purchase food. In fact, lessons from Ethiopia and elsewhere suggest that the implementation of the proposed pilot PREPARE system could be complementary to other systems and that a combination of transfer modalities may be appropriate. For example, if school feeding pipelines were used to channel commodities to beneficiaries to replace local procurement and remove some local demand pressure from the marketplace, they would enable use of cash transfers by governments for other categories of beneficiaries. The review of existing safety nets called for above could be an opportunity to consider a wide range of existing and potential tools, including conditional and unconditional cash transfers.

Steps associated with a PREPARE pilot would be equally valuable to safety net and social protection systems in any form because of their universal needs for targeting, monitoring and administrative oversight. They could help to form the foundation for a broader, nationally owned safety net system, including cash-based programmes.

G. GOVERNANCE and TRANSPARENCY

The proposed pilot PREPARE system would be established as a separate legal entity. It would operate under a flexible, streamlined and accountable public governance structure that promotes efficiency, transparency and operational integrity and enables the system to respond effectively to urgent needs and take account of changing circumstances (Action Aid: Food Reserves as Key to Preventing Food Crises, June 2011, pg. 7-8). Modelled on Ethiopia's EFSR and drawing on examples from corporate and other governance structures,¹⁴ the proposed structure outlined below accomplishes these objectives while ensuring strong ownership by and partnership with participating eligible countries and regional organisations.

At a Glance:
<i>Governance and Transparency</i>
<ul style="list-style-type: none"> • The ECOWAS Commission President chairs an Executive Board • A Management Agent has legal custody of reserve stocks and manages and provides oversight of the system • An Advisory Committee assists the Executive Board and Management Agent by providing regular and timely food security and market analysis, early warning information and market intelligence

¹⁴ Other models reviewed include basic corporate board structures, the World Bank's Haiti Reconstruction Fund and Caribbean Catastrophe Risk Insurance Facility, the Global Alliance for Vaccines and Immunization and UN multi-donor trust funds.

1. Governance

The proposed pilot system would be governed by an Executive Board that operates with the advice and support of an Advisory Committee. The composition and roles of each of these bodies is outlined further below. Wherever possible, existing regional structures would be used to perform the functions of the Executive Board and Advisory Committee. Taking into account regional capacity, new institutions would be created only where their functions and composition are not covered by existing structures.

1.1. *Executive Board*

The Executive Board would be established under the Chairmanship of the President of the ECOWAS Commission or his/her designee. The ECOWAS Commission would serve as the Secretariat of the Executive Board, with the support of one or more international organisations. The exact composition of the Board would be determined during the implementation phase of a pilot, but at a minimum would include representatives of participating countries, regional organisations (UEMOA, CILSS, AU Commission and NEPAD) sustaining bilateral donors,¹⁵ international organizations that are supporting the system, and the Management Agent.

The Executive Board would meet semi-annually in April and December unless otherwise required. These times would take full advantage of food security evaluations available through the CILSS CSPN, which provides the following information:

- September: outlook of the rainfall season in the Sahelian band;
- November: provisional cereal balance sheet, identification of the zones of cereal production shortfalls and at risk; food and nutritional balance sheets;
- December: identification of zones at risk for food security and nutrition, estimation of food needs assistance by zone and by category; global meeting with donors and partners for presenting the results of the rainfall campaign of the region;
- March: definitive food balance sheet; confirmation of food insecurity and shortage zones, intervention actions recommended during the lean season;
- June: agro-meteorological and hydrological season forecast, including risks of drought and/or floods.

The Executive Board would serve as the custodian of the reserve stocks and provide overall policy guidance, strategic coordination, and operational and financial oversight. Specifically, the Executive Board would:

- Set operational and financial rules for a PREPARE system, establish financial controls and monitoring and enforcement procedures;
- Revise operational rules as necessary to strengthen the performance of the system and to take account of changing circumstances;

¹⁵ A “sustaining bilateral donor” is a bilateral donor that is contributing to the annual recurring costs associated with the operation of the PREPARE emergency humanitarian food reserve.

- Select and oversee the Management Agent, ensuring all rules applicable to the operation and financial management of the system are followed faithfully;
- Monitor the financial and operational performance of the system and initiate evaluations and reviews;
- Review operational and financial reports prepared by the Management Agent, including an annual report;
- Review and approve schedules of safety nets and monitoring plans submitted by participating countries;
- Decide on the release of stocks in cases in which a participating country is seeking to borrow food in excess of one third of its allotment or has requested food from the system in excess of its total allotment, based on the advice of the Advisory Committee and considering the stock level of the reserve at the time of the request;¹⁶
- Decide on the release of stocks in cases in which a participating country is seeking food from the system when the country-level trigger criterion has been met but the global-level criterion has not, based on the advice of the Advisory Committee and considering other relevant factors;¹⁷
- Facilitate capacity building for food reserve management and for the establishment and operation of national safety net programmes;
- In collaboration with the Management Agent, develop a capacity building and transition plan for transferring the responsibilities of the Management Agent to national and regional ownership and control.
- Seek to position the PREPARE system as a vital complement to existing national and regional structures and a critical part of a coherent response to food crises in West Africa;
- Ensure regular and timely communication about the operation of the system to the general public; and
- Monitor and ensure participation agreements are adhered to by participating countries. Establish enforcement procedures and penalties to address instances of non-compliance.

1.2. Advisory Committee

The Advisory Committee could be composed of representatives of civil society (such as the Farmers and Producers Organizations Network [ROPPA]¹⁸), the private sector, multilateral and regional (BOAD and EBID) development banks, national food reserve managers, and early warning and market information systems, such as AGRHYMET, AMIS, FAO GIEWS, FEWSNET, RESIMAO and WFP VAM. The Committee would elect a chairman who would serve a two-year term.

The Advisory Committee would collect and provide to the Executive Board and the Management Agent regular and timely food security analysis, early warning information, market intelligence and advice necessary to anticipate and respond to needs, requests and challenges associated with the ongoing operation of the proposed

¹⁶ In the case of Ethiopia's EFSR, for example, authority to release food from the reserve is sharply limited if stocks drop to or below 25 percent of the targeted total stock.

¹⁷ Other relevant factors may include the magnitude of the shock as indicated by early warning systems, prevailing local and regional market conditions and the situation of national response mechanisms, including national reserves.

¹⁸ Réseau des Organisations Paysannes et de Producteurs de l'Afrique de l'Ouest.

pilot PREPARE system. Specifically, the Advisory Committee would provide to the Executive Board with the following:

- Annual food production and expected shortfalls based on information from CILSS/PREGEC and other sources;
- Statements of available food reserve stocks in the region at different levels, including at the community level if possible;
- Regular quarterly reports on the prices of staple foods in the main markets of the region and at international level (maize, millet, rice and sorghum);
- Food needs and import plans by the private sector;
- Regional food exchanges and trade between countries; and
- Recommendations of actions to be taken for the movements of the regional food stock in a food crisis situation or in a normal situation of the regional stock rotation.

2. Management Agent

The Executive Board would select a qualified Management Agent with demonstrated experience in the management and operation of food stocks and the delivery of capacity development assistance. The Management Agent would report to the Executive Board and have authority to operate and provide oversight of the system. In close collaboration with ECOWAS and its Member States, the Management Agent would:

- Procure food (international and regional tender appeals, contracting system);
- Manage logistics (transport, storage, loaning procedures, food movements);
- Maintain stocks (warehouse management, quality control);
- Issue notices to participating countries when trigger criteria have been met;
- Notify release prices and negotiating replenishment terms;
- Release food up to the limit of national allotments and organise and coordinate deliveries;
- Establish and implement a system for monitoring food releases, working closely with relevant international organisations and NGOs;
- Manage stock rotation;
- Provide regular financial and operational management reports to the Executive Board, including an annual report; and
- Build the capacity of national and regional officials to manage and operate the PREPARE system, including by conducting regular training programmes and hosting staff seconded by participating country governments.

For the purposes of a pilot and if endorsed by ECOWAS and its participating Member States, WFP initially could manage and provide oversight of a pilot PREPARE system in view of its long experience in supply chain management and history of advising governments on local, national and regional reserves. It may be possible to improve cost-effectiveness by outsourcing certain system operations to the private sector.

Following a successful pilot period and through effective capacity building assistance, management and oversight functions could be transferred to national and regional ownership and control.

3. Transparency

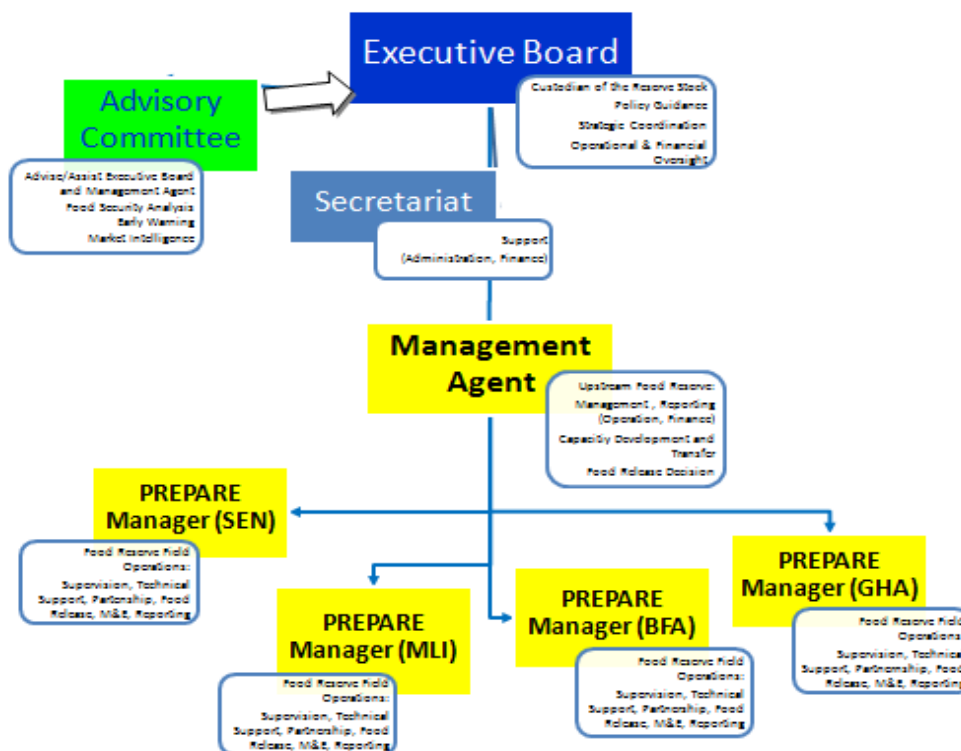
To promote accountability and the efficient use of the PREPARE system, the Executive Board would ensure provision of regular and timely information about the status and operation of the system to the general public. Specifically, the Executive Board will establish and maintain a web site for the system to publish the following information:

- Rules governing the operation and financial management of the system, including trigger criteria, release terms and maximum allocations by country;
- Notices of meetings of the Executive Board and the Advisory Committee;
- Notices of periods when eligible countries that did not opt into the system at inception can elect to participate in the reserve;
- Monthly data on the quantity of each commodity held by the system, by location, provided by the Management Agent;
- Notifications to participating countries when trigger criteria are met, indicating they have the opportunity to purchase or borrow from the system;
- Information about releases of food from the reserve, including requests from participating countries and proposed use of stocks;
- Annual reports of the Emergency Humanitarian Food Reserve system; and
- Evaluations of the system.

4. Organigram

Figure 10 that follows illustrates the proposed PREPARE system’s governance and management structure and assignment of main responsibilities.

Figure 10: PREPARE System Organigram



H. FINANCING

The proposed PREPARE pilot assumes that all 11 ECOWAS Member States will participate in the system. On the basis of that assumption, it proposes a physical stock of 67,000 MT, composed of maize, millet, rice and sorghum. The cost of these commodities – as well as the cost associated with the virtual stocks foreseen under PREPARE – will depend on market prices at the time of purchase. This proposal thus cannot guarantee an exact cost, but rather presents a cost estimate.

At a Glance: *Financing*

- PREPARE operates on a cost-recovery basis, with transparent financing and appropriate burden sharing by all parties involved
- Initial costs are estimated at \$44.3 million and annual recurring costs are estimated at \$16.6 million

The total cost of a proposed PREPARE pilot can be divided into two categories: 1) initial, one-time costs associated with establishing and stocking the system and 2) annual recurring costs associated with the ongoing operation of the PREPARE system. As explained further below, the initial cost of establishing and stocking the proposed pilot is estimated to be \$44.3 million, with recurring annual operational costs of \$16.6 million. Financing and in-kind contributions necessary to stock the reserve and to cover recurring costs could come from countries participating in the PREPARE system and from donors, including through existing facilities maintained by multilateral development banks.

1. General Principles

Three general principles will guide the cost structure of the proposed pilot PREPARE system. Specifically, they are as follows:

- Initial and recurring costs would be covered through appropriate **burden sharing** by all parties involved. As highlighted in Section IV.2, *Lessons Learned*, appropriate burden sharing between participating ECOWAS Member States, relevant regional organisations and interested external donors will be crucial for the success of the system and ensure strong national and regional ownership.
- The proposed pilot PREPARE system would operate on a **cost-recovery** basis. This means that once the initial costs of stocking the reserve are covered, no further external capital should be required to restock the reserve. By borrowing or purchasing food from the system, participating ECOWAS Member States would cover the cost of replenishing the PREPARE system following a drawdown from the reserve.
- The financing and administration of a PREPARE pilot would be **transparent**. The Management Agent in charge of PREPARE implementation will submit regular financial updates on the running costs, which PREPARE's Executive Board will examine and verify.

2. Estimated Cost of the Proposed PREPARE Pilot

As indicated in the following charts, the initial cost of establishing and stocking the proposed PREPARE pilot is estimated to be \$44.3 million. Annual recurring costs associated with the operation of the reserve are expected to be \$16.6 million.

2.1. Initial costs

Initial costs associated with establishing the reserve would include expenses necessary to purchase and transport commodities to reserve sites, rent and set up warehouses, train staff and set up inventory control systems. Since the reserve will operate on a cost-recovery basis, commodity costs would be neutral following initial stocking. Table 10 that follows details initial costs.

Table 10: Initial PREPARE Costs

INITIAL COSTS	
ITEM	COST (MILLION US\$)
Initial physical commodity stocks	\$33.4
Inbound transportation	\$9.0
Initial training and support of local staff	\$1.6
Equipment and other set-up costs	\$0.3
TOTAL	\$44.3

2.2. Recurring costs

Recurring annual costs for the management and operation of the reserve would include stock rotation, virtual stock commitments, warehousing, capacity development activities and administration. Table 11 that follows details recurring costs.

Table 11: Recurring PREPARE Costs

INITIAL COSTS	
ITEM	COST (MILLION US\$)
Storage	\$5.4
Rotation	\$1.0
Virtual reserve	\$5.3
Administration	\$3.0
Governance	\$0.5
Capacity development	\$1.4
TOTAL	\$16.6

3. Financing Initial Stocking Costs

Financing necessary to cover the estimated cost of \$44.3 million to initially stock the reserve could be met through cash and in-kind contributions from participating countries, bilateral donors and regional organisations, including through facilities available from multilateral development banks. Leveraging multiple sources of financing could significantly limit the share of direct contributions necessary from bilateral donors.

3.1. *Stocking the reserve*

As outlined above, the PREPARE system will need to hold 67,000 MT of physical stocks of maize, millet, rice and sorghum, which have – at present – an estimated value of \$33.4 million. These costs would be covered either by in-kind donations or by cash contributions from regional organisations, participating countries and donors.

Participating countries could make in-kind donations of maize, millet, rice and sorghum. In-kind donations of maize and rice could be secured from countries outside West Africa. Several developed and developing nations, including some G20 countries, have offered or provided significant quantities of maize, rice and other commodities as in-kind contributions to food assistance organisations for humanitarian and development purposes. In 2010, more than 1.6 million MT of cereal food aid was provided as in-kind contributions by food aid donors (WFP International Food Aid Information System 2011, Annex Table 1). Concrete discussions about possible in-kind contributions from ECOWAS Member States and countries outside West Africa could be initiated as soon as a proposed PREPARE pilot is adopted.

If all the maize and rice required to initially stock the reserve were supplied through in-kind donations, roughly \$5 million would remain to be supplied in cash contributions for local and regional purchases of millet and sorghum. Regional organisations and participating countries could meet some of this need, either in cash or in-kind. ECOWAS Member States have already committed \$150 million toward their overall regional CAADP food security plan, and some of those resources could be leveraged for this purpose.

Among ECOWAS Member States, it is common for national governments to supply at least some of the physical stocks needed for their national reserves and RESOGEST's provisions also lay the foundation for national contributions to a regional reserve. Such a burden sharing approach is not unusual. For instance, when the Ethiopian EFSR was established, the Ethiopian government and donor countries jointly constituted the stocks through in-kind and cash contributions (EFSRA, 2008, pg. 3).

3.2. *Covering associated costs*

Of the total estimated initial set up costs of the reserve (\$44.3 million), roughly \$9 million would be required to cover the costs associated with inbound transportation of the commodities to the four proposed reserve locations. Participating ECOWAS Member States could cover a portion of the costs by providing local transport and/or donating transport capacity. Under agreements governing reserve systems in a number of West African states, it is not uncommon for national governments to cover logistics and warehouse costs. Analogous agreements could be negotiated in support of the PREPARE system.

Certain facilities maintained by multilateral development banks could also be leveraged to cover associated costs if participating countries are willing to deploy those resources for this purpose. For example, Regional IDA funding is available through the World Bank for projects that promote regional integration (IDA, pg. 3). Roughly SDR (SDR) 1.5 billion in resources are currently available through the Regional IDA programme. The

funding can finance two-thirds of a country's share of the costs of a regional project, with the remaining one-third contribution from the country's IDA allocations. Country contributions to a regional project are capped at 20 percent of annual allocations for countries with small allocations.

While IDA funds cannot be directed toward the purchase of food stocks, they could be used for transportation, warehousing, early warning system support, capacity building and other purposes. According to World Bank officials, the proposed PREPARE system would be eligible for IDA regional financing.

Programmes available through the African Development Bank (AfDB) could also be leveraged to cover certain associated costs. In response to the global food price crisis, the AfDB set up the African Food Crisis Task Force (AFCR) in July 2008. Among other things, the AFCR proposed the establishment of a Crisis Response Facility designed "to contribute to the stabilisation of [...] economies exposed to crises such as food, oil and other commodity price shocks" (African Development Group, 2008, pg. 14). Support was provided through the AFCR to some 24 countries. In addition, AfDB has recently begun supporting programs that further regional integration and there may also be opportunities to reallocate funds from other initiatives to support the initial costs of a pilot.

The private sector may also represent a potential source of financing through a variety of channels. Corporations involved in the global grain trade could be approached for in-kind contributions for the initial stocking of the reserve, while others companies may be able to with recurring costs through corporate social responsibility programmes. The proposed pilot system may also be of particular interest to some larger foundations and social venture capital organizations.

4. Financing Recurring Operational Costs

As indicated in Table 10 above, Recurring costs are limited to maintaining warehousing and storage capacity, rotation, virtual stocks, governance, administration and capacity development. The costs of commodity replenishment under a proposed PREPARE pilot would be neutral since participating countries would borrow or purchase food from the system.

Financing necessary to cover the estimated \$16.6 million annual recurring cost of maintaining the reserve could be met by contributions from regional organisations, participating countries and donors, as well as from facilities available through the multilateral development banks discussed above.

5. Additional Funding Considerations

The Management Agent would provide regular financial reports to the PREPARE Executive Board, including an annual report. These reports would also contain information on the use of financial contributions and in-kind donations and will inform Board members about any foreseen changes in the cost structure of the PREPARE pilot.

Because the proposed PREPARE pilot would extend for a period of five years, flexible multiyear funding would help guarantee the financial stability of the system and ensure activities can be carried out as planned.

VII. Implementation Timeline

If launched in late 2011, the proposed pilot PREPARE system could be operational in early 2014, beginning a five year pilot period. The following section lays out major milestones following the launch of the system and into the early years of its operation, provides an implementation timeline and suggests some key success factors by which a pilot could be evaluated.

1. Major Milestones

Major milestones following the launch of the proposed pilot PREPARE system and continuing into the early years of its operation include establishing the legal foundation for the efficient operation of the system, setting up and stocking the reserve and responding to initial shocks.

1.1. *Establishing the legal foundation*

Following the launch of the proposed pilot PREPARE system, initial implementation activities would focus on establishing a strong legal foundation for the governance and operation of the system. Steps toward that end include the following:

- **Establishing the system.** As explained in Section VI.G., *Governance and Transparency*, the proposed pilot PREPARE system would be established as a separate legal entity with an independent Executive Board.
- **Constituting the Executive Board** under the chairmanship of the President of the ECOWAS Commission or his designee and holding the first meeting of the Executive Board.
- **Defining operational rules and financial controls.** The Executive Board would establish transparent operational rules and financial controls to guide governance and management of the system.
- **Executing participation agreements with participating countries.** As discussed at Section VI.A., *Participation*, countries that wish to participate in the system would agree to take certain steps to support its efficient operation.
- **Approving safety net schedules and monitoring plans.** As discussed at Section VI.F., *Safety Nets*, participating countries would submit a schedule of safety nets that and a monitoring plan for approval by the Executive Board.

It may also be valuable to conclude formal agreements between a pilot PREPARE system and key implementing partners, such as ECOWAS, CILSS, FEWSNET and others to clarify roles, responsibilities and expectations and to guide future collaboration. Such agreements could take the form of Memoranda of Understanding.

1.2. *Setting up the system*

As legal steps are concluded, the focus of implementation activities would turn to actions necessary to operate a pilot PREPARE system and respond to the needs of participating countries. These steps could include:

- **Identifying the Management Agent** that would manage and provide oversight of the system during the pilot period.
- **Securing warehouse space** to store the grain for the system. This would involve identification of specific sites and warehouses at the locations identified in Section VI.C., *Procurement*, as well as negotiating and signing leases.
- **Stocking the reserves** with appropriate commodities as outlined in section VI.B., *Sizing and Composition*, by procuring those commodities and/or accepting in-kind donations as noted in Section VI.H., *Financing*.
- **Testing systems** to ensure a PREPARE pilot is ready to operate when the trigger criteria at Section VI.D., *Triggers*, are met.

1.3. Responding to Shocks

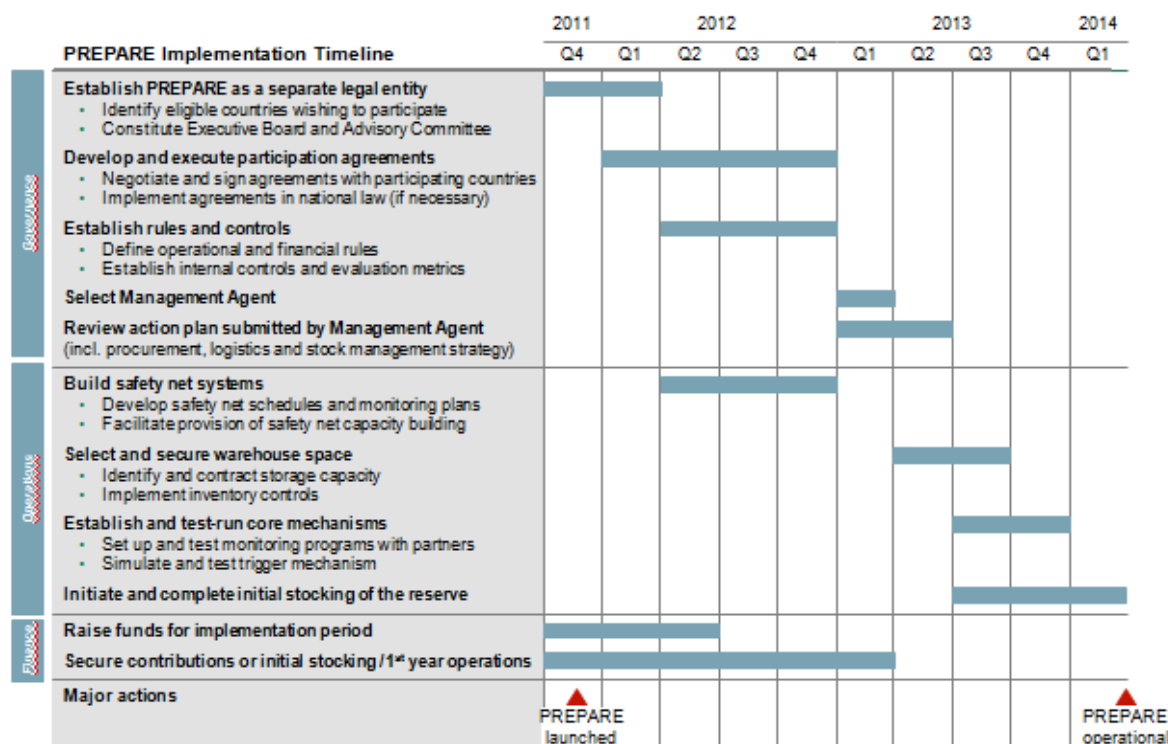
Once a pilot PREPARE system is operational, the first instances when the trigger criteria are activated and food is released from the reserve to participating countries would be critical milestones and opportunities to evaluate how well the system:

- **Responded to activation of the trigger criteria**, communicating the availability of food from the reserve to relevant participating countries.
- **Released food** from the reserve to participating countries and replenished that food through purchase (if food is purchased from the reserve) or in-kind replenishment (if food is borrowed from the reserve).
- **Distributed food through safety nets** according to the safety net schedules proposed by participating countries and approved by the Executive Board.

2. Timeline

The implementation timeline at Figure 11 below illustrates key steps from the launch of the proposed pilot PREPARE system to operation.

Figure 11: PREPARE Pilot Programme Implementation Timeline



3. Evaluation

Evaluation criteria will be essential to assess the ongoing operation of a PREPARE system, to review the success of a pilot and to determine whether the pilot should be extended, expanded to other countries and/or replicated in other regions. While detailed criteria would best be elaborated by the Executive Board, a pilot system generally could be judged on the basis of whether it:

- **Was needed.** Were there continued periods of high and volatile prices? Were the trigger criteria activated for participating countries?
- **Was used.** When the trigger was activated, did participating countries take delivery of food from the system? Was the size of the country allocation adequate? Were stocks rotated cost-effectively and on schedule?
- **Operated with strong national and regional ownership.** Did the country government gain expertise and build capacity related to procurement, market analysis, stockholding? Was the system successfully managed in partnership with ECOWAS and its participating Member States? Did the system achieve synergies with national and regional efforts? Did governance and related protocols, systems and monitoring plans work as intended?
- **Worked.** Was food procured at a reasonable price? Did food reach beneficiaries in a timely manner? What beneficiaries received food through safety net programmes? What percentage of food was procured locally and regionally? Was stock drawdown from PREPARE viewed as transparent and predictable? Was the system adequately financed? Was management and oversight of the system successfully handed over to ECOWAS and its participating Member States?

VIII. Cost-Benefit Analysis

As requested by G20 Agriculture Ministers, this section provides a cost-benefit analysis of the proposed pilot PREPARE system and evidence of cost effectiveness and efficiency compared to other instruments. It contrasts the proposed pilot PREPARE system with four alternative approaches to helping poor food deficit countries in West Africa with little resilience to external shocks ensure predictable and rapid access to sufficient food for their most vulnerable population groups during periods of high and volatile food prices and other shocks. Those alternative approaches are:

- Expanding the current system of **national food reserves** (NFRs),
- Expanding the current system of **community granaries**,
- Establishing a **regional cash reserve facility**, and
- Providing **emergency food aid**.

These alternatives were selected for comparison because, like the proposed pilot PREPARE system, they are all possible ways of ensuring access to physical food during shocks to meet the urgent needs of vulnerable populations. It was also feasible to compare these alternatives with a proposed pilot PREPARE system because most cost and benefit information was available. All of the alternatives either already exist in practice in some form (NFRs, community granaries, emergency food aid) or have been sufficiently described in academic literature to provide a clear understanding of their potential operation (regional cash reserve facility). Given that no robust empirical data is available on the historic frequency and amplitude of volatility-induced food security shocks for the considered countries, scenario analysis was applied to simulate and compare the cost performance of the different options.

The analysis finds that the proposed pilot PREPARE system is a cost-effective option. Compared with the four alternatives, it offers superior availability, speed and risk coverage with lower set up and intervention costs. However, each of the alternative options has different strengths and weaknesses and may be a better way of achieving certain other objectives not measured here. In practice, they are complementary rather than competing tools.

1. Methodology

The cost-benefit analysis evaluates the benefits¹⁹ and costs of the proposed pilot PREPARE system and the four alternative approaches along the following two dimensions:

BENEFITS	
Speed	How many days are needed for the proposed system to be operational? How many days elapse between the onset of a food emergency and the delivery of food rations to the beneficiaries?

¹⁹ Potential health benefits were considered for comparison between the proposed pilot PREPARE system and the four alternative options. However, there does not appear to be sufficient robust empirical data and evidence available to accurately measure and estimate the comparative health impact of PREPARE and the alternative options.

Availability	How reliably does the mechanism make food available to the vulnerable during a crisis?
Sustainability	To what extent does the system contribute to building local capacity and improving local self-reliance?

COSTS		
System Costs	What is the cost to set up and then operate the proposed system?	
	<i>Set-up Costs</i>	<i>Annual Operating Costs</i>
	What are the expected initial, set-up costs for establishing the mechanism, including: <ul style="list-style-type: none"> • Cost of procurement of the initial physical commodities, • Inbound shipping or ground transportation of physical commodities, • Cost of training and support of local staff, and • Equipment and other set-up costs such as IT and office infrastructure, pallets, etc. 	How much does it cost per year to keep the proposed mechanism running and ready, including: <ul style="list-style-type: none"> • Storage, security and maintenance of stocks, • Technical rotation to ensure stock quality, • Any cost incurred for maintaining a virtual stock, • Administration, insurance and office running costs, • Governance costs, including staff, and • Capacity development.
Intervention Costs	What are the expected costs incurred with each option when responding to volatility-induced food insecurity crises?	

To account for the different nature of the analyzed alternatives, system costs and intervention costs were integrated into a timeline analysis that simulated the cost performance of each option over five years (the assumed five year pilot period of PREPARE) and ten years. The resulting net present values (NPVs) of each option provide a comprehensive indicator for the relative cost effectiveness of each approach.

Additionally, to ensure as much of a like-for-like comparison as possible, the assessments relied on the central input factors listed below, common to PREPARE and all options. These and any additional assumptions applied to the cost simulation are outlined and explained in full detail in Annex A.

- Annual food supply needs per country as specified in Section VI.B., *Sizing*.
- Food basket compositions per country based on country balance sheets (see Section VI.B., *Sizing* and Annex A) and procurement, transportation, rotation and storage cost in line with the principles detailed in Section VI.C., *Procurement, Logistics and Stock Rotation*.
- Average commodity prices under normal market conditions, equal to \$520/MT for maize, \$490/MT for rice (25 percent broken) and \$490/MT for millet and sorghum.
- An average 30 percent general market price increase assumed for commodities during volatility-induced food security crises.
- An average 34 percent risk premium added to the market price for any imports made under crisis market conditions by national governments.

- Capability development activities – when applicable – are included. This entails annual capacity development activities performed by a team of two international experts in each participating country.

2. Cost-Benefit Analysis of Proposed Pilot PREPARE System

The analysis finds that the proposed pilot PREPARE system would offer strong benefits across all dimensions evaluated, with initial set-up costs lower than most other alternatives. A description of the proposal and assumptions, as well as an analysis of benefits and costs is described below.

2.1. Description of the option and analysis assumptions

The cost-benefit analysis of the proposed pilot PREPARE system provided below is based on the following additional input factors:

- **Physical capacity** of the reserves is 67,000 MT. The model assumes a total of four reserves, strategically located in Senegal, Mali, Burkina Faso and Ghana to minimize inbound and outbound delivery time to the region's most vulnerable populations and to optimize stock rotation procedures.
- **Sourcing scenario:** While PREPARE explicitly prioritizes regional and local procurement, it is difficult to predict how much food would actually be available on local markets for (re-) stocking the regional reserve. To reflect this uncertainty, the cost simulation for PREPARE assumed a conservative scenario, with a substantial share of internationally procured produce.²⁰
- **Physical stock composition** is further addressed in Section VI.B., *Sizing*. For the cost simulation, 17,800 MT of maize (27 percent of total physical stock), 39,100 MT of rice (58 percent of total physical stock) and 10,100 MT of millet and sorghum (15 percent of total physical stock) were assumed
- **Virtual reserve composition** is further addressed in Section VI.B., *Sizing*. For the cost simulation, 78,000 MT of maize (58 percent of total virtual stock), 36,000 MT of rice (27 percent of total virtual stock) and 20,000 MT of millet and sorghum (15 percent of total virtual stock) were assumed.
- **Reserve warehouses** in Dakar (Senegal) and Accra/Tema (Ghana) are intended to be located as close as possible to the port and used to store internationally traded commodities (rice from Asia and possibly maize from South Africa). Reserve warehouses in Bamako (Mali) and Ouagadougou (Burkina Faso) will be used to store locally produced commodities (millet, sorghum). All warehouses are rented.
- Food released to participating countries from PREPARE is provided to vulnerable populations through **safety nets** and other targeted distribution programs according to the safety net schedules proposed by participating countries.
- The **rotation mechanism** is as follows: 100 percent of the stock stored in coastal countries (Senegal, Ghana) and 50 percent of the stock stored in landlocked countries (Mali, Burkina Faso) is rotated each year and replaced with fresh

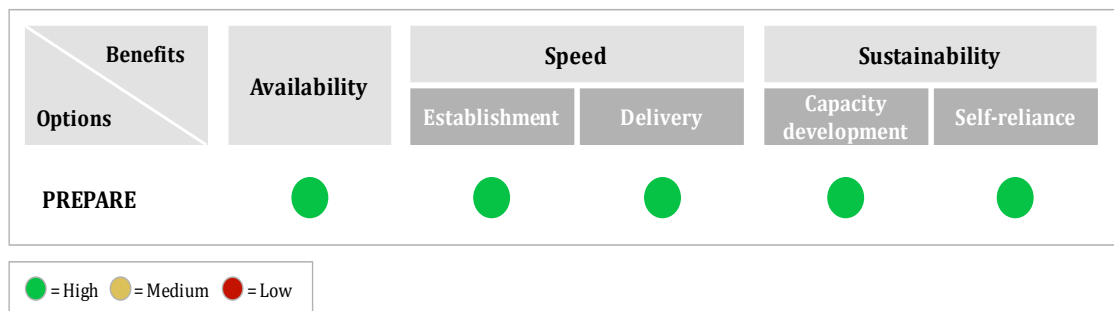
²⁰ The specific opportunities for local procurement will be elaborated further during the implementation phase, on a case by case basis.

supply of similar composition. Rotation frequency is determined based on average cereal shelf life by climate type.

- **Costs** included in the analysis include the cost of replenishment, including crisis commodity price premium (on virtual stock procurement), outbound and inbound transportation costs, local staff training and initial support, costs associated with governance bodies, management fees and insurance costs on the warehouses.
- **Management Agent costs** are estimated at international UN equivalent rates and fees for a team of ten people. The fees are 7% of the total salaries.
- A two percent annual **stock decay** is assumed.

2.2. Benefits

A proposed pilot PREPARE system would deliver significant benefits across the full range of dimensions included in the analysis. The overall assessment of PREPARE benefits is summarized as follows:



2.2.1. Speed

PREPARE scores well on measures of both speed of delivery and speed of establishment. **Speed of response**, defined as the range in number of days from trigger activation until food reaches vulnerable people, is estimated to be **high** at just 10-25 days. The key determinants of response time for the proposed pilot system are as follows:

- **Information time:** 0-5 days. The trigger mechanism embedded in PREPARE allows for proactive detection of and rapid response to existing and possible emerging food crises.
- **Decision time:** 0-5 days. The proposed trigger criteria are transparent and automatic. Once the trigger criteria are met, the Management Agent is authorized to make food available immediately to the participating countries concerned.
- **Procurement time** (tender to inbound delivery): 0 days. The reserve would have a 30-day supply of food in stock for each participating country. No time is lost in procurement of emergency supplies, assuming timely activation of virtual supply.
- **Distribution time** (warehouse to beneficiary): 10–15 days. For a regional system, outbound delivery generally can be expected to take longer than for national and local options since warehouses would be located at a greater distance from some affected populations. However, prior planning designed to

limit potential distribution bottlenecks and transfer food to vulnerable populations through safety nets would reduce delays.

Speed of implementation is defined as the time required to establish the proposed system and to make it operational. It is a valuable indicator of how quickly the system can be effective in helping vulnerable populations. The PREPARE system's speed of implementation is **high** due to the following factors:

- Smaller number of required warehouses, strategically located in the selected region,
- Lean, small governing organization, quick to establish and launch, and
- Faster initial stock procurement time, thanks to coordinated regional tenders.

2.2.2. Availability

Under the proposed sizing criteria, the proposed pilot PREPARE system is designed to be **100 percent reliably available**. Correct sizing of the 30-day physical stock, virtual stock management and the replenishment process would allow the system to cover needs during periods of high and volatile food prices and other shocks in an adequate and reliable manner. Specifically, PREPARE excels along the following dimensions:

- **Actual levels of physical stock:** The system would hold physical stock to meet immediate needs. Stock procurement and monitoring at the regional level can help guarantee stock levels are maintained appropriately and adapted to the specific needs of the region.
- **Transparent and predictable rules:** A transparent and arms-length governance structure with clear rules, procedures and controls that is owned and led by the countries and region concerned and supported by donors and regional and international organisations can ensure compliance with drawdown procedures and a predictable and timely response to urgent needs.
- **Reduced risk:** By addressing potential distribution barriers in advance, holding stock in multiple locations and ensuring strong management, the system can significantly reduce the risk of supply chain disruptions due to geopolitical and other risks.
- **Financial sustainability:** While the ongoing operation of the system would involve certain recurring costs, the proposed pilot would operate on a cost recovery basis with respect to stocks held by the system and should not need to be restocked at a later date. This feature ensures stocks are available when trigger criteria are met and makes the system a more financially sustainable option over the long term.

2.2.3. Sustainability

The proposed pilot PREPARE system offers a **highly sustainable** solution to ensuring poor food deficit countries have predictable and rapid access to sufficient food to meet the needs of their most vulnerable populations during periods of high and volatile prices and other shocks. Sustainability has been measured along two dimensions:

- **Capacity development:** PREPARE's regional governance by design allows for easy and efficient sharing of best practices among participating countries. PREPARE also strengthens the efficacy of safety nets and the embedded capabilities required to run them.
- **Self-reliance:** PREPARE reduces reliance on external assistance by allowing replenishment of the reserve with locally produced goods.

2.3. System costs

As outlined in Section VI.H., *Financing*, the estimated system costs (composed of initial setup and annual recurring operating costs) of the proposed pilot PREPARE are as follows:

COST ITEM	AMOUNT, (USD M)
Total initial set-up cost	44.3
Initial physical commodity stocks	33.4
Inbound transportation	9.0
Initial training and support of local staff	1.6
Equipment and other set-up costs	0.3
Total recurring annual operating cost	16.6
Storage	5.4
Rotation	1.0
Virtual reserve	5.3
Administration (incl. local admin. staff & mgmt agent fees)	3.0
Governance bodies (Executive Board and Advisory Committee)	0.5
Capacity development	1.4

2.3.1. Initial set-up costs

The total estimated initial set-up cost for establishing the proposed pilot PREPARE system in West Africa amounts to just over \$44 million, composed of initial commodity stock purchase of \$33.4 million, inbound transportation cost of \$9.0 million, initial training and support costs of \$1.6 million and other equipment and set-up costs of \$0.3 million. The main inputs applied for this estimation are summarized in the methodology above. Other set-up costs include purchase of information technology and office equipment, warehouse fencing, pallets and other necessary equipment.

As highlighted above, it is PREPARE's declared goal to prioritize local procurement over international purchases, as long as local markets can provide the required quantities at acceptable rates. If PREPARE is able to source a higher share of local produce (e.g. millet, sorghum) than conservatively assumed, it could potentially realize savings from a decrease in inbound transportation expenses. If, for instance, the weight of millet and sorghum was 50% instead of 15%, up to \$3 million could be saved and redirected to additional training and capacity building.

2.3.2. Recurring annual operating costs

Total recurring annual operational costs for the proposed pilot PREPARE system amount to approximately \$16.6 million, composed of storage costs of \$5.4M, rotation costs of \$1 million, virtual reserve costs of \$5.3 million, local labor and administrative costs (including Management Agent fees) of \$3 million, governance costs (Executive Board and Advisory Committee) of \$0.5 million and capacity development investments of \$1.4 million. In calculating the recurring annual operational costs, the following specific assumptions have been made:

- Activities related to storage and rotation are outsourced to third parties and therefore storage and rotation costs include any associated labor costs. Since the reserves are not meant to be accessed for drawdown on a daily basis, outsourcing of those activities is the cheapest option.
- Storage costs include all rental, warehouse maintenance and cleaning, stock fumigation and regular stock movement activities, as well as annual losses equal to two percent of the stored commodities' value due to decay.
- Rotation costs assume a 10 percent market price discount from fresh stock for 25 percent of rotating stock sales. For the other 75 percent of sales, no discount is assumed as the stock will be rotated with other international aid organizations.
- Virtual reserve costs include annual payments to qualified suppliers in return for holding 50 percent of PREPARE's virtual reserve volume (67,000 MT) in stock in their commercial warehouses. The annual fees to these suppliers are based on the expected storage expenses (including rent and decay), assuming average cost of \$79/MT per year. The remaining 50 percent of the virtual reserve is backed by guarantees from international
- Administration costs include Management Agent salaries and fees (at UN equivalent rates) for a team of ten people
- Administration costs also include seven permanently employed local warehouse staff persons each at reserve warehouses in Ghana and Senegal (manager, accountant, shipping operator, commodity tracking system technician and three storekeepers) and five staff persons at warehouses in Burkina Faso and Mali (manager, accountant, commodity tracking system technician and two storekeepers). Based on that assumption, local administrative staff costs per warehouse would break down as follows: Burkina Faso (\$82,140), Ghana (\$88,200), Mali (\$56,340) and Senegal (\$86,772). Administration finally includes office space, running costs (utilities, etc.) and insurance costs (assumed as 0.5 percent of the commodity cost).
- All other assumptions summarized in the methodology above apply.

Any increase in the share of millet and sorghum in the commodity mix (relative to the assumed weight of 15%) could open opportunities for higher efficiency. Up to \$1.0 million, for instance, could be saved in storage and rotation costs if millet and sorghum made up 50% of the stock. These funds could be redirected to further strengthen capacity building.

3. Cost-Benefit Analysis of National Food Reserves

The analysis finds that expanding the current system of NFRs in West Africa by establishing new national food reserves and supplementing existing food reserves could

speed delivery of food during shocks and provide strong capacity development gains at a lower annual recurring cost. However, initial set-up costs are higher and NFRs may take longer to put in place.

3.1. Description of the option and analysis assumptions

An alternative to a regionally organized and managed emergency humanitarian food reserve is to establish separate, independent NFRs in each eligible country in the region. Under this option, eight countries that do not currently have reserves would be equipped with new NFRs: Benin, The Gambia, Guinea, Guinea-Bissau, Liberia, Senegal, Sierra Leone and Togo. The costs and benefits of this option have been extrapolated from the experience of Mali's NFR²¹. The following basic design principles from Mali's PRMC have been applied to simulate the benefits and costs from installing identical systems in all participating countries:

- NFRs are run and **controlled by national authorities**.
- The mandate of NFRs is limited to **food supply emergencies** only. General market price stabilization is outside the scope of their mandate.²²
- NFRs operate **physical reserves** (60 percent of their targeted protection level²³), complemented by earmarked government funds for incremental supplies (cash reserve, equal to 40 percent of the total targeted protection level).
- NFRs are required to source and replenish physical stock with priority from **local producers**.
- NFRs use **existing decentralized national storage facilities** (instead of a single central warehouse) and the storage facilities are distributed in order to match poverty and vulnerability.
- NFRs address food supply emergencies mainly via **targeted release and distribution of free rations**.
- Unlike the proposed pilot PREPARE system, NFRs **do not pool coverage regionally**. Each NFR is sized and limited to addressing national emergencies, only.
- **Cost information from Mali was used** to simulate the cost associated with installing and operating the new NFRs. Unit multiples (US\$/MT) were used as the standard approach for aligning the cost estimates with the size of the simulated new reserves.

Unless otherwise highlighted, the NFR simulation uses the same input parameters as PREPARE – notably for commodities, as well as inbound and outbound transportation. Further, for Mali, Niger and Burkina Faso (countries that could participate in a PREPARE pilot and already have NFRs in place) the simulation does not assume

²¹ A field trip to Mali was conducted in early August to gather required performance and operational metrics for Mali's reserve as benchmark and reference point for the cost-benefit analysis. Appendix A provides more detail about the assumptions and methodology applied.

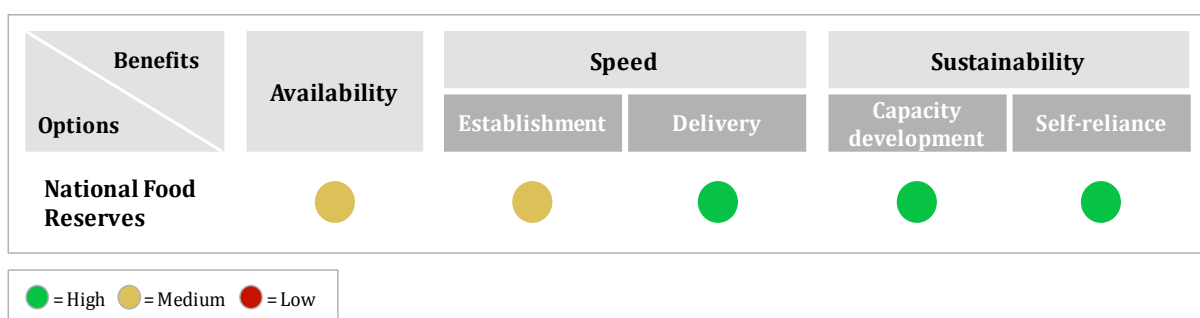
²² This is a slightly simplifying assumption. In reality, some reserves release part of their stock to the market at subsidized rates. Whether officially or unofficially, NFRs often pursue "hybrid" mandates, addressing at the same time food security and market price stabilization challenges. This "multi-purpose" usage is one of the most fundamental challenges that NFRs face with regard to their net effectiveness as food security instruments.

²³ Based on Mali's reserve composition with 35.000 MT physical stock and 23-25.000 MT financial reserves. 60 percent of 90 days of security stocks equals 54 days of physical stock, complemented with 36 days of financial reserves (40 percent of total capacity).

installation cost of a new reserve. Instead, the incremental cost of closing the gap between current actual size and the required size of the countries' reserves according to the methodology used in Section VI.B., *Sizing* has been factored in. For example, the analysis included additional physical and financial reserve capacity (4,600 MT and 3,100 MT respectively) for Mali.

3.2. Benefits

Expanding the current system of NFRs in West Africa could speed the delivery of food during shocks and provide strong gains in capacity development and self reliance. The overall assessment of NFRs' benefits is summarized as follows:



3.2.1. Availability

NFRs are sized and designed to protect vulnerable populations from food supply shocks of average frequency and magnitude. However, the **actual reliability of NFRs is below 100 percent**. Specifically, NFRs may be somewhat less reliable along the following three dimensions:

- **Average level of physical stock:** NFRs are designed to address any humanitarian emergency, including those triggered by high and volatile food prices. In addition, NFR replenishment is typically synchronized with local harvest cycles. Both factors reduce the likelihood that NFRs have their full target stock level available at any point in time when a shock may occur.
- **Maintenance level of cash reserves:** Evidence from Mali suggests cash reserves are sometimes maintained at suboptimal levels due to high opportunity costs.²⁴ Furthermore, NFRs are likely to face more difficulties in mobilizing virtual reserves than PREPARE, including to the extent virtual stock relies on cross-border assistance from neighbouring countries that are also threatened or hit by the same supply emergency.
- **Adherence to governance rules:** NFRs are inherently exposed to political interests and interference, with negative consequences for their reliability. Depending on their operating rules and governance structures, NFR stocks could be used for purposes other than emergency interventions, such as general market price stabilization. Independent NFRs also create a risk of each country

²⁴ They are for instance used to bridge liquidity gaps, e.g. for funding the replenishment of the physical stock. As a result, the cash reserve component is likely not to be 100 percent available at any point in time.

trying to protect its food supply through uncoordinated imports in times of scarcity, leading to increased volatility in already thin markets.

The real level of food availability through NFRs is also threatened by uncertainty about the long-term financial sustainability of these operations. New NFRs would form major additional cost centres for national governments and donors, requiring continuous and stable funding as they are typically not in the position to self-sustain their operations. Unless they are reliably backed and funded by their respective governments and other sources, NFRs can face significant financial challenges and uncertainty.

3.2.2. Speed

NFRs score well on measures of speed of delivery, but may take longer to establish. Under normal circumstances, the **speed of delivery** of national reserves is expected to be comparably **high**. The expected lag for stocked rations to reach the vulnerable communities is 13-23 days. The assessment results from the following components:

- **Information time:** 0-5 days. Even if a smoothly operating early warning system with continuous monitoring and forecasting is assumed to be in place, the physical distance between locally emerging food crisis situations and centralized NFR units is likely to cause information time lags of up to 5 days .
- **Decision time:** 3-5 days. Following Mali's model, the governance structures of NFRs are explicitly designed for fast responses. Procedures, rules and "off-the shelf" intervention plans are designed to allow for a standard response time of 5 days.
- **Procurement time** (tender to inbound delivery): 0 days. Given the pre-crisis build-up of food rations for 54 days, releases from national reserves should not be affected by procurement time lags²⁵.
- **Distribution time** (warehouse to beneficiary): 10–13 days. Given the decentralized storage facilities and assuming the use of established safety net channels, the average distribution time is expected to be comparably low.

The main risk factors that could adversely impact the lead time for food distributions from NFRs in emergency situations relate to transportation delays and any limits on the ability to quickly convert financial reserves into additional food supplies for the local population.²⁶

When it comes to the ease and speed of **establishment**, the installation of new NFR systems will clearly take longer, stretching beyond 2 years. The installation of operational NFRs across the region could be slowed by longer lead times for capacity-

²⁵ This assumes a) that the virtual reserve is activated early enough to ensure timely inflow of supplementary stocks before the physical base stock is depleted and b) that national reserves are replenished in due time before any subsequent crisis.

²⁶ While this last aspect is highly situational and contingent on the specific context, the ability to buy food from the financial reserve is to a large extent a function of the underlying quality of the NFR's management. Any factors (e.g. political interference, rededication or misuse of the financial reserve) that negatively affect the quality of management thus are also likely to affect the average delivery lead times of the system.

building and initial stock procurement (especially if rigorously sticking to local purchasing requirements) and a more complex fundraising challenge.

3.2.3. Sustainability

The impact of national reserve systems goes beyond mere emergency relief. The sustainability effects of national reserves are thus deemed to be **considerably high**. The main expected long-term benefits from national reserves are along the following dimensions:

- **Capacity development:** NFRs strengthen national capacity to address food insecurity and to respond to sudden shocks. They can create a means (and even an incentive) to provide food to vulnerable populations.²⁷ However, continuous improvement via circulation and sharing of best practices works less well under a scheme of independent national reserves.
- **Self-reliance:** NFRs provide governments with a potentially powerful mechanism to cope with food crises in a *largely autonomous way*, while also creating opportunities and incentives for local farmers to increase production through local purchases.

Two main risks could significantly limit the sustainability of NFRs. Poor governance and management can limit benefits in emergencies, damage local markets and invite misuse of food stocks. Lack of reliable and sustained financing and support from national governments and other partners can undermine the longer-term value and viability of NFRs. The longer the period between major shocks, the higher the likelihood cash-constrained governments may divert resources for other priorities.

3.3. System Costs

The following table summarizes the total estimated cost of expanding the current system of NFRs:

COST ITEM	AMOUNT (USD M)
Total one off costs	89.4
Initial physical commodity stocks	31.3
Initial cash reserve	33.6
Inbound transportation	15.1
Initial training and support for local staff	9.0
Equipment and other set-up cost	0.4
Total annual operating cost	13.4
Storage	5.7
Rotation	3.5
Administration	1.7
Governance bodies	1.5
Capacity development	1.0

²⁷ Local capacity is further enhanced only to the extent that stock releases are channelled through safety nets that build human capital (e.g., "feeding at school"). If commercial channels are used (e.g. contracted shipping companies), this effect diminishes.

3.3.1. Initial set up costs

Total estimated initial set-up costs for putting in place national food reserves systems in the eight selected countries amounts to approximately \$89 million, composed of \$31 million for the initial stock endowment, \$15 million in associated transportation costs, an initial cash reserve of \$34 million, \$9 million for initial training and support for the local staff and \$0.4 million for initial equipment and other set-up costs. The central driver behind the initial one-off costs for the NFR alternative is the required physical and financial capacity of the new reserves. The simultaneous development of independent national reserve systems in eight countries also drives the need for higher initial training and support expenses.

The assumed food basket composition for NFRs closely follows local consumption and production patterns, based on the individual countries' food balance sheets. The weighted average composition of the new security stocks would include 50 percent milled rice, 27 percent millet and sorghum and 24 percent maize. As a result of this composition, the average unit cost amounted to \$497/MT.

To ensure the financial part of the reserves can cover the equivalent of 40 days of food needs, it was sized by factoring in (a) an anticipated price inflation of +30 percent for food purchased during periods of high and volatile food prices and (b) a risk premium of +34 percent charged by commercial traders for food purchased on global markets in times of crisis to customers in remote locations with weak purchasing power.

3.3.2. Recurring annual operating costs

Total recurring annual operating expenditures for new national reserves amounts to approximately \$13 million, driven by storage (\$6 million), rotation (\$3 million), administration (\$2 million), governance expenses (\$2 million) and capacity development investment (\$1 million). These costs are expected to recur regardless of the frequency and extent of emergency interventions.²⁸ The main drivers and multiples associated with running NFRs across the ECOWAS region are the cost of storage (\$90/MT), rotation (\$56/MT), labour and operations (\$20/MT) as well as governance (17 percent of total operating cost).

While the financial components of the NFRs do not incur any significant management costs, substantial opportunity costs can be associated with putting these funds aside. Instead of holding cash for emergency situations, governments could invest it productively to stimulate further economic development. However, opportunity costs cannot be quantified easily. A minimum opportunity cost level could consist of the inflation effect that gradually erodes the purchasing power of the financial reserve.

4. Cost-Benefit Analysis of Community Granaries²⁹

²⁸ Costs for technical rotation are currently estimated at the conservative end. The higher and/or more frequent emergency drawdowns occur, the lower the need and associated cost for technical rotations.

²⁹ Source: The WFP in Cameroon, with support of the European Union: Community Granaries, a local mechanism to fight food insecurity in the northern part of Cameroon.

The analysis finds that expanding the current system of community granaries could speed delivery of food during shocks and provide strong capacity development gains at a lower annual recurring cost. However, initial set-up costs are higher and community granaries may take longer to put in place. They may not be sustainable during periods of high and volatile food prices.

4.1. Description of the option and analysis assumptions

This section considers the option of expanding community granaries in West Africa. Community granaries are small-size warehouses (usually 10-40 tons) located centrally in a community. They are used to store a portion of local farm production after the harvest and sell commodities at affordable and reasonable prices to members of the local community. Their primary purpose is to reduce food shortages during lean seasons. A farmers' committee that is usually staffed by women manages the granary on behalf of the community. The revenues from sales are meant to be saved and used to reconstitute stocks at harvest time. Funds can also be used for loans to local farmers. The central advantages of a community granary are:

- Providing favorable prices for buyers and sellers of grain, more reliable availability of grain in villages, improved terms for borrowing during lean seasons, and reduction of over-selling (farmers having to sell a large proportion of their harvest),
- Reducing post-harvest losses,
- Strengthening village-level ties and organizational capacity,
- Creating village-level emergency food stocks, and
- Spatial (moving grain over space) and temporal (moving grain over time) arbitrage.

Since most of the eleven countries that could participate in a proposed pilot PREPARE system do not have community granaries in place, it was necessary to rely on experiences in countries that do have such facilities to estimate the additional number needed. The analysis relied on Mali's experience. Mali already has an extensive system of 752 granaries in place. Using this benchmark, one would have to establish a total of 4,968 new granaries (20 MT each granary) across the other ten countries to achieve the same ratio of coverage of rural population per granary as Mali. Even though the pattern of existing granaries shows that it might make more sense to build community granaries for the Sahel countries, a hypothetical regional approach was chosen in order to make this alternative option comparable to others.

4.2. Benefits

Expanding the current system of community granaries could speed delivery of food during shocks and provide strong capacity development gains. However, community granaries may be less reliable during periods of high and volatile prices and can take longer to put in place. The overall assessment of community granaries' benefits is summarized as follows:

Options \ Benefits	Availability	Speed		Sustainability	
		Establishment	Delivery	Capacity development	Self-reliance
Community Granaries	●	●	●	●	●

● = High	● = Medium	● = Low
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4.2.1. Availability

A granary system does not require a third party estimating demands of vulnerable people. It enables better-informed community members to react to the evolving situation on the ground. Each community has its own storage fully available, conditional on the community granaries being well managed by their committees. However, the following risks may limit the availability of food from local granaries, especially during periods of high and volatile prices.³⁰ For these reasons, availability is assessed as **low**.

- Strong **management skills** are required to operate community granaries, especially to continually buy at low prices and sell at higher prices (margins are thin), while ensuring sales prices provide a benefit to vulnerable families.
- Granaries may be open to **mismanagement and default risk**. Managers supervise collective goods and may not have sufficient incentives to cut costs or to ensure stock levels are sufficient to meet needs. Grains loaned out are not always paid back.
- Partly as a result of these challenges, studies³¹ have found that **sixty percent of new granaries go out of business after a short period of time**, with just one in ten still operating after a few years. Well-designed training is needed to keep the rate of bankruptcies as low as possible. Not every vulnerable individual is part of a community and has the **possibility to receive help; a granary system can therefore not reach all vulnerable people**. In particular, a community granary is unfeasible for vulnerable populations in urban areas.

4.2.2. Speed

The overall **speed of response** is estimated to be **high** in the range of 0-5 day(s). Located in **local communities where transport distance generally is not a factor**, granaries are readily accessible to vulnerable households. However, withdrawing from the granary requires the approval of the committee. **Speed of implementation** is estimated as quite **low**. It would take around 3-6 years to identify suitable communities (1-2 years), collect funding (1/2-1 year), build the granaries (1-2 years) and educate community members (1/2-1 year).

³⁰ World Bank. Missing food: The case of post-harvest grain losses in Sub-Saharan Africa. REPORT NUMBER 60371-AFR. April 2011.

³¹ USAID/OFDA-Workshop. Notes from the workshop on: Community-level storage projects (cereal banks): Why do they rarely work and what are the alternatives?. Hotel Alafifa Dakar, Senegal. Jan 1998

4.2.3. Sustainability

Expanding the current system of community granaries in West Africa could address certain root causes of food shortages by improving conditions for local production and storage of food, while improving access to food for vulnerable populations. As an alternative option, it ranks high on the following measures of sustainability:

- **Capacity development:** Community granaries strengthen local ties and reduce the income variability. They can also strengthen women's empowerment where women manage stocks.
- **Self-reliance:** Community granaries enable local communities to better meet their own food needs by improving conditions for local production and storage of food.

However, high and volatile food prices can undermine the efficient management and operation of community granaries, limiting their value for vulnerable households. Local farmers are quite familiar with changes between harvest periods and dry seasons. However, evaluating and forecasting price fluctuations is exceedingly difficult. During the 2008 food price crisis, community granaries in Mali recorded significant losses and required fresh stock from the national government.

4.3. System Costs

The estimated cost of expanding the current system of community granaries in West Africa to include 4,968 additional granaries is summarized as follows:

COST ITEM	AMOUNT USD (M)
Total set-up costs	62.6
Initial physical commodity stocks (20t)	49.5
Inbound transportation	4.5
Initial training and support of local staff	8.7
Total annual operating costs	10.5
Storage	3.0
Administration	4.3
Governance body	1.4
Capacity development	1.8

4.3.2. Initial set up costs

The one-off costs for set-up associated with expanding community granaries are the provision of the initial commodity stock (20 MT for each granary), training for the committee, and the implementation of the system.

4.3.3. Recurring annual operating costs

The annual operating costs are mainly composed of replenishments by the national government, rental costs for the granaries, a governance body on the national level, and capacity development.

5. Cost-Benefit Analysis of Establishing a Regional Cash Reserve Facility

The analysis finds that a regional cash reserve facility could be established quickly and could deliver strong gains on measures of self-reliance at a very low recurring annual operating cost. However, it ranks relatively lower on availability and speed of delivery, and initial set-up costs are the highest for this option.

5.1. Description of the option and analysis assumptions

Instead of holding physical and virtual stock like PREPARE, one alternative for a regional crisis protection mechanism would be a regional cash reserve facility. While we are not aware of any such facility that currently exists, this option was constructed based on a regional import insurance program Trueblood et al. (2001) have simulated for SADC.

Under this option, a regional cash reserve similar to an insurance policy would be established. During periods of high and volatile food prices and other shocks, the facility could issue compensatory crisis funds to governments for the purpose of purchasing and distributing food to vulnerable populations. The triggers for such cash releases are assumed to be identical to those of the proposed pilot PREPARE system. The same holds for the value of the compensations. The cash reserve and the released compensations would be sized to close the same food supply gaps as PREPARE. It would be governed by an independent cross-regional body.

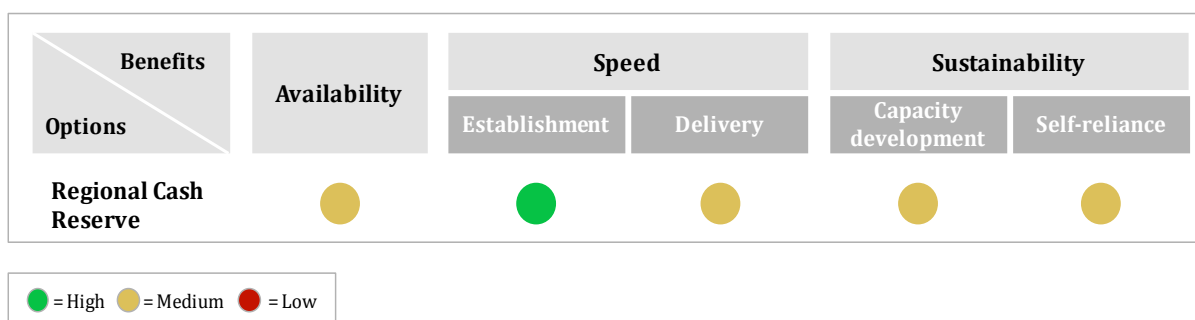
In addition to storing cash instead of food, the financing of a cash reserve would also differ from the proposed pilot PREPARE system. To be self-sustaining, the reserve would require participating countries to pay annual premiums in return for the release of crisis funding during periods of high and volatile food prices and other shocks. These insurance premiums would be set to cover the cost of interventions, based on each country's risk profile (*i.e.*, the expected frequency and amounts of compensation).

However, no robust historical data was available to distil and determine each country's risk exposure to volatility-induced food security shocks and therefore calculate annual insurance premiums for each country. In the absence of that data, the cost simulation for the cash reserve assumed a "pay-as-you-draw-down" principle. This means that, instead of annual premiums, the simulation assumes that countries would have to repay the exact value of their draw downs rather than pre-paying a flat insurance premium.

The simulation also assumed that governments have a strong preference for local purchases (where feasible) and for commodities that match domestic consumption patterns. Therefore, the same food basket composition and transportation cost assumptions as NFRs were applied.

5.2. Benefits

A regional cash reserve facility could be established quickly and deliver strong gains on measures of self-reliance. However, it ranks relatively lower on indicators of availability, speed of delivery and sustainability.



5.2.1. Availability

A regional cash reserve facility is assumed to make available the equivalent 90 days of projected needs for the most vulnerable in participating countries. However, several factors suggest such a facility would not be as reliable a mechanism to achieve that goal as other options, particularly during periods of high and volatile food prices. For these reasons, availability of food through a regional cash reserve is assessed as **medium**.

- A cash reserve facility would be **more sensitive to price increases** than options that partially hedge such risk through physical stockholding. As a result, the effective protection that a cash alternative can offer is less certain than for other options. Climbing market prices directly reduce the quantities of food that national governments can buy with the facility's cash compensations.
- Even if the regional facility readily provided all necessary funds at any point in time, its contribution to food security **depends on the ability of national governments to quickly source food** on local, regional and international markets, which may be limited during periods of high and volatile food prices and other shocks.

5.2.2. Speed

The **speed of response** of a cash reserve facility would depend not only on how quickly it could make cash available to participating countries but how quickly those countries could purchase food for distribution to their vulnerable populations. A cash reserve conceivably could release funds faster than other alternatives could release food. However, food purchased with those funds could take from one to four months to arrive, depending on whether it was procured locally, regionally or internationally.

For these reasons, speed of response is assessed as **medium**, with delivery time estimated at between **30-90 days**. This substantial spread implies that, in the worst case,, vulnerable populations may remain without assistance for a considerable time:

- **Information and decision time:** 0 days, assuming that the facility's governance is designed for pro-active monitoring, situation analysis and fast decision taking.

- **Fund disbursement:** 1-3 days, depending on how fast the facility managers can transfer the funds onto government accounts.
- **Procurement time** (tender to inbound delivery): 24 –72 days. For the reasons outlined above, this is the single largest factor of uncertainty for the actual swiftness of using funds from the facility making food available for distribution. In extreme cases, where local food markets are depleted, the lead time would be even longer, up to 72 days.
- **Distribution time** (warehouse to beneficiary): 5–15 days. Food gets distributed through a set of existing channels – both commercial (private warehouses as outlets) and public (such as national safety nets or targeted assistance programs). The time eventually needed for outbound delivery is again very contingent on where the food was sourced: As long as sufficient food can be bought on markets close to the vulnerable population, distribution is expected to be rapid.

The **speed of establishment** for a regional cash reserve facility is largely the same as the proposed pilot PREPARE system and is assessed as **high**. Most implementation steps (*e.g.*, governance structure, participation requirements, trigger and monitoring mechanisms) are assumed to be identical. However, the considerably higher upfront financing requirements of a cash reserve facility could cause significant delays.

5.2.3. Sustainability

The following two potential long-term benefits can result from a regional cash reserve facility. For these reasons, the sustainability of this option is assessed as **medium**.

- **Capacity development:** A cash reserve facility could not provide capacity development opportunities for the management of food reserves. However, it could provide capacity development opportunities for safety nets if it were linked to national safety nets and provided incentives to participate in safety net capacity building programmes.
- **Self-reliance:** If nationally and regionally owned and governed, a cash reserve facility could strengthen self-reliance and improve the ability of governments and regional organisations to manage food crises.

Depending on how a cash reserve facility is structured, however, the actual cost and the opportunity costs of participating in such a facility could be high. If the initial setup funding for the facility were restricted to the equivalent of 90 days of crisis compensation per year, the premiums for replenishing the insurance fund are likely to be significant and close to the total value of the compensation. Unless the initial facility is sized for a much larger amount, the cash-based replenishment mechanism of the insurance facility may also limit the ability of participating countries to invest in other priorities.

5.3. Costs

The following table summarizes the total estimated cost of a regional cash reserve facility:

COST ITEM	AMOUNT (USD M)
Total one off costs	147.0
Initial cash reserve	147.0
Total annual operating cost	2.1
Administration	0.2
Governance bodies	0.5
Capacity development	1.4

5.3.1. Initial set up costs

Compared to the other assessed alternatives, the one-off costs of a regional cash facility are very high, with an estimated total of \$147 million³². The size of the initial endowment was estimated by simulating how much cash would be needed to compensate for the price increase on the equivalent of 90 days of food rations. The cash reserve was thus sized to hold the cash value of the proposed pilot PREPARE system's total physical and virtual capacities of 201,000 MT plus the same price premium expected for NFRs in case of crisis.

As previously indicated, the cash endowment was calculated assuming the same food basket that NFRs would use, composed of 23 percent corn, 50 percent rice and 27 percent millet and sorghum. Based on the outlined pricing rationale, the cash reserve would be sized based on expected weighted average unit cost of \$732/MT.

5.3.2. Recurring annual operating costs

Since a cash reserve facility would not hold physical food, its recurring annual operating costs would be very low at just \$2.1 million. The main components of recurring cost are overhead cost for administration (\$0.2 million), governance (\$0.5 million) and capacity development in the participating countries (\$1.4 million). Given the size of the facility, the recurring annual operating costs could be partially or fully offset by interest income on the reserve.

6. Cost-Benefit Analysis of Emergency Food Aid

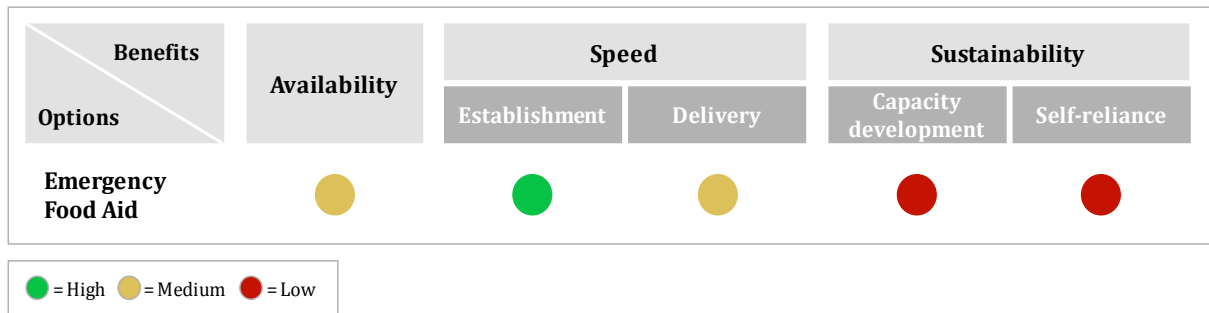
6.1. Description of option and analysis assumptions

This section considers emergency food aid as an alternative option, based past WFP emergency food aid operations. In the early days of a crisis, UN Emergency Assessment teams generally evaluate the situation on the ground and estimate the number of beneficiaries and their needs. Based on this information, an emergency operation (EMOP) delivers assistance needed to the vulnerable population. For the quantitative analysis, all WFP emergency operations for the years 2005-2010 in the ECOWAS region (23 overall) were taken into the sample. On average, an EMOP lasted about two years.

³² This calculation assumes the theoretical minimum size of the facility. A much larger fund size may actually be required to keep the facility solvent at all times and to reduce the annual premiums for the countries.

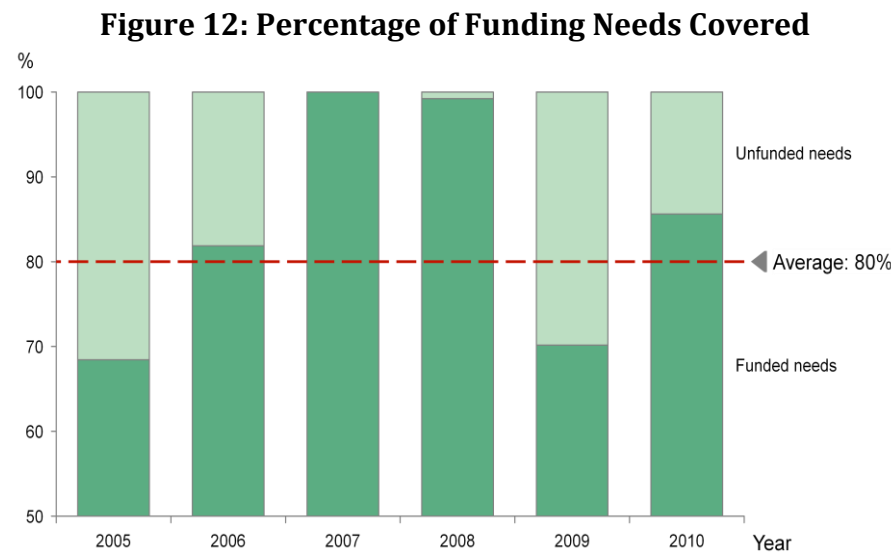
6.2. Benefits

The analysis finds that emergency food aid scores well on indicators of speed of establishment (since necessary infrastructure is already largely in place) with relatively lower recurring annual operating costs. However, emergency food aid alone does not promote capacity development or self-reliance and can take time to reach beneficiaries. The overall assessment of emergency food aid's benefits is summarized as follows:



6.2.1. Availability

Food aid is not reliably available. EMOP financing is usually a problem that international organizations such as WFP face, as donations vary and can limit the size and ramp-up of operations. The lack of reliability is reflected in the graph below, which shows the percentage of funding needs covered for the ECOWAS region during the years 2005-2010. The average coverage for these years is around 80 percent. Based on the above, EMOPs availability is therefore only assessed as **medium**.



Source: Factory Database, WFP

6.2.2. Speed

If stocks are available, the average estimated response time of the EMOPs considered is 45 days (30 days for shipping and 15 days for distribution). However, the lack of

availability of stocks can raise this number significantly and response times differ by EMOP depending on the nature of the shock, the flow of information, available transport means and funding. For these reasons, **speed of delivery** of food through emergency food aid is assessed as **medium**.

Since organisations capable of delivering emergency food aid already exist, **speed of establishment** is assessed as **high**. There is no time delay due to implementing a system that is able to run emergency operations in case of crises.

6.2.3. Sustainability

Overall, the sustainability of emergency food aid is assessed to be **low**, evaluated along the following dimensions:

- **Capacity development:** EMOPs can strengthen national capacity to implement safety net programs. However, its central role is to meet urgent humanitarian needs.
- **Self-reliance:** EMOPs are conducted in close coordination with national governments. They can be implemented using food procured locally and regionally and with resources donated locally and regionally. However, their main objective is to meet urgent humanitarian needs – often following conflicts or natural disasters and using food and resources donated internationally.

6.3. System Costs

6.3.1. Initial set-up costs

Since this option is already in place, no costs are incurred to set up the system.

6.3.2. Recurring annual operating costs

However, there are recurring annual operating costs associated with maintaining capacity to deliver emergency food aid between emergencies, including staff and facilities costs. In order to reflect these costs adequately in this analysis, a share of the annual regional operating expenses of the 11 WFP country offices in the ECOWAS region and regional office (\$2.5 million) were included. For better comparability with the other options considered, which account for the costs of the governance body, a percentage of headquarter operating costs (\$2.7 million) was factored in.

7. Comparison of Proposed Pilot Programme and Potential Alternatives

Following is a comparison of the benefits and costs of the proposed pilot PREPARE system and the four other alternative options described above.

7.1. Benefits comparison

The following table summarizes the benefit analysis of the options considered:

Benefits Options	Availability	Speed		Sustainability	
		Establishment	Delivery	Capacity development	Self-reliance
PREPARE	●	●	●	●	●
National Food Reserves	●	●	●	●	●
Community Granaries	●	●	●	●	●
Regional Cash Reserve	●	●	●	●	●
Emergency Food Aid	●	●	●	●	●

● = High ● = Medium ● = Low

Overall, the proposed pilot PREPARE system is the only option that delivers fundamental benefit in ALL the analyzed dimensions of availability, speed and sustainability. It scores particularly highly on availability, minimizing many of the most important risks inherent in the alternative options. One third of the overall stock would be physically available in the ECOWAS region and reliably accessible during periods of high and volatile food prices and other shocks without significant transaction delays or inbound shipping delays. Its governance structure is designed to ensure disciplined access to the reserve and to limit potential mismanagement and political interference.

Through risk pooling, the proposed pilot PREPARE system offers each individual country superior protection during periods of high and volatile prices and other shocks than could be available at the national or communal level. It would contribute to capacity development at the regional and national level, complementing existing initiatives and enabling participating countries and regional organisations to better meet their own food needs during emergencies.

7.2. System costs comparison

The proposed pilot PREPARE system also compares favourably to other alternative options on cost. The following table summarizes the costs of the proposed pilot PREPARE system and other alternative options:

System costs	Unit	PREPARE	National reserves	Community granaries	Regional cash reserve	Emergency aid
Set up costs	\$ M	44	89	63	147	-
Operating costs	\$ M p.a.	17	13	11	2	5

Because it entails relatively low initial physical stock levels, no upfront cash reserves and limited infrastructure investments, the proposed pilot PREPARE system has a relatively low initial set up cost of \$44 million, while all other new options incur

substantially higher upfront investments. As proposed, the pilot PREPARE system would also keep start-up costs low by purchasing initial physical stock under normal market conditions. In contrast, NFRs (for their financial component) and the cash reserve facility need to put aside additional funds in the event food prices rise. These effects are substantial enough to give PREPARE an initial cost advantage of 40-230 percent over the other alternatives considered. Lower initial set-up costs are particularly advantageous for a pilot programme, involving less financial risk than other alternative options.

The recurring annual operating costs of the proposed pilot PREPARE system are higher than for the alternative options considered. But since one of the most significant components of the proposed pilot PREPARE system's recurring annual costs relative to the other alternative options (~30 percent of PREPARE's operating cost, or \$5 million) consists of the investment necessary to maintain a reliable virtual reserve with external suppliers,³³ higher annual recurring costs could also be viewed as a "cost premium" for superior availability.

7.3. *Simulation and comparison of cost performance over time*

The costs associated with each option are valuable, but provide an incomplete perspective of how the different options would perform over time when interventions are required during periods of high and volatile prices. For a more informed comparison of cost performance, a five year timeline simulation was conducted comparing the intervention costs of the proposed pilot PREPARE system and the four alternative options. The resulting analysis laid out below indicates that PREPARE is the more cost effective option overall. Looking at the 5-year pilot timeline and a large shock scenario, PREPARE and emergency food aid are the two most cost effective options. All others are inferior. However, considering a realistic 10 year timeline, PREPARE is the most cost effective solution overall.

Several shock scenarios that would trigger interventions were considered in order to compare the intervention costs of PREPARE versus the four alternative options. More details about the modeled shocks and associated scenarios can be found at Appendix A. This section illustrates the outcome based on a large shock similar to what the ECOWAS region experienced in 2007/08 with the following features:

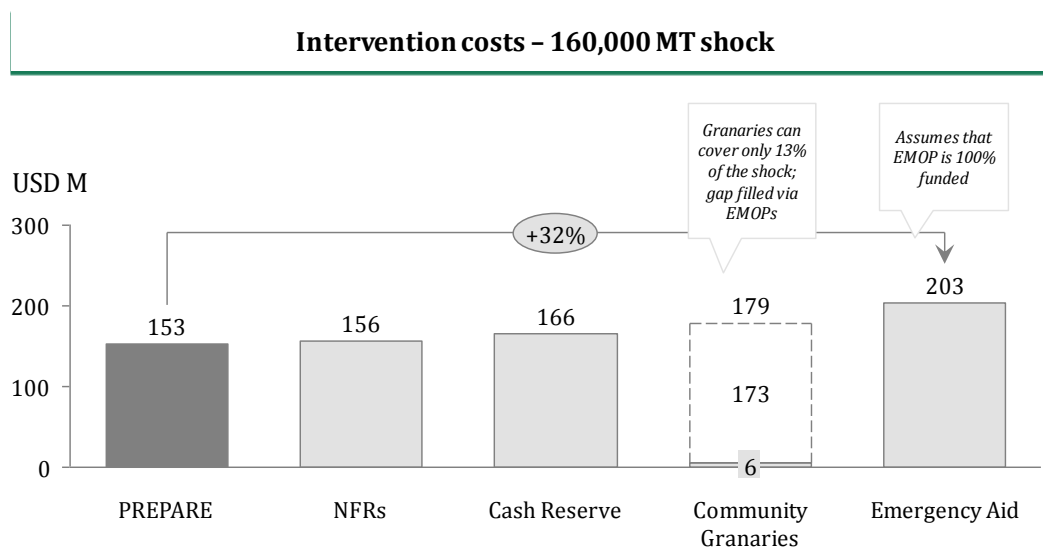
- The shock affects all eligible countries in the ECOWAS region, translating into incremental food needs of 160,000 MT³⁴ for the most vulnerable populations.
- The physical stock available for emergency drawdown in existing NFRs in Mali, Burkina Faso and Niger (110,000 MT) has already been depleted and is therefore not accessible.

³³ As indicated at several occasions, the cost profile of the annually recurring cost for the cash reserve alternative would look less favourable if factoring in the annual insurance premiums that the participating countries would have to pay.

³⁴Extent of the shock: 90 days drop in consumption in 2007/08 compared to the average consumption change for all eligible countries (subtracting the existing physical national reserves).

- On average, a 30 percent premium on the average commodity market price is assumed for any stock purchases made during a food price crisis.

The graph below summarizes the associated intervention costs by option:



As indicated in the graph, the proposed pilot PREPARE system has the lowest intervention cost (\$153 million) of all the options that cover 100 percent of humanitarian need. Depending on how much food PREPARE can source on local markets in such a crisis context, the cost of PREPARE's intervention could potentially be even lower: If, for instance, 50% of the sourced commodities (instead of the assumed conservative share of 15%) consisted in locally procured millet and sorghum the transportation costs associated with the intervention could drop by up to \$13 million.

Yet, even under the applied conservative assumptions, PREPARE would meet needs at a lower cost than NFRs or a cash reserve facility and is clearly superior to emergency food aid and community granaries with regard to impact and cost effectiveness:

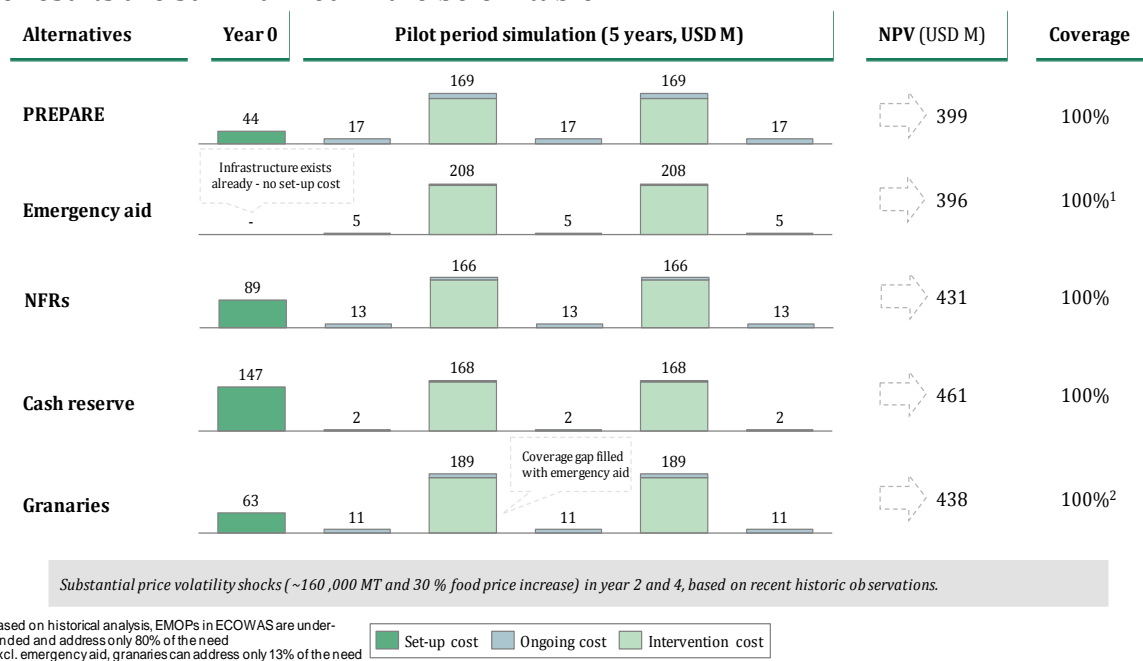
- **Community granaries are not able to sustain the shock**, covering just 13 percent of total need. To address the full crisis demand, a secondary security system would be needed (*e.g.*, complementary emergency food aid or government intervention).³⁵
- When looking at the isolated cost of intervention, **emergency food aid clearly is more expensive than PREPARE**. Moreover, the simulation for emergency aid was based on the simplifying assumption that no funding constraints would exist, and that food aid would therefore be able to cover all emerging needs. However, empirical evidence from the period 2005-2010 suggests emergency food aid has on average only been able to meet 80 percent of needs in West Africa.

³⁵ The intervention costs of \$6 million arise as the national government has to replenish the stocks in order to keep the granaries in business.

These assumed shock responses were incorporated in a timeline analysis that provides an integrated picture including all three cost buckets for (a) set-up, (b) annual ongoing expenses and (c) intervention-related cost:

- In year 0, the full set-up costs for implementing new infrastructure are incurred for all options³⁶.
- In the following years, annual ongoing cost as well as shock intervention costs are incurred.
- The scenario assumes two major food price shocks of the kind outlined above (160,000 MT), taking place in the periods 2 and 4.
- A three percent discount rate was assumed for all options to calculate the net present value (NPV) of the total costs incurred over the five year pilot period³⁷.
- A coverage factor (equal to the percentage of the humanitarian need covered by the proposed option) was introduced to indicate the level of actual protection that is associated with the cost of each option.
- Further details on the modelled shock scenario can be found at Appendix A.

The results are summarized in the below table:



This 5-year timeline simulation suggests the following conclusions:

- The proposed pilot **PREPARE** system is cost-competitive to emergency food aid and more cost-effective than the other options. PREPARE also displays certain structural advantages. While intervention costs are relatively comparable across most options, the low setup costs and the commodity sourcing advantages

³⁶ For simplification reasons, it was assumed that all options would be established and operational within one year (period 0), irrespective of the longer lead times that need to be realistically expected for most of the options, as described earlier.

³⁷ While sensitive to the selected discount rate, the simulation results (i.e. the NPV ranking) do not change fundamentally when applying higher discount rates.

(buying pre-crisis, no country-specific risk premiums) make PREPARE a preferable option.

- **Emergency food aid** turns out to be as cost-effective as PREPARE due to the fact that no setup costs are involved (the infrastructure to deliver food aid is already established). However, as noted above, given that EMOPs in the ECOWAS region between 2005 and 2010 were underfunded and only 80 percent of the need could be addressed, emergency food aid is unlikely to deliver the same humanitarian benefit as PREPARE at inferior cost³⁸.
- **NFRs** appear to be less cost effective than PREPARE, despite a somewhat favourable shock scenario.³⁹ Also, the simulated shocks result in near-depletion of most NFRs. If the overall shock was more severe or more asymmetric, some NFRs could actually fail to cover it. Due to its superior risk pooling capabilities, PREPARE would, in contrast, still be able to ensure full coverage.
- The **cash reserve** is clearly less cost effective than PREPARE, which is a function of its greater exposure to price movements during periods of high and volatile food prices. Moreover, if modelled as an insurance policy, the cost profile for the cash reserve should look different. There would be no intervention-related cost but flat annual operating cost that would include the annual insurance premiums of all countries, which are likely to further increase the NPV of the pilot period cost.⁴⁰
- **Community granaries** turn out to be less costly, but simply insufficient to address food insecurity during periods of high and volatile food prices. They only deliver 13 percent of the quantity of food needed to feed affected vulnerable populations and therefore supplementary emergency food aid is necessary to address 100 percent of the need. Granaries are also designed to sell food only in the lean season, meaning they are operationally active about 25 percent of the time. In addition, capacity is limited to the size of the granary and oftentimes insufficient to fully address needs. High and volatile food prices undermine the sustainability of community granaries, often requiring external funding or other assistance to sustain operations.

Looking at a 10 year timeline for this large shock scenario, with major shocks occurring in every second year, PREPARE is clearly the most cost effective option. PREPARE

³⁸ Theoretically (i.e. under the assumption of unconstrained funding), emergency aid would have higher intervention cost (\$178 million per shock) but a lower overall NPV with \$342 million, given it does not entail any set-up cost.

³⁹ The shock favours the NFRs due to the different commodity mix, which assumes a much higher share of millet and sorghum in Mali, Niger and Burkina Faso – the countries which absorb ~30 percent of the total modelled shock impact. If the analysis applied the same conservative commodity mix to these countries that was assumed for PREPARE, the intervention cost of the NFR and the cash reserve alternative would increase by ~10 percent due to the higher price tag for international imports.

⁴⁰ As outlined above, no robust historical data was available to calculate the risk premiums. For illustration purposes, one could assume that the discussed shock scenario is representative of the average compensation needs of each of the eligible countries. As a result, the average annual premiums would amount to at least \$68 million p.a. (i.e. the equivalent of annual operating cost of \$2 million, plus the averaged five-year intervention cost of \$66 million). Given the risks to which the continuous refinancing is exposed (e.g., geopolitical risks, default risk, moral hazard risk), a more realistic pricing would mean increasing the annual premiums beyond the mere cost of the commodities. Alternatively, the initial cash endowment could be increased substantially to cushion the facility against bankruptcy. Either way, these adjustments would result in an increased NPV for the cash facility.

benefits from its relatively low intervention costs. In addition, the relative weight PREPARE's fixed cost component decreases as illustrated in the following chart.

It is important to note that the cost competitiveness of the proposed pilot PREPARE system and the alternative options is a function of the frequency and intensity of price volatility shocks. If shocks are less intense than simulated above and occur just as frequently or less frequently, then emergency food aid emerges as a more cost-effective solution, ahead of PREPARE. If shocks are as intense as or less intense than simulated above but occur more frequently, PREPARE emerges as the most cost-effective choice.

7.4. Conclusions

PREPARE delivers unique benefits at a competitive cost. More specifically, it turns out to be the most cost-effective scheme in the large shock scenario considered. In stark contrast to options with similar cost-effectiveness (*e.g.*, emergency food aid), it offers 100 percent availability and reliability during periods of high and volatile food prices.

PREPARE is a highly agile and dynamic regional food security system. It is effective in addressing the effects of food price volatility. In comparison with alternative approaches that could meet the same humanitarian needs, PREPARE stands out as the preferred solution. It also is a sustainable solution that builds capacity to manage food security across the region and thereby increases self-sufficiency and resilience. That is also a major difference from emergency food aid and the cash reserve alternative, which fail to make as substantial contributions to sustainability and self-reliance in the region.

Equally important, PREPARE's design offers inherent advantages when it comes to managing and mitigating the different risks, limitations and challenges that face other alternatives, including limited geographic risk pooling and unprotected exposure to procuring food at peak prices. Integrating these different aspects, the timeline simulation for the pilot period confirmed that these factors put PREPARE in a position to deliver more reliable protection than the alternatives at competitive cost.

ANNEX A: Cost-Benefit Analysis, Technical Annex

Assumptions / Inputs	Option	Description / rationale	Values used for cost / benefit assessment	Source
General comments				
Commodity mix	PREPARE	The explicit goal of PREPARE is a high share of local procurement of commodities. However, in order to conservatively account for potential fluctuations of commodity mix, it is assumed for this analysis that little food is available on local markets and consequently the majority of food has to be procured internationally. As a result of this, the share of locally sourced millet and sorghum is 15%, while internationally important corn and rice make up the majority of the commodity stock.	Rice 58%, Corn 27%, Millet and Sorghum 15%	WFP/ Technical Working group
Set-up costs				
1 Sizing				
Total size (MT) of the option	PREPARE	Sizing taken from sizing section IV. B	201,000 MT, thereof 67,000 MT physical stock	WFP/ Technical Working group
	NFRs	Sizing based on same balance sheet data that informed the sizing of PREPARE: Total size, like for PREPARE, equal to the 30 day demand drop from 2007/08 (91,000 MT), allocated to the different countries according to the relative size of their 10-year maximum demand drop. The resulting reserve size estimates were corrected for existing reserve volumes in Mali, Burkina Faso and Niger	105,000 MT incremental NFR capacity across the participating countries, thereof 63,000 MT physical stock	WFP/ Technical Working group
	Cash reserve	Same sizing approach as for PREPARE, given that the regional cash facility would be able to capture the same risk pooling synergies as PREPARE	201,000 MT, purely financial	WFP/ Technical Working group
	Granaries	As the benchmark for estimating the number of granaries necessary in each country, Mali's experience was chosen. The ratio of (rural population of Mali)/(number of existing granaries in Mali) was used to estimate the number of granaries needed in country X: (number of rural population in country X)/benchmark. Existing granaries were subtracted from the ones to be implemented.	Existing granaries: Mali=752, Niger=83, Senegal=17	IFPRI/WFP report. West African Grain Banks in a New Era of Food Crisis. A Policy Report. March 2011.

2 Initial physical commodity stocks

Commodity prices	All	Price of commodities under normal market conditions	Rice 490 USD / MT, Corn 520 USD /MT, Millet & Sorghum 490 USD / MT, (August 2011)	August 2011 WFP/Technical working group estimate
Physical reserve commodity basket	PREPARE	Composition of the reserve	Rice 58%, Corn 27%, Millet and Sorghum 15%	WFP/Technical Working group
	NFRs	Assuming that the governments would compose the reserves to match local consumption preferences AND local availability of food stocks. The specific commodity baskets were defined individually by country, based on historical weight of main grains (millet/sorghum, rice, corn) in national consumption	Weighted average reserve composition across new NFRs: Rice 50%, Corn 24%, Millet and Sorghum 27%	WFP/Technical Working group
	Granaries	The composition of one granary can differ significantly to another. Therefore, the composition of PREPARE was chosen as an average across all granaries. This initial stock would be bought locally by the national government and transported to the granaries. Each granary was assumed to be provided with have a 20 ton initial stock. Prices under normal conditions were assumed.	Rice 58%, Corn 27%, Millet and Sorghum 15%	WFP/Technical Working group, WFP programme in Cameroon, Mali field research

3 Initial cash endowment

Commodity prices	NFRs, Cash reserve	Price of commodities under normal market conditions	See above (Set-up costs, 1)	
Financial reserve commodity basket	NFRs, Cash reserve	Assuming same average basket as for the physical component of NFRs (see above). Also applies to how the size of the cash reserve was calculated, assuming that the governments which receive funds from the cash facility would purchase food baskets that are in line with local consumption patterns	See above (Set-up costs, 1)	
Volatility shock market price premium	NFRs, Cash reserve	Using cash to procure food in a volatility-induced food supply crisis commands a premium over market prices in normal market conditions. When sizing and setting up financial reserves, this premium needs to be factored in to ensure that the funds allow to procure the desired in-kind equivalent.	+30% price premium on average market prices	WFP/Technical Working group

Food crisis risk premium	NFRs, Cash reserve	ECOWAS countries typically pay a premium to international prices because of weak direct relationships with exporters, lower credit ratings and information asymmetry. This holds in particular for countries trying to make infrequent or one-off purchases in food crisis contexts. Grain imports to West Africa are controlled by a handful of trading firms that charge an additional premium to governments, on top of the risk premium assigned by the vendor, because of weak competition, poor transparency and greater market knowledge. As a result, low-income food-deficit countries were likely to pay a significant premium to procure grain even before the onset of the food crisis.	+33.5% risk premium added to the market price for any imports made under crisis market conditions	Expert discussions (commercial grain traders), IFPRI, WFP analysis
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4 Inbound transportation

Source of supply	PREPARE, Emergency aid	Mix of local vs. international procurement	Rice: 100% international (Asia), Corn: 44% local, 56% international (South Africa), Millet and Sorghum: 100% local	WFP/Technical Working group
	NFRs, cash reserve	Accurate simulation of the actual sourcing proves very difficult. Even if local purchasing were the preference for NFRs and the cash reserve, the exact share of local vs. international sourcing would be specific (and different) during each volatility shock. Therefore, as a default assumption, the same same share of local vs. international sourcing as for PREPARE was assumed, albeit differentiated by commodity by country.	For each commodity-country combination, the same <i>proportion</i> of imports vs. local sourcing as for PREPARE was assumed (see above). Due to differences between PREPARE and NFRs with regard to the commodity basket composition, however, the <i>absolute tonnage</i> of imported vs. locally sourced food may differ. Example: On average, 44% of the corn used as security stock for one country is imported; if the weight of corn in this country's NFR food basket is lower than what was assumed for PREPARE, the resulting volume of corn that is imported will be lower. - Given the higher share of millet and sorghum in the NFRs basket, the NFR (and cash reserve) simulations have an implicit tendency to attribute more local (and therefore potentially cheaper) supply to NFRs/cash reserve than to PREPARE. In reality, all analyzed options (except for community granaries) can be expected to optimize their sourcing case-by-case.	WFP/Technical Working group

	Granaries	Granaries are only established in agricultural zones and exclusively source from local production.	The transportation of each initial stock costs are 900 USD: 20 tons*250 km (average distance to be travelled in the country)*0,18 USD (average cost of transportation per km and ton)	WFP/Technical Working group
International inbound transportation costs	All (excl. Granaries)	Components of international inbound transportation costs: sea shipping + port handling and duties + average ground transport to reserve + handling at reserve arrival	Estimated at 166 USD / MT for PREPARE, same inputs and approach applied to all other analyzed options (excl. Granaries)	WFP/Technical Working group
Local inbound transportation costs	All (excl. Granaries)	Components of local inbound transportation costs: ground transport to reserve + handling at reserve arrival. As NFRs are assumed to be located close to the vulnerable population, inbound distances for the NFR (and cash reserve) simulations were assumed to be longer than for PREPARE, balanced out by shorter outbound distances	Estimated at 49 USD / MT for PREPARE; same inputs and approach applied to other analysed options; for NFRs/cash reserve, the estimated total inbound transportation cost (international and local) ranged between USD 82 / MT for millet/sorghum and USD 328 / MT for imported rice, with a weighted average of USD 268 / MT.	WFP/Technical Working group
5 Initial training and support of local staff				
Training and support cost items	PREPARE	Average number of days and people required for initial training and external support	20 international staff members for 6 months for initial support at USD 440 / day , 24 local staff members for 15 days for initial training at 200 USD / day	Southern Sudan security stock budget, WFP analysis
	NFRs		~110 international staff members for 6 months for initial support at USD 440 / day , ~230 local staff members for 15 days for initial training at 200 USD / day	Southern Sudan security stock budget, WFP analysis
	Granaries		50 international staff members for 6 months for initial support at USD 440 / day, 948 training costs for the committee for 2 committee members for 3 days	Southern Sudan security stock budget, WFP analysis, Mali field research
6 Equipment and other set-up cost				
IT equipment	PREPARE, NFRs	IT infrastructure required to operate the proposed system	USD 20,000 / warehouse OR country	WFP/Technical Working group
Office equipment		Office equipment required to operate the proposed system	USD 10,000 / warehouse OR country	WFP/Technical Working group

Warehouse equipment - pallets		Pallets to stock cereals in the warehouse	USD 50,000 for 67,000 MT of cereals (~ 0.75 USD / MT ~1.5 USD / MT of targeted physical stock)	WFP/Technical Working group
Warehouse fencing		Fencing around the warehouse(s)	USD 25,000 / warehouse (~1.5 USD / MT of targeted physical stock)	WFP/Technical Working group

Annual operating cost**1 Storage**

Technical storage cost	PREPARE	Includes security costs, fumigation, maintenance and cleaning, technical stock movement. All activities are assumed to be outsourced to third parties	USD 28 / MT	WFP/Technical Working group
	NFRs	In principle, same components as above. The activities are partly executed by internal staff and temporary third party hands. Assuming higher storage activity in humid than in dry climate.	USD 19 / MT	PRMC 2010 audit (Mali field research), estimate
Stock decay rate	PREPARE, NFRs	Rate of stock deterioration when held in warehouses - estimated based on WFP experience of worst case scenario	2%	WFP/Technical Working group
Rental costs	PREPARE	Annual average rental cost / MT. All warehouse are assumed to be rented	USD 47 / MT	WFP/Technical Working group
	NFRs	Annual average rental cost / MT. All warehouse are assumed to be rented	USD 30 / MT	Mali field research, WFP field offices
	Granaries	Annual average rental cost / MT. All warehouse are assumed to be rented	USD 50 / MT	Mali field research, WFP field offices

2 Rotation

Rotation frequency	PREPARE, NFRs	How often stocks need to be rotated based on location and cereal type	Rice and corn in coastal countries rotate every year; millet and sorghum or rice and corn in landlocked countries rotate every 2 years	PRMC 2010 audit (Mali field research), WFP/Technical working group
Rotation cost	PREPARE	Composed of cost of handling +discount on market price to be borne by the system because rotating stock is older than comparing fresh stock available on the market	Average cost of handling of USD 2.7 / MT and 10% discount on market price. For PREPARE, the discount applies to only 25% of the rotating stock as the remaining 75% is rotated within humanitarian organizations and therefore not discounted.	PRMC 2010 audit (Mali field research), WFP/Technical working group

	NFRs	Same components as for PREPARE	See above, estimated average cost of handling based on data from Mali's food reserve PRMC: USD 2.6 / MT. In the case of NFRs, the 10% discount is assumed to be required on ~75% of aged stock rotated for technical reasons. - Annual cost associated with technical rotation for are expected to decrease with each ton of physical stock that is released for emergency purposes.	PRMC 2010 audit (Mali field research), Expert interviews (Mali reserve management), WFP/Technical working group
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3 Virtual reserve

Virtual reserve composition	PREPARE	Commodity mix of virtual reserves	Rice 27%, Corn 58%, Millet and Sorghum 15%; higher percentage of corn vs. rice is assumed in virtual stock to minimize inbound delivery times	WFP/Technical Working group
Provenance of virtual reserve funds	PREPARE	Mechanisms and sources of 60-day virtual supply	50% from international governments and national reserves guarantees, 50% from physical storage at qualified suppliers' premises. For the latter, PREPARE will need to reimburse suppliers for the total cost of storage (incl.rent and stock decay), assumed at USD 79 / MT /year. No additional costs are assumed for the first 50%.	WFP/Technical Working group

4 Administration (incl. local admin. staff & mgmt agent fees)

Local administration staff	PREPARE	Cost of full time reserve employees that manage the daily reserve operations	5 FTE / reserve needed for small reserves (<20,000MT), 7 FTE / reserve needed for large / medium reserves (>=20,000 MT). UN local rates by country are assumed	WFP/Technical Working group
Management agent costs	PREPARE	Annual cost of management agent: staff and service related costs	External, permanent staff of 10 FTE at international salaries + 7% service fee	WFP/Technical Working group
Office running costs (Utilities, etc.)	PREPARE	Cost of electricity, water and other utilities	USD 8,000 / year / reserve	WFP/Technical Working group

Operating expenditure	NFRs	In principle, all of the cost components listed for PREPARE: All direct (notably wages) and indirect cost associated with running NFR operations (incl. utilities, 3rd party services, transport, etc., but excl. direct storage and rotation cost); NFRs are assumed to be run by government agencies as cost centers (i.e. no profit orientation, cost-based funding from the governments)	Mali's security reserve operating expenditure (excl. storage/rotation) in 2010 (USD 20 / MT of targeted physical stock) used as a multiplier scaled to simulated NFR size of each country; minimum set at 10 FTE. Salaries adjusted to country specific income level by indexed GDP / capita; Ongoing cost for the existing reserves in Mali, Burkina Faso and Niger was not factored in.	PRMC 2010 audit (Mali field research), HDI, WFP/Technical Working group
	Cash reserve	Cost of full time team to manage the cash facility operations	6 FTE with USD 20-150k wage p.a. plus USD 20k for office infrastructure (incl. bank fees)	WFP/Technical Working group
	Granaries	Gratifications for the committee for running the granary	540 USD annually	Mali field research
	Emergency aid	Operating costs for general infrastructure inside and outside of beneficiary countries (headquarters, staff and equipment readiness, etc.).	50% of the regional overhead costs allocated to emergency food aid (USD 2,5M). 2,4% of the total headquarter costs allocated to emergency food aid for the eleven eligible countries (USD 2,7M).	WFP/Technical Working group
Insurance costs	PREPARE, NFRs	Cost of property and casualty insurance the physical stock	0.5% of physical commodity value	WFP/Technical Working group
Replenishment Costs	Granaries	Rate of stock that has to be replenished in order to keep the granaries in business (at their 20 ton level)	annually 3,3% of the stock	Mali field research

5 Governance bodies (Executive Board and Advisory Committee)

Executive Board	PREPARE	Annual cost of executive board: activities, equipment and staff	Estimated at USD 361,000 / year	WFP/Technical Working group
Advisory Committee	PREPARE	Annual cost of advisory board: activity related costs and equipment	Estimated at USD 148,000 / year	WFP/Technical Working group
Governance body	Cash reserve	Annual cost of advisory board and executive board (same as for PREPARE)	Estimated at USD 509,000 / year	WFP/Technical Working group
	NFRs	Estimate based on the annual cost of the office of the technical secretary (ST) of Mali's security food reserve, incl. expenses for liaison with donors and the government authorities	Ratio from Mali applied to estimate governance cost for each NFR (ST annual cost equal ~17% of annual operating expenditure for managing the security stock).	PRMC 2010 audit (Mali field research), estimate

	Granaries	A decentralized community system would require on average the same amount of governance as national food security reserves systems	for all countries: USD 1.8M	PRMC 2010 audit (Mali field research), estimate
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6 Capacity development

Capacity development cost per country	All (excl. emergency aid)	Annual cost of two permanent trainer / mentors per country	Estimated at USD 1.4M / year, based on UN staff rates	WFP/Technical Working group
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Intervention costs

Volatility shock market price premium	All	See above; average premium paid on commodity in time of price hikes; applies to procurement of financial and replenishment stocks in crisis intervention times	+30% price premium over "normal" market prices for all stock purchased during the crisis period	WFP/Technical Working group
Food crisis risk premium	NFRs, Cash reserves	See above; additional price premium charged to organizations with weak purchasing power in time of crisis	+33.5% risk premium added to the market price for any imports made under crisis market conditions	Expert discussions (commercial grain traders), IFPRI, WFP analysis
Outbound transportation costs	PREPARE, emergency food aid	Composed of handling, ground transport to intermediate distribution facility, handling at distribution facility and ground delivery to beneficiaries	Estimated at average 177 USD / MT on total 90-day PREPARE supply. Same approach used for calculations of outbound transportation costs of other options.	WFP/Technical Working group
	NFRs, Cash reserves	Same components as for PREPARE apply. As mentioned above (on inbound transportation), NFRs and government outlets used in case of the cash reserve are assumed to be located close to the vulnerable population. Therefore, inbound distances for the NFR (and cash reserve) simulations were assumed to be longer than for PREPARE, balanced out by shorter average outbound distances.	Estimated at average 51 USD / MT	WFP/Technical Working group
Inbound transportation	PREPARE, NFRs	After each crisis, inbound transportation cost are incurred for the restocking of the physical security reserve. For details on the rationale/approach, see above (Set-up cost, 2)	See above (Set-up cost, 2)	

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Replenishment costs	Granaries	If a shock hits in the harvest season, the planned budget to rebuy the full stock is too small.	With a 30% price hike, a government has to replenish 4.6 tons with a probability of 25% as the buying season is around 25% of the year.	WFP/Technical Working group
Transport costs (Inbound and outbound)	Emergency food aid	Transport costs highly depend on the case (source of purchases, location of crisis, availability of food on different markets, etc.).	Same inbound and outbound costs as PREPARE	WFP/Technical Working group
Other direct operational costs (ODOC), direct support costs (DSC), indirect support costs (ISC)	Emergency food aid	Costs for local country offices (DSC) costs for direct distribution (usually done by NGOs) (ODOC), and 7% of total intervention costs for headquarter costs (ISC).	Average expenditures per ton were calculated for non-immediate-response EMOPs that delivered food aid only for the ECOWAS region for 2005-2010.	WFP data from Standard Project Reports
Storage costs	Emergency food aid	Emergency food aid has to rent local storage capacity on short notice for the duration of the EMOP.	Annual storage costs of PREPARE are 79 USD/ton. Assumption: warehouses have to be rented for 4 months (90 days plus one month buffer). Costs = 26,5 USD/ton.	WFP/Technical Working group
Premium on direct support costs (DSC)	Emergency food aid	The EMOPs considered are rather short (90 days) compared to the ones analyzed from SPRs. Therefore, a premium has to be paid for gathering staff and equipment on the ground.	15 % premium on direct support costs (DSC).	WFP/Technical Working group

Shock model and pilot period simulation

Discount rate	Period Simulation	Discount rate applied to NPV calculation	3%	WFP/Technical Working group
Timeline scenario (1)	Period simulation	Pilot period simulation (5 years).	Assumed set-up costs in year 0 and shocks of type (1) in years 2 and 4.	WFP/Technical Working group
Timeline scenario (2)	Period simulation	Long-term period simulation (10 years).	Assumed set-up costs in year 0 and shocks of type (1) in years 2, 4, 6, and 8.	WFP/Technical Working group
Total size of shock (1): "Large shock"	Shock model	90 days of food needed. Sum of 3 months country needs from sizing of PREPARE (270,000 MT) without risk pooling. Subtracting existing national physical reserves (110,000 MT) that would first be depleted.	160,000 MT	WFP/Technical Working group
Distribution of the shock (1)	Shock model	Share of country needs on total needs based on 10 year maximum drop in consumption compared to the 10 year average.	Country level percentages.	WFP/Technical Working group

Other shock considered (2): "Medium shock"	Shock model	Only import-dependent countries (import share of food higher than 30%) are affected by the shock. The national needs remain the same as in shock (1). No existing national reserves in these countries.	Total size of the shock: 82,000 MT	WFP/Technical Working group
Other shock considered (3): "Small shock"	Shock model	Benin, Togo, Burkina Faso, and Niger, had a flood and now suffer under price shocks. The national needs remain the same as in shock (1). Existing physical national reserves are depleted first.	Total size of the shock: 48,000 MT	WFP/Technical Working group
Coverage of community granaries	Shock model	Community granaries are only meant to be used during the lean season. Hence, they have full coverage (20t) around 25% out of the year. They can only serve the needs of the rural population.	For shock one this amounts to an average coverage of 13%. Shock 2: 11%. Shock 3: 18%.	WFP/Technical Working group

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