MULTI-HAZARD EARLY WARNING FOR IMPACT ASSESSMENT IN FOOD CRISIS PREVENTION PROCESS

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Food insecurity is still one of hardest problems in West Africa sahelian countries. It dramatically depends on biophysical and socio-economic characteristics. Climate hazards represent the principal insecurity factor but other hazards such as desert locusts, floods and population displacements contribute to jeopardize agro-pastoral production and, as consequence, population food security.
A **regional food crisis** corresponds to the highest level of food insecurity, potentially driving to famine millions of people.

Existing Early Warning Information Systems had to face operational limits, as mainly monitoring cropping season rather than providing an early forecast of crises impact.

CPC

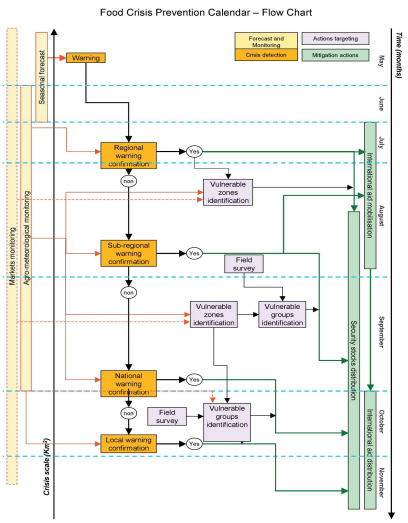
The **Food Crises Prevention Calendar** (CPC) is an innovatory approach developed by AGRHYMET Regional Center and IBIMET-CNR in collaboration with WMO in order to satisfy information needs in terms of early warning according to different levels and different geographical extensions of crises.

The CPC, currently at its second year of test, differs from traditional approaches because of its **variable geometry** allowing it to respond to crises in a different spatio-temporal dimensions wich are due to the concurrence of several factors.

The CPC approach is based on the characterization of crisis levels and the appropriate information production in terms of timing and format as decision makers require depending on the crisis level.

Crisis levels	Frequency	Main Causes	Touched population	Mitigation actions
Regional crisis *Reduction in cereal production ≥ 30%*	1 year in 15	Climatic hazards	Millions of people	Mobilization of international food aid
Sub-regional crisis a) 10% ≤ *Reduction in cereal production* < 30% b) *Touched population ≥ 50% and reduction in cereal production ≥ 10%*	1 year in 7	Conjunction of climatic or other biophysical and socio-economic factors	Hundred of thousand of inhabitants	Mobilization of international food aid
National crisis	1 year in 2	Conjunction of climatic or other biophysical and socio-economic factors	Tenths of thousand of inhabitants	International triangulations and distribution of national stocks
Local crisis	Every year	Socio-economic factors (food access, market prices, population movements)	Thousand of inhabitants	Distribution of national stocks

On the operational side, the **CPC is a methodological environment** which integrates cartographic, biophysical and socio-economic data, models and analysis in order to monitor factors affecting food security during the year and to evaluate the impact on population vulnerability caused by an natural or human extreme event.



The CPC follows a strict **time schedule** responding to the need of planning aid mobilization on the suitable scale. In a year of regional crisis, i.e. 1984, the first alarm should have been launched even before rains arrive in the Sahel, (mid-June).

The risk of a such crisis occurring drops to zero if the rainy season continues to develop without majors anomalies until mid-July.

Thus, as the season progresses and if negative conditions do not occur, the need for complex responses decreases.

Time	Objectives	Scale	Input	Models / tools	Output	Target questions	Decision making
1 June	Crisis scale forecast	Regional/sub-regional	Climatic models (PRESAO, ITCZ, OWI)	Agro-meteorological models for yield forecast from PRESAO data	Regional warning bulletin	Which is the probability of regional/sub-regional crisis?	Warning
1 July	Confirmation of crisis scale	Regional/sub-regional /national	Rainfall data, METEOSAT, NDVI, market prices	Rainfall anomalies, ZAR, Vegetation Front, vulnerability analysis (PRVS)	Confirmation bulletin and impact scenarios	Which is the crisis scale and how many people are touched?	International aid mobilisation
1 August	Risk zones identification and et entity of touched population	Sub-regional National	Rainfall data, METEOSAT, NDVI, market prices	Rainfall anomalies, ZAR, Vegetation Front, vulnerability analysis (PRVS)	Risk zones bulletin and impact scenarios	Where are the risk zones, why are them at risk and how many people are touched?	Logistic planning and international aid mobilisation (Planning of risk zones monitoring)
1 Sept	Risk zones monitoring and vulnerable population estimation	National/sub-national	Rainfall data, METEOSAT, NDVI, market prices, Field survey (GTP)	Rainfall anomalies, ZAR, Vegetation Front, agro-meteorological models for yield forecast, vulnerability analysis (PRVS)	Vulnerable zones bulletin	Where are the vulnerable zones, why are them vulnerable and how many people are touched?	Security stocks distribution
1 October	May-September season evaluation	Regional/sub-regional/national/sub-national	Rainfall data, METEOSAT, NDVI, market prices, Field survey (GTP)	Rainfall anomalies, ZAR, Vegetation Front, agro-meteorological models for yield forecast, models for biomass estimation, vulnerability analysis (PRVS)	Seasonal bulletin	How was the season, which are the countries and the zones touched by the crisis, which are the causes and how many people are touched?	Security stocks and/or International aid distribution Planning of the monitoring-evaluation of international aid distribution Launch of integrative measures for most vulnerable groups
October - June	Update of populations vulnerability conditions as reference framework for crisis impact evaluation						

CPC Products schedule

Ex-post case studies

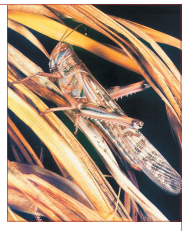
Sub-regional crisis 2000/01

Countries: Burkina Faso, Chad, Mali, Niger.
Causes: Forward end of rainy season, high prices, migrations after Ivory Coast crisis.
Warnings: November 2000 - February 2001
National stocks distribution: November 2000- Mars 2001.
International aid distribution: June 2001.

Country	Cereal production vs. previous 5 years av.	Deficit MT (11/00)
Senegal	+ 14%	- 138.900
Mauritania	- 3%	- 84.000
Mali	-	- 147.700
Burkina Faso	- 23%	- 442.200
Niger	- 10%	- 313.200
Chad	- 16%	- 377.100
CILSS	**- 8%**	**- 1.410.300**

Lessons:
Food crisis could not be forecasted and national warnings were very late.
International aid mobilisation took 6 months and the most vulnerable people suffered many famine months.
Only Burkina Faso could overcome the crisis with security stocks, Niger and Chad did not have enough stocks.
Only an early forecast of a regional of sub-regional crisis can ensure appropriate mitigation measures.
CPC, if it has been already operative could have given the first warning to international community on July, 4 months in advance.

The locust plague of 2004



Countries: Mauritania, Senegal, Mali, Niger, Chad
Causes: Locusts infestation.
Warnings: Mai-August 2004.
Control operations: August-September 2004
Effects: diffused reduction of crop and pasture production in Mauritania and north of Senegal.
Localised reduction of crop and pasture production in Mali, Niger and Chad.
First warning has been given at the beginning of the rainy season, the mobilisation of bilateral and international aid could start the control operations three months later. Only modest actions could be taken based on national capacities. The impact on crop and pasture production could not be evaluated, except for Senegal, as well as the impact of the crisis on population. As consequence the mitigation actions were not targeted on needs and vulnerable population, allowing a rising of food insecurity in the following year that contributed to the 2005 crisis in Niger and Mali.

Lessons:
Locust infestations need to be early forecasted in order to allow the international community to take the appropriate measures for the plague control. Early warning needs the development of more effective and efficient operational tools for monitoring and predicting locust development and migration and evaluate the impact on crop and pasture production. Such early warning tools could help avoid situations such as the 2005 famine in Niger.

The project "Vulnerability Assessment in Sahel" (SVS) for the CILSS countries is being implemented by the World Meteorological Organisation within the framework of the AGRHYMET regional Center with financial support provided by the Italian Cooperation.

The project aims at improving CILSS ability to prevent and face recurrent food shortage crisis. The specific objective of the project is to provide to the Sahelian countries appropriate tools for vulnerability assessment for food security and the management of natural resources.

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