



# SENEGAL DISASTER RISK MANAGEMENT Country Note

Senegal is one of the priority countries for the World Bank Disaster Risk Management (DRM) Team for year 2009-2011. The Senegal DRM Country Note is a document which will serve as a framework for investments in DRM activities in Senegal, which are expected to be about USD 5 million over a three-five year period. It identifies key gaps in the existing DRM situation and interventions, according to the five priorities of actions of the Hyogo Framework of Action (HFA)<sup>1</sup>It includes the overview of major risks, the overview of existing institutions, policies and investments that will provide the basis for identification of priorities, challenges, and gaps in DRM and recommendations for an indicative action plan proposed for GFDRR investments. This Country Note has been developed through a participatory process led by the Directorate of Civil Protection (DPC) which is the official institution in charge of DRM coordination, and involving main governmental and nongovernmental stakeholders in Senegal.

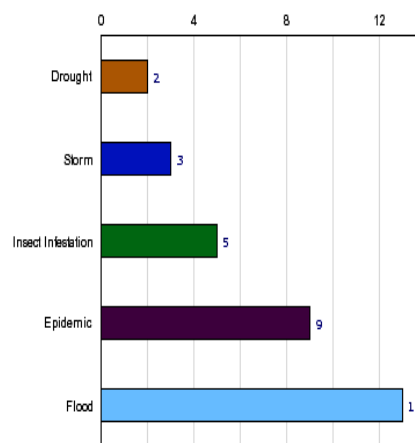


## 1. Country Disaster Risk and Vulnerability Profile

**Senegal is vulnerable to four main natural hazards: drought, locust invasion, flooding with its often associated epidemics (figures 1)<sup>2</sup>, and finally (sea level rise (storm surge) which combination with sediment deficit and human activities along the coast causes important coastal erosion.** This is mainly linked to its 700 km coastline largely open to the Atlantic Ocean, its latitude position in a transition zone between Sahelian climate and Guinean climate which causes an important rainfall variation within the country, and finally the existence of two major river systems and a high potential of groundwater, very superficial in some places<sup>3</sup>. **This physical vulnerability is exacerbated** by: a low economic development with GDP per capita of US\$710 in 2005<sup>4</sup>, and a low UNDP's Human Development Index, ranking Senegal at 156 (with 0.499) among 177 countries in 2005<sup>5</sup>; a dependence on non irrigated rain-fed agriculture; and a land-use planning failure. Senegal's current population of almost 11 million is distributed very unevenly across the country. As a result of enduring internal migration, Senegal's population was already over 48% urban in 2001. Over 76% of this urban population lived in areas classified as slums, which were growing at over 4% p.a.<sup>6</sup>

**In 28 years (1980-2008), floods have affected over 600 000 people, killed over 45 people and caused damage estimated at over USD 42 Million<sup>7</sup>.** Occurring in both urban and rural areas, floods affect all the country's 11 regions but particularly 7: Dakar, Saint Louis, Matam, Kaolack, Thies, Diourbel and Tambacounda<sup>8</sup>. They have various causes: flood and rivers overflowing (of main rivers such as Gambia river and Senegal river) following heavy rains (Saint Louis and Matam), or a combination of high rainfall and a lack of drainage infrastructure

Figure1. Natural Disaster Occurrence Reported in Senegal, 1982-2008



Source: EM-DAT: The OFDA/CRED International Disaster Database, Université catholique de Louvain, Brussels, Belgium.

<sup>1</sup>The five Hyogo Framework of Action (HFA) priority action areas are: 1) Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation; 2) Identify, assess, and monitor disaster risks – and enhance early warning; 3) Use knowledge, innovation, and education to build a culture of safety and resilience at all levels; 4) Reduce the underlying risk factors; 5) strengthen disaster preparedness for effective response at all levels.

<sup>2</sup>Do not include 2009 disaster situation data.

<sup>3</sup> «ADM (Municipal Development Agency) – PRECOL (Local Collectivities Equipment and Strengthening Program): Framework for Social and Environmental Management (CGES)» - final report May 2005 – Mbaye Mbengue FAYE ».

<sup>4</sup>CAS World Bank: 2007-2011.

<sup>5</sup>Human Development Report 2007/2008: Fighting Climate Change: Human Solidarity in a divided world” – UNDP.

<sup>6</sup>Preparing to manage natural hazards and climate change risks in Dakar, Senegal: a spatial and institutional approach 6 Pilot Study Report” – June 2009 – World Bank- The Géoville Group - Institut Africain de Gestion Urbaine

<sup>7</sup>EM-DAT: The OFDA/CRED International Disaster Database, Université catholique de Louvain, Brussels, Belgium

<sup>8</sup>Plan National de Contingence (National Contingency Plan)

(Kaolack) or the sea flooding causing salinization of arable land (Saloum Delta region)<sup>9</sup>. In urban areas like Dakar, the underlying causes of the recurrent floods are complex and involve not only the recent increase of rainfalls, but also the lack of efficient rainwater drainage systems, the rising groundwater, the uncontrolled urban sprawl and the occupation of depressions and wetlands areas. They affect people, often poor in suburban areas every year. In 2008, floods have affected over 250 000 families and caused extensive damage, with 88 schools and 12 basic health centers under water. In late August 2009, due to heavy rainfall severe floods affected again Senegal<sup>10</sup>. Underequipped and low-lying peri urban areas were the most affected and according to the Ministry of Interior, and it seems that the situation is worse than in 2008. The number of affected people in 2009 represents about 43% of the total number of affected people during the last 28 years (1980-2008)<sup>11</sup>.

**Drought affects mainly arid and semi-arid Sahelian areas in the northern part of Senegal. In 25 years, until 2002, the country has experienced six years of major shocks in terms of rainfall**, characterized by the late arrival of rains, an irregular spatial distribution and an early end of the rainy season<sup>12</sup>. They caused a considerable decline in crop yields with losses of about 17.4 to 68.4 billion FCFA<sup>13</sup> for peanuts and 12 to 30 billion FCFA<sup>14</sup> of revenue for the millet/sorghum<sup>15</sup>. The degradation of soil quality and other factors contribute also to the occurrence of droughts. Even in normal times, the duration of the dry season increases from 5 and 9 months, from the South to the North. The precipitation also is varying from about 1000 mm per year in the South to less than 300 mm per year in the North<sup>16</sup>.

**Senegal undergoes regular locust invasions, originated from breeding areas located in neighboring countries: Mauritania, Niger, Chad and Senegal.** In June 2004, the locust plague has covered an estimated area of 1 million hectares<sup>17</sup>. It has affected all the 11 regions of the country but more severely 7 regions: Saint Louis, Diourbel, Thies, Matam, Fatick, Louga and Dakar<sup>18</sup>. The loss of basic production was about 22% including 34% for millet and 30% for sorghum<sup>19</sup>. The overall loss of agricultural production is estimated at less than 50,000 tons equivalent to a loss of about 7 billion CFA francs<sup>20</sup>. Fighting locusts cost 11.868 billion FCFA with 4 billion from the Government<sup>21</sup>.

**From its combination with sediment deficit, natural instability of slopes, surface runoff, and mainly with human activities along the coast, rising sea level, causes coastal erosion which is a very serious threat for the population and the economy of Senegal.** It threatens 74% of households in Senegal living in coastal areas and economic activities undertaken: fishing, tourism, agriculture. Human activities along the coast are main triggering and aggravating factors of coastal erosion<sup>22</sup>. They include the removal of sand and other sediment on the coast, building constructions on the beaches as well as building structures perpendicular to the coast that hinder sedimentary transits. The observed decline rate of the shoreline varies between 1 to 2 m per year for sandy beaches. More important rate is recorded in exceptional circumstances, such as the opening of the Lagoba breach in the Sangomar arrow (rate of 100 to 150 m/year; Diara, 1999) but they are usually followed by stabilization. Saint-Louis and the Mbao-Bargay are among the most affected by coastal erosion<sup>23</sup>.

**Climate change has influenced and will influence negatively the availability of water resources, agriculture and coastal zones**<sup>24</sup>. According to studies, the overall rainfall quantity has decreased by 35%, combined with a decrease in the duration of the rainy period and a decrease in the frequency of rainy days between the period 1950-1965 and 1970-1995. A downward trend in groundwater levels was also noted in the last 30 years of drought (1968-1998). The vulnerability is mainly due to the high dependence of Senegalese agriculture to a rarefying rainfall over time for which, variability is difficult to predict. Research predicts a warming of about 2 to 4 ° C, a decrease in cloud cover of 5 to 10% and correspondingly, a in rainfall decrease of 5 to 25%. In 2100, there would be a decrease of the

<sup>9</sup> SNPSGR (National Strategy for Social Protection and Risk Management 2006-2010).

<sup>10</sup> PRSP Annual Review – Summary Report - Final version - July 2009.

<sup>11</sup> Calculation using OFDA-CRED-EMDAT data on CRED website (Nov 2009).

<sup>12</sup> National Strategy for Social Protection and Risk Management (2006-2010).

<sup>13</sup> About USD 40 to 159 million (for 1USD = FCFA 430)

<sup>14</sup> About USD 27 to 69 million (for 1USD = FCFA 430)

<sup>15</sup> National Strategy for Social Protection and Risk Management (2006-2010).

<sup>16</sup> «ADM (Municipal Development Agency) – PRECOL (Local Collectivities Equipment and Strengthening Program) : Framework for Social and Environmental Management (CGES)» - final report May 2005 – Mbaye Mbengue FAYE ».

<sup>17</sup> Information Note on AELP Project (African Emergency Locust Project) – For the Minister of Agriculture and Aquaculture (May 2009/AELP project).

<sup>18</sup> Mission of formulation and conception of the National Program of Prevention and Reduction of Major Risks and Natural Disasters Management : major risks context analysis in Senegal and strategic orientations for the reduction of risks and disasters – Stage 1 : Formulation» - December 2008 – PAPNGRC/DPC/MGP

<sup>19</sup> Compared to the average production during the past 5 years: National Strategy for Social Protection and Risk Management (2006-2010).

<sup>20</sup> National Strategy for Social Protection and Risk Management (2006-2010) – About USD 16 million (for 1USD = FCFA 430)

<sup>21</sup> Information Note on AELP Project (African Emergency Locust Project) – For the Minister of Agriculture and Aquaculture (May 2009/AELP project) – so, about respectively 27 and 9 million (for 1USD = FCFA 430).

<sup>22</sup> Formulation of a National Integrated Program of Fight against Coastal Erosion” – Final Report – January 2008 – Ministry of Environment and Protection of Nature, Retention Basins and Artificial Lakes – Direction of Environment and Classified Establishments– Senegalese Society for Natural Resources Operation – Senior Consultants Associates.

<sup>23</sup> NAPA or National Action Plan for Adaptation to Climate Change

<sup>24</sup> All data presented in this section is from NAPA.

ground water level ranging from 5m (for an average climate sensitivity baseline scenario) to 10 m (for a high sensitivity scenario of doubling of the current rainfall deficit). This requires better management of water resources, through the revitalization of the river and protection of available water reserves, and a strengthening of the fight against drought and desertification with the use of appropriate agriculture technologies. It is expected that climate change will increase coastal erosion, flooding of low-lying coastal areas<sup>25</sup>, and salinization of soil and water with the risk of loss of mangroves.

## 2. Country Disaster Risk Management Framework

### 2.1. Policy, Institutional Capacity and Consensus Building

Chaired by the Minister of Interior, the High Commission for Civil Protection is the consultative organ in the field of civil defense, especially for disaster prevention and management<sup>26</sup> (figure 2). In charge of advising the Minister of Interior on all civil protection issues, it contributes to the coordination of sectoral activities for disaster prevention and relief organization. Its members include representatives of all ministries. The High Commission is also responsible of examining the implementation conditions of laws and decrees related to civil protection, and for ensuring the execution of tasks assigned to its decentralized branches which are the Regional Civil Protection Commissions headed by the Governors, and the Auxiliary Civil Protection Commissions<sup>27</sup> headed by the Prefects.

Specialized department within the Ministry of Interior, the Directorate of Civil Protection (DPC) is the focal point in charge of the coordination of risk and disaster prevention and management activities within the country. Executive arm of the Minister of Interior for civil protection matters, the DPC acts also as the secretariat of the High Commission of Civil Protection<sup>28</sup>, and then its operational body (figure 2). DPC is responsible for ensuring the protection of people and the conservation of public and private facilities and resources<sup>29</sup>. Its main tasks include the development of legislation regulating the field of civil protection in Senegal. It is also in charge of the identification and the mobilization of additional resources to be engaged to support the rescue teams in times of disaster. The DPC chairs the Sub commission "Intervention Plans" of the High Commission of Civil Protection<sup>30</sup> and is the coordinator of the National Committee in charge of managing the Relief Organization (ORSEC) Plan Means<sup>31</sup>.

Chaired by the Prime Minister, a National Platform for the Prevention and the Reduction of Major Disaster Risks<sup>32</sup> (figure 3) has been

Figure 2: Disaster Risk Management Coordination Scheme in Senegal.

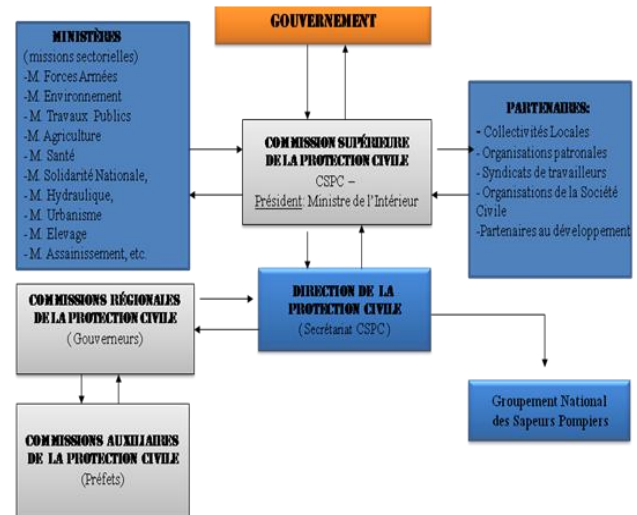
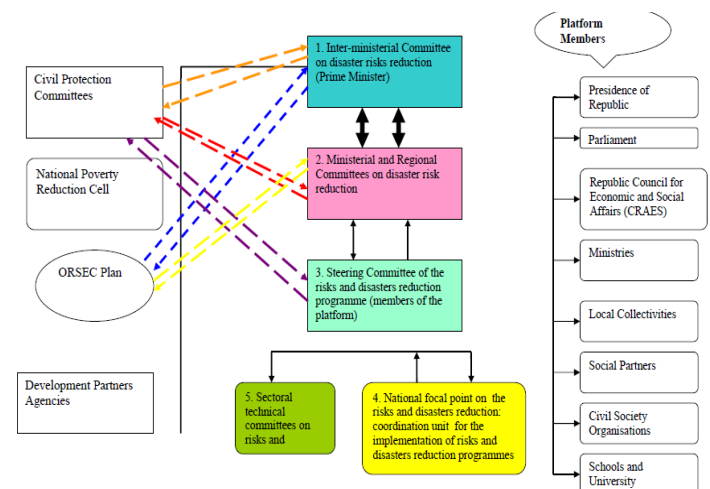


Figure 3: Senegal National Platform for Disaster Risk Reduction



Source: Gueye, Ndèye Fatou D. African Urban Management Institute (IAGU). Hotspot Characterization and Assessment of Institutional Capacities in Peri-Urban Areas of Dakar, Senegal.

<sup>25</sup>The possible positive impact of rainfall decrease on the reduction of flooding occurrence and intensity is not mentioned in the various available studies on climate change impacts.

<sup>26</sup> Decree N° 99-158 - 22 February 1999

<sup>27</sup> Commissions Régionales et Auxiliaires de Protection Civile

<sup>28</sup> Commission Supérieure de la Protection Civile

<sup>29</sup> Decree n° 64-563 - 30 July 1964, completed by decision n° 539/MINT - 12 January 1990.

<sup>30</sup> Sous-commission Plans d'Intervention

<sup>31</sup> Comité national de gestion des moyens du plan ORSEC

<sup>32</sup> Une plateforme nationale pour la prévention et la réduction des risques majeurs de catastrophes

recently established (2008)<sup>33</sup>. Through its Inter-ministerial Committee for disaster risk reduction, the National Platform is responsible for promoting the sustainable integration of the prevention and disaster risk reduction dimension into development policies, plans and strategies of good governance and poverty reduction. It is also in charge of validating the national disaster risks prevention and reduction program which is the medium term vision in the field, and of ensuring the effective articulation of the Poverty Reduction Strategy Program (PRSP) and the disaster risk reduction Program. Composed of five bodies (figure 3) it includes as members representatives of all ministries.

**Floods are current stated priority of the Government. Numerous inter ministerial structures have been established to address floods issues. Recently, the creation of a High Commissariat in charge of Flooding was announced following 2009 floods.** Practically, following each catastrophic flood event, a structure grouping all concerned sectoral institutions were set up, such as: in 2001, the National Commission for the Forecast Management of Floods (CONAGPI)<sup>34</sup>, coordinated by the Ministry of Urbanization and Land Use Planning - in 2003, a National Unit for the Prevention and the Fight against Floods (CNLPI)<sup>35</sup> headed by the Ministry of Interior and Local Collectivities - in 2007, a National Commission for Prevention, Supervision and Monitoring of the Fight against Flooding headed by the Prime Minister<sup>36</sup> - and finally, following the 2009 floods, a High Commissariat in charge of Flooding, will be created as stated by the State Minister, Minister for Urban Development, Housing, Hydraulics, and Sanitation<sup>37</sup>. The last one would be responsible for the definitive resolution of the flooding problems in the country. All those structures are grouping practically the same institutions and ministries concerned by floods issues.

**In 2005, Senegal developed a National Strategy for Social Protection and Risk Management (SNPS / GR), covering the period 2006-2010, in which the “management of major risks and disasters” is the fourth pillar.** Its main aim is to reduce the impact of shocks directly threatening the population, especially the most vulnerable groups by helping households to better manage the risks that could lead to the irreversible loss of life or capital and to promote access of the most vulnerable segments of the population to basic social facilities.

**In 2009, Senegal is currently developing a “National Program of Prevention and Reduction of Major Risks and Natural Disasters Management”** through a process led by the Ministry of Interior through the Directorate of Civil Protection (DPC), which would serve as the operational framework for interventions in the field of DRM. The PRSP and a preliminary study for the formulation of this national program states its four components: (i) legal and institutional framework strengthening – (ii) disaster risk prevention and reduction (DRR) – (iii) national and local capacities strengthening in terms of preparedness and disaster response – and (iv) implementation of communication strategies for DRR. Expected to be completed at the end of 2009, the development of this National Program would be followed by a round table meeting with potential donors for resource mobilization purpose.

**The National Action Plan for Adaptation to Climate Change (NAPA) in Senegal was developed in 2006 by the Ministry of Environment and Nature Protection.** Developed following an analysis of vulnerable sectors to climate change, through a participatory process within a multi-disciplinary team, the NAPA identified 4 priority programs related to: (i) agro forestry development; (ii) rational use of water; (iii) coastal protection; and (iv) public education and awareness rising. From the NAPA, several projects have been designed and funded by various technical and financial partners, including projects: for reducing vulnerability to climate change, focusing on the integration of climate change into the national planning, on the agriculture, on the use of coastal areas but also on coastal erosion and on local environment with a territorial approach, etc<sup>38</sup>. The country is planning to revise its strategy in terms of adaptation to climate change<sup>39</sup>.

Despite the efforts and progress made by the country, a number of challenges need to be addressed.

**DRM mechanism is not fully successful due to the institutional scheme complexity and lack of clarity, the weakness of the supporting legal, regulatory and operational mechanisms, and to the stakeholder’s ignorance of the current DRM organization. Defining a more appropriate rationalized institutional framework, with a strengthened supporting legal, regulatory and operational frameworks and tools, combined with the promotion of stronger stakeholders’ information, awareness and involvement, are key needs.** The respective mandates and

<sup>33</sup> Decree n° 2008-211 - 4 March 2008

<sup>34</sup>Commission Nationale de Gestion Prévisionnelle des Inondations (CONAGPI) : created by Prime Minister’s « arrêté » n°006124 - 01/07/2001

<sup>35</sup>Cellule Nationale de Prévention et de Lutte contre les Inondations (CNPLI) : created from Decision of the President of the Republic – Decree N° 2003-685 - 12/09/2003, modified by Decree N° 2004-1153 - 18/08/2004

<sup>36</sup>Commission Nationale de Prévention, de Supervision et de Suivi de la Lutte contre les Inondations : created by «arrêté » n° 006440 - 16/07/2007.

<sup>37</sup> « Quotidien Le Soleil (Sénégal) - Article intitulé : « Oumar Sarr au Conseil Economique et Social : Un Haut commissariat contre les inondations annoncé » (24/09/09) by E. KALY ».

<sup>38</sup>Directorate of Environment and Classified Establishments (DEEC) - Ministry of Environment.

<sup>39</sup>Directorate of Environment and Classified Establishments (DEEC) - Ministry of Environment.

roles of the various existing structures and institutions within the DRM system and the links between them are not often clearly defined and formalized, such as the formal operational and/or hierarchical links between the National Platform and the High Commission of Civil Protection. The weakness of tools and operating mechanisms limits an effective operationalization of the institutional arrangements and mechanisms put in place, and does not allow a clear coordination between stakeholders, vertically (between the central, regional, departmental and local levels) and horizontally (across sectors, and between inter ministerial structures). The existing legislation and regulations contribute to the implementation of disaster and risk management but does not cover systematically all the required aspects for operationalizing the mechanism. Number of stakeholders does not know exactly the existing DRM mechanism and their responsibilities within it.

For floods management specific case, all the above mentioned statements apply. The various established structures seemed to be not operational as the years go by, despite legal texts putting them in place. No clear one strong specialized institution has been officially mandated to take the technical lead.

**Directorate of Civil Protection (DPC)'s current structure and profile are weak and do not allow it to effectively implement its mandate of coordination, mobilization and facilitation of interventions and sectoral actors involved in Disaster and Risk Management (DRM). Defining more appropriate DPC's profile and structure, for both central and decentralized levels, through its reform and its technical, organizational and material capacity strengthening, are priority needs.** Its anchorage as a directorate within the Ministry of Interior makes it difficult to mobilize stakeholders in other ministries, which are often of a higher level (often Directorate General level). Moreover, its internal organization and human resources current profile seem primarily oriented towards the implementation of prevention and relief operations on the ground. But they seem fairly limited to implement more conceptual, multisectoral and systemic vision and approach, for a medium and long terms disaster and risk reduction. At the decentralized level, there are no Civil Protection regional or communal offices, representing the DPC. Its mandates and missions are there implemented, within the Regional and Auxiliary Civil Protection Commissions, by the decentralized representatives of the Fire Brigades National Group, which are mostly operational structures. Authorities recognized already the DPC's institutional weakness and planned to implement measures, including the reform of the DPC as a Directorate General<sup>40</sup>.

**Local disaster risk management is still weak because of a weak decentralization of DRM capacities and resources to local authorities. Defining clearly the local authorities' responsibilities, strengthening their capacity to successfully implement them, and promoting local populations and stakeholders' awareness and commitment are crucial needs.** Local authorities, mainly decentralized territorial collectivities at communal level, do not have sufficient capacity to implement the mandates and tasks assigned and transferred to them. There is mainly a lack of knowledge, operational concrete tools, guiding reference and models, financial and material resources, which will need to be notably enhanced. Given specifically their responsibility in aggravating flooding in some high flood prone areas, local authorities should be provided with adequate technical capacity to better control factors which could cause or exacerbate flooding at the local level (land use planning, sanitation, drainage, and soil occupancy). Defining at the local level, a more clarified DRM institutional mechanism, with the appropriate supporting legal, regulatory and operational framework, modalities and tools, would be also a preliminary priority that should be addressed within a more comprehensive framework of the national DRM institutional mechanism, above-mentioned.

## **2.2. Disaster Risk Assessment, Monitoring and Early warning:**

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**Senegal has a relatively strong capacity and experience for the regular assessment and monitoring of risks related to drought and locusts' invasion, but remains weak for flooding and coastal erosion.**

**Mechanisms are in place to ensure regular assessment, monitoring of drought levels and trends, and early warning,** mainly: (i) the Information System on Desertification/System of Information and Monitoring of Senegal Environment (SID/SISEI)<sup>41</sup> which aims among others to facilitate the monitoring of desertification and environmental degradation, to assess the impact of projects against desertification, to provide and measure the impact of disasters related to drought and to allow access to data and information<sup>42</sup> - (ii) the Center for Ecological Monitoring (CSE) which ensures regular monitoring of Senegal environment, particularly plant and animal resources, using monitoring tools like satellite imagery combined with field work, which results are recorded in an environment database feeding a Geographic Information System, and (iii) the Committee of the Permanent Inter-

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<sup>40</sup> Announced (to the mission) by the General Secretary of the Ministry of Interior.

<sup>41</sup> Système d'Informations sur la Désertification/Système d'Information et de Suivi sur l'Environnement du Sénégal

<sup>42</sup> Multi source, multi format, multi scale, multi media using classical and modern communication and information means (hard and electronic supports: CD ROM, internet).

State Committee for the Fight against Drought in the Sahel (CILSS), with a mandate to invest in research for food security and the fight against the effects of drought and desertification for a new ecological balance, which coordinates through its National Coordination (CONA CILSS), crop and food situation assessment and monitoring missions in relationship with the FAO, WFP and FEWS-NET (USAID), providing then a framework for understanding of impacts on individual households or groups of current or potential shocks including drought.

**The National Committee for the Fight against Locust Invasion<sup>43</sup> carries out analysis and regularly follows the locust situation.** This Committee is coordinated by the Directorate of Plant Protection<sup>44</sup>, of the Ministry of Agriculture.

**The National Agency of Meteorology carries out regular monitoring and analysis of temperature and rainfall for drought, floods and locust invasion assessment and monitoring uses. But rainfall forecast data accuracy and coverage need to be strengthened.** Discrepancies between rainfall forecast and actually reported rainfall were sometimes observed. Data calibration is thus necessary to ensure a better adaptation of the general data used by the agency to real Senegal specific context and situations. More synoptic observation stations might also be needed to enhance coverage of data collection on the ground.

**The Directorate of Water Resources Management and Planning carries out regular hydrologic situation analysis and monitoring (rainwater, rivers, and groundwater)<sup>45</sup>. But data accuracy and the coverage need to be strengthened.** The existing hydrologic forecasting system would need to be formalized and hydrologic observation geographical coverage would need to be improved to optimize hydrologic monitoring quality. Existing observation stations are currently limited to a few important river courses<sup>46</sup>.

**Collaboration between the National Agency of Meteorology and the Directorate of Water Resources Management and Planning should be enhanced** through the development of consolidated hydro-meteorological products, allowing the optimal use of both hydraulic and climatologic data. Currently those two institutions provide data to institutions in charge of drought, floods and locust situation monitoring, separately without real cooperation.

**Significant efforts have been made in risk assessment and mapping, but they need to be strengthened for flooding and coastal erosion,** by a more accessible, complete and dynamic risk atlas, including a comprehensive hazard and vulnerability spatial analysis (geo referenced).

**Regarding drought risk, maps on crop production monitoring, pastoral monitoring and agricultural monitoring are regularly produced by the Center for Ecological Monitoring<sup>47</sup> (CSE).** These maps provide information on drought situation, enabling to monitor its evolution and to identify appropriate anticipatory and corrective measures regarding agriculture and farming.

**Regarding coastal erosion, some vulnerability analysis and risk mapping initiatives have been undertaken. But they will need to be completed and capitalized to get full spatial risk analysis and assessment.** Vulnerability analysis carried out in the framework of NAPA preparation process (1998) allowed identifying risk prone areas, understanding the development mechanisms of coastal erosion in these areas and its consequences, and having estimates of the potential impacts of a sea level rising, based on different scenarios. A spatial analysis of coastal erosion risk for the capital Dakar was carried out through a pilot study on a spatial and institutional approach of DRM<sup>48</sup> using new tools of spatial analysis based on geographic information system (GIS) data. Other studies and mapping were undertaken for specific vulnerable areas, mainly Saly Portudal and the Senegal estuary by the CSE<sup>49</sup>.

**Regarding flooding, some floods risk mapping initiatives have been carried out. But they will need to be completed and capitalized to get a full flood risk spatial analysis and assessment. Coordinated by DPC,** an inventory of flood prone areas has been carried out in 2002 in order to identify the nature of these risks and the preventive measures to implement and to proceed to their mapping. In 2009, DPC<sup>50</sup> proceeds to the development of a methodology for flood risk mapping and its application to the regional level in the Dakar region. The new risk spatial analysis tools based on GIS data were also applied for floods in Dakar (the same mentioned pilot study). The Ministry of land use planning would be also having developed flood prone areas mapping in Dakar region.

**The development of a Geographic Information System for disaster and risk management (GIS for DRM), multi hazard but focusing initially on floods, including complete analysis of hazard, vulnerability and likely impacts according to scenarios, is a key identified need.** Free of access for everybody, this GIS for DRM should provide a

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<sup>43</sup> Le Comité National de Lutte Anti Acridienne

<sup>44</sup> Direction de la Protection des Végétaux

<sup>45</sup> Through mainly its Hydrologic Division.

<sup>46</sup> Even sometimes underequipped, such as limnometric stations (*stations limnométriques*) for the Gambia River.

<sup>47</sup> Centre de Suivi Ecologique

<sup>48</sup> Pilot study entitled "Preparing to manage natural hazards and climate change risks in Dakar, Senegal: a spatial and institutional approach" carried out through GFDRR Funding.

<sup>49</sup> Studies entitled: "Study and mapping of the coastal erosion phenomenon in the area of Saly Portudal" and "The sea-level rise: the Senegal estuary, a vulnerable area".

<sup>50</sup> with UNDP's support

risk analysis and mapping covering the national territory to get a comprehensive overview. But it should be established for the local level (city level, or at least communal level) to really serve as an effective decision-making and planning tool. It should also include detailed information on infrastructures vulnerability such as roads, housing, electricity, sanitation, and a detailed information and analysis of probable socio-economic impact according to developed scenarios. The development, from this year, of a National Geomatics Plan<sup>51</sup> would be a good opportunity to promoting collaboration and sustainability as it aims to create a harmonized framework for the production and dissemination of geo spatial referenced data in Senegal.

**Early Warning System (EWS) is operational for drought and locust invasion but is weak for flooding. Setting up an appropriate effective flood early warning system, and a permanent, multi hazard early warning coordination and monitoring Unit to ensure optimal success, use and coordination of all established specific early warning systems, is a key expressed need.** To this end, the Government, through DPC carried out a study in 2008<sup>52</sup> to make a proposal on their missions, organization, structure, functioning and operating procedures.

**Regarding the Early warning coordinating and monitoring Unit, most of the stakeholders recognize the need of such a proposed structure, which plays a key facilitating and coordinating roles.** But support was requested for the preliminary identification of gaps and needs in the field of EWS and for the identification of the subsequent responsibilities and tasks of such a structure, and the adapted mechanism for coordination with other existing warning systems related to specific hazards or themes (such as the EWS related to locust invasion, wildfire, food security, etc.). This would be necessary to ensure consistency with country realities.

**Official flooding early warning system is still weak. In addition to traditional mechanism, civil society such as the network of women leaders involved in DRM, are still playing key roles in the transmission of alerts to the population and even to the authorities when necessary. Setting up an appropriate, formalized flooding EWS is thus a key priority<sup>53</sup>.** It is crucial to ensure that this flooding EWS would be able to develop and maintain a formalized and efficient local EWS. It should be institutionalized and based on a clear established mechanism, involving concerned local authorities, and specialized technical officers at all levels (local collectivities, central and decentralized technical departments, regional development agents<sup>54</sup>, etc.) But it should also include all stakeholders including media, civil society, community leaders and private sector, who could play a role in the collection, analysis and transmission of the alert to people and designed departments, as well as in the implementation of response/reaction measures following the warning reception.

**Regular simulation exercises should be carried out,** to ensure ownership of the required reactions following the reception of an alert. Collaboration with the National Meteorology Agency, the Directorate of Water resources management and Planning, and the local media, for the development of messages and warning information easily understandable and usable by the community and their transmission to the village level should be strengthened.

## 2.3. Knowledge and Capacity Enhancement for DRM

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**Some Disaster risk management (DRM) Training initiatives targeting various audiences were undertaken in Senegal with support from partners. DPC provided DRM training sessions** for: the members of the Network of Parliamentarians involved in DRM, the members of the women leaders in DRM Network, municipal technicians, territorial administration staff, elected officials and other policy stakeholders, partners of the Municipal Development Agency (ADM)<sup>55</sup>. **An action plan for integrating DRM teaching in the curriculum at primary and secondary education was prepared** by a multisectoral committee chaired by the Ministry of Education, under the coordination of the DPC. It would be implemented within the framework of the future National Program of Prevention and Reduction of Major Risks and Natural Disasters Management.

**A National Center of Civil Protection exists in Senegal, but has no local premises.** It offered annual training courses with the support of the International Organization of Civil Protection (OIPC). The DPC's support project would provide support for the effective implementation of this training center. **A training seminar on "crisis communications"** was organized by the DPC **for the press and communication officers** from several governmental agencies and departments (police, armies, national group of firefighters, ministries) and for thirty press bodies. **There is currently no disaster risk management specialized university training in Senegal,** but training modules relating to specific sectoral aspects and techniques of risk reduction are an integral part of training curricula.

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<sup>51</sup> This work will be fulfilled within an Inter Institutional Coordination and Consultation Group (Groupe interinstitutionnel de Coordination et de Concertation) coordinated by the State Data Processing Agency who chairs the Steering Committee.

<sup>52</sup> Study entitled "the Early Warning System for floods, industrial accidents and maritime disasters" was conducted by the DPC and its support project in September 2008.

<sup>53</sup> Such as for Gambia River overflowing following 2009 Floods experience.

<sup>54</sup> Agents de Développement Régional (ARD).

<sup>55</sup> Agence de Développement Municipal.

**Research Centers and Institutes contribute to disaster and risk reduction in Senegal.**

**Research results contributed to convince authorities to adopt concrete measures promoting the preservation of marine/coastal sand and the use of sustainable and profitable alternative.** Among those relevant researches which aim at reducing pressure on the coastal and marine sands, there are<sup>56</sup>: (i) The geotechnical characteristics studies of various substitution sands, particularly sand hill (dune sand), conducted by the Directorate of Mines and Geology, which showed that reserves are available in the border areas of Niayes zones, outside the casuarinas trees areas; and (ii) the studies and experiments on recycling of rubble from old buildings demolition, and on valorization of local materials and careers debris uses, conducted by the Experimental Center of Researches and Studies for Equipment (CEREEQ)<sup>57</sup>.

Then, **the Direction of Environment and Classified Establishments provided instructions, for the preparation of regional action Plans to combat illegal extraction of marine/coastal sand** by the regional Divisions of Environment which have coastline. The action Plan for Dakar region has been validated in last August 2009.

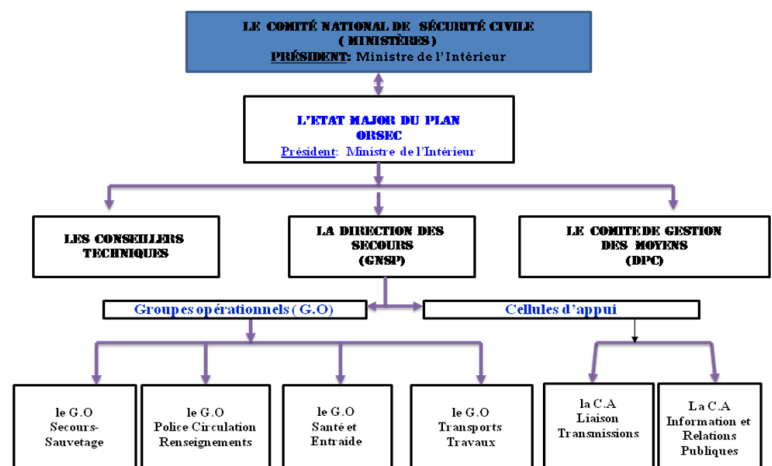
**Despite these achievements, it seems that awareness directly targeting local vulnerable populations was not yet carried out systematically.** A communication and awareness Plan should be developed and clearly established to cover those populations and all relevant stakeholders not yet covered. Clear messages, with content tailored to the targets' needs and profiles, should be sent with the adapted format, through the appropriate support. The training modules developed till now for local authorities' awareness raising are a possible starting point, but their content and structure will need beforehand an important improvement and adaptation to optimize their understanding and ease of use by the target. The dissemination of research results should be strengthened, especially to policy makers to enable their transformation into practical decision.

## 2.4. Disaster Preparedness and Recovery

**Adopted, in anticipation of serious events that could endanger many lives, property, the environment or important facilities, the National Relief Organization (ORSEC) Plan is the tool for crisis and disaster management in Senegal<sup>58</sup>.** It is an organizational framework allowing to establishing in advance the rapid implementation and efficient use of all public and private relief means available. The Minister of Interior is in charge of stating by decree the National ORSEC Plan modalities of triggering, implementation, and lifting<sup>59</sup>. National ORSEC Plan arrangement comprises (i) a Command Staff, (ii) operational Groups and (iii) support Units (figure 4).

**Within the Staff Command headed by the Minister of Interior, the National Fire Brigade is responsible of relief operations conception and direction, and for the coordination of the four operational groups' interventions.** The National Fire Brigade is also responsible of the transmission of pre warning from the Ministry of Interior for the activation of the ORSEC Plan, and for the proposition of its lifting. In charge (i) of planning, coordinating and monitoring the implementation of measures to control the situation, but also (ii) of promoting the coordinated involvement of civil and military, national and international means, at the Government's disposal, the Staff Command has two other members<sup>60</sup> which are the Governor of any affected area, playing an advisory role and the Director of Civil Protection (DPC).

Figure 4: The ORSEC Plan (Relief Organization Plan)



<sup>56</sup>"Formulation of a National Integrated Program of Fight against Coastal Erosion" – Final Report – January 2008 – Ministry of Environment and Protection of Nature, Retention Basins and Artificial Lakes – Direction of Environment and Classified Establishments– Senegalese Society for Natural Resources Operation – Senior Consultants Associates.

<sup>57</sup> Centre Expérimental de Recherches et d'Etudes pour l'Équipement.

<sup>58</sup> Decree N° 99-172 - 04 March 1999.

<sup>59</sup> Arrête N° 4386/MINT/DPC - 04 June 1999.

<sup>60</sup>If necessary, the Ministry of Interior can invite any specialists, to join the Staff Command, through a technical Committee. He can also associate any Regional Council President or any concerned Mayors.

**The DPC is coordinating the Committee for the management of the National ORSEC Plan's means, which is responsible for logistical support** to the Staff Command, the operational Groups and the support Units<sup>61</sup>. It may proceed to the requisition of national private means<sup>62</sup>, according to regulation procedures<sup>63</sup>.

**DPC is also chairing the Intervention Plans Sub-Committee of the High Commission for Civil Protection, which is responsible for the monitoring and Improvement of the National ORSEC Plan**<sup>64</sup>. Assistance to the Minister of Interior regarding to relief and assistance financing modalities, priority interventions definition, resource mobilization, and disaster evolution monitoring is also provided by the High Commission for Civil Protection

**At the decentralized level, the Governor adopts by decree, the Regional and Departmental ORSEC Plans, in the same way as the National ORSEC Plan.** Regional and Auxiliary Civil Protection Commissions provide assistance respectively to the Governor and to the Prefect for organizing relief and managing disaster.

**In 2008, Senegal developed its National Contingency Plan based on three probable disaster scenarios (floods, epidemics and locust invasion),** targeting seven regions, depending on scenarios: Dakar, Saint Louis, Matam, Kaolack, Thies, Diourbel and Tambacounda, covering the period from July 2008 to June 2009. It is a joint Plan of the Government, UN agencies and specialized NGOs involved in DRM fields. Designed to generate well common coordinated response strategies, the national contingency Plan is coordinated centrally by the Directorate of Civil Protection (DPC), it is expected to support the ORSEC Plan. Its updating is scheduled for this year 2009. DPC assisted by its support project begun the implementation of a regional contingency plans development program.

**Post floods response efficiency this year (2009) was limited due to a lack of sufficient and appropriate means, and to a lack of adequate preparedness.** The management of the recent floods allowed identifying limitations to the optimal functioning of the existing post-disaster response mechanism in general. **So,** despite the effort realized to establish a common framework for preparedness and response, weaknesses should be addressed to optimize the effectiveness of the system.

**Capacity of the ORSEC Plan's conception and direction team needs to be enhanced. Specifically, it is necessary to strengthening material and technical capacities of the National Fire Brigade, mainly for water evacuation, communication and information management, and for the establishment of adequately equipped command posts, to enable it to successfully carry out its mandates and missions.** Despite all its efforts, the National Fire Brigade met technical and material constraints. The effectiveness and the geographic coverage of the water evacuation, one priority intervention, were limited. One main reason, apart from the nature of the flooded area, was the decrepitude and the lack of available pumps, despite the allocation of additional new pumps from partners (particularly from the World Bank<sup>65</sup>). The lack of adequate communication and information management facilities, was also impeding the implementation of an optimal coordination of relief interventions on the fields, in addition to inadequate, underequipped central and advanced operational command posts.

**The implementation of a regular and systematic preparedness should be adopted and institutionalized.** The National Contingency Plan prepared to support the ORSEC Plan seemed to have not actually been operational during the floods management this year. One major limiting factor of ORSEC interventions to evacuate water was the inadequate preparation of certain needed drainage infrastructure such as the prior retention basins draining and the finalization of the connection to the sea. Participatory assessment of weaknesses, strengths and improvements needs regarding the implementation of the National ORSEC Plan and the National Contingency Plan needs to be undertaken regularly. Participatory design of a common preparedness Plan and/or updating of the contingency Plan should be carried out with clear and formal allocation of responsibilities and timelines for the implementation of each defined preparedness action, but also a clear follow-up mechanism. The new preparedness Plan should be regularly tested and improved if necessary between two crises.

**Strengthening recovery implementation, including post-emergency needs assessment system strengthening seems necessary.** It would include stakeholders' capacity strengthening for post-emergency needs assessment and economic assessment of damage and post-disaster needs<sup>66</sup>, and for planning and implementing their results. But it would consist also in setting up an improved mechanism for post-emergency assessment and recovery implementation. This would contribute to ensure appropriate socio-economic recovery in the affected areas,

<sup>61</sup> Decree N° 99-172 - 04 March 1999

<sup>62</sup> Arrêté N° 04387/M.MT/DPC - 22 June 1999

<sup>63</sup> He can also invite any person or institution whose competencies are needed.

<sup>64</sup> Arrêté N° 04383/MINT/DPC - 22 June 1999.

<sup>65</sup> Under the first phase of the World Bank's support to the 2009 floods management (a total funding of 4 million USD from IDA funds, through the PDLP project), which is an emergency support consisting in pumping water out of the inundated areas to the natural spillway in order to mitigate immediately the severity of immediate floods, in the remainder of this rainy season.

<sup>66</sup> Mainly through training in Post-Disaster Needs Assessment, in accordance with the standard methodology DALA (Damage, Losses and Needs Assessment).

avoiding vulnerability increasing due to cumulative effects of successive disasters that would not be fully addressed. This strengthening action would also feed the country data of risk exposure, while providing basis for probabilistic risk assessment, risk mapping and use for risk transfer (in particular insurance if necessary).

## 2.5. Disaster Risk Reduction and Financing

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**Interventions aiming specifically at reducing drought underlying risk factors and consequences (including desertification), are implemented** in Senegal, mainly in the areas of: environment and natural resources management, including water resource management, sustainable land and soil management, agriculture, energy and food security. They are mainly carried out through the implementation of the National Program of Actions of Fight against Desertification (PANLCD)<sup>67</sup> and the National Environmental Action Plan (PNAE)<sup>68</sup>. They are also implemented through the continental Program of Green Great Wall in the Sahel and Sahara (GMV)<sup>69</sup>, of 7,000 km long and 15 km wide, from Dakar to Djibouti, for which Senegal is in charge of coordination. It aims at strengthening implementation of existing continental frameworks and action plans for the fight against soil degradation threats and desertification, and its mechanisms include the detailed Program for agriculture development in Africa (PDDAA)<sup>70</sup> and the regional, sub regional and national Programs of actions to fight against desertification (RAP, SRAP and NAP)<sup>71</sup>. Soil erosion slowing down, degraded soils restructuring, reforestation increasing rate with eco-climatic balance and biodiversity restoration, and water supply sources control, are among its objectives<sup>72</sup>. The initial phase would begin soon, waiting for financial resources. But Senegal already built about 525 km of the great green wall, and decided to develop about 250 rainwater ponds along the wall<sup>73</sup>.

**While drought and desertification issues are sustainably addressed, the long-term reduction of floods risk and coastal erosion needs to be enhanced.**

**Protection against flooding is stated as a current priority by the Government. A “short and medium terms Program for protection of communities at risk of flooding by rain water and/or overflowing river” was developed in 2005.** Expected to be carried out over a period of 5 years (until 2010), its implementation is not yet starting now. It proposes measures for sustainable prevention and protection of the population in the eleven regions of Senegal, such as the construction and rehabilitation of protection dikes, the development of hillside ponds, the establishment of sewage systems, the transfer of villages at risk of flooding, the construction, repair and rehabilitation of some bridges and roads, to avoid the isolation of risk prone areas - and the strengthening of pumping equipment. Its implementation would require further investigations and evaluations.

**A project intending to develop a Liquid Sanitation (sewerage) Master Plan for Dakar Region, on the horizon 2025, is currently being prepared by the National Office of Sanitation (ONAS)<sup>74</sup>.** It would consist in technical assistance for carrying out a study updating the sanitation master plan of Dakar and its surroundings, developed in October 1994 (horizon 2010) with funding from Japan (JICA)<sup>75</sup>. It is expected that during the project implementation process, protective measures against flooding will be assessed and a protection system (primary pipeline/channels, infiltration areas, retention basins, etc.) to complement sewage evacuation measures, will be proposed.

This study undertaken by ONAS is timely welcome following the recent floods experienced by Senegal.

**However, since the flooding problem is multisectoral, it requires integrated solutions through the development of a comprehensive framework of medium and long term integrated solution to flooding (integrated program).** Thus, it is important to seize the momentum generated by this study to gather and mobilize all concerned sectoral actors to this end (in sectors such as: urban planning, land use management, environment, water, roads and other infrastructure, waste management, etc.). Support for funding complementary studies in this regard, which themes are still to be determined, might be required.

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<sup>67</sup> Programme National d'Actions de Lutte contre la Désertification

<sup>68</sup> Plan National d'Actions Environnementales

<sup>69</sup> Programme Grande muraille verte au Sahel et au Sahara

<sup>70</sup> Programme détaillé pour le développement de l'agriculture en Afrique

<sup>71</sup> Programmes régionaux, sous-régionaux et nationaux d'action pour la lutte contre la désertification

<sup>72</sup> « Programme Grande Muraille Verte au Sahel et au Sahara – Plan d'Action 2008-2010 » - African Union and Sahelo-Saharan States Community – on [http://www.cen-sad.org/new/dmdocuments/Reunions/Tripoli\\_4th\\_MinistersofAgr/ActionPlan\\_GGWS\\_fr.doc](http://www.cen-sad.org/new/dmdocuments/Reunions/Tripoli_4th_MinistersofAgr/ActionPlan_GGWS_fr.doc)

<sup>73</sup> Speech of the President of the Republic of Senegal during the General Debate of the 64<sup>th</sup> ordinary United Nations General Assembly – New York, September 24, 2009.

<sup>74</sup> « Terms of Reference: Study for the Updating of the Liquid Sanitation (Sewerage) Master Plan of Dakar (horizon 2025) » - 2009/S 33-047410, TA2009003 SNIF2 » - BEI – ONAS - project title: Sanitation of Dakar – 26 June 2009.

<sup>75</sup> Scheduled to begin in November 2009, for a maximum duration of 14 months, the study would cover the entire Dakar region, except Rufisque department

**Senegal adopted in 2008 a “National Strategy for the Protection and the Fight against Coastal and Marine Erosion”, which corresponds to an integrated view of protection of its coastline<sup>76</sup>.** This strategy intends (i) to minimize the damage caused by the phenomenon, and (ii) to identify and apply institutional, regulatory and structural measures that will address some human causes of coastal erosion, like construction on beaches and marine/coastal sand extraction. It has been formulated within the framework of a National Integrated Program of Fight against Coastal Erosion, with six (6) strategic axes/pillars, namely: (i) Design a master plan for coastal development and planning, (ii) Ensure the consistency of institutional arrangements, (iii) Master the coastal erosion phenomenon through research and development activities, (iv) Develop a Coastal Observatory, (v) Build diversified infrastructures adapted to each local situation, (vi) Strengthen the capacity for monitoring those infrastructures. To implement this vision, through the Integrated Program, a priority actions framework and an action Plan with several phases (short, medium and long terms)<sup>77</sup>, have been developed.

**Capacity strengthening and technical support, and accompaniment for the implementation of this National Strategy for the Protection and the Fight against Coastal and Marine Erosion, have been expressed by the lead institution and stakeholders.** This support/ accompaniment could include: (i) financing one phase among those in the proposed action Plan, (ii) financing feasibility studies for technical solutions in specific vulnerable sites, (iii) providing high level technical assistance, to strengthen and optimize the national implementation team, (iv) supporting the development of land use management master plans for vulnerable areas, (v) implementing some measures accompanying interventions to fight against the human causes of coastal erosion, especially against the illegal extraction of marine/coastal sand, and finally (vi) implementing a coastal erosion integrated management pilot project.

**Financing mechanisms for disaster and risk management exist in Senegal, but often cumbersome to mobilize from disaster risks management’s actors’ views. The definition of a more flexible funding mechanism, including for local level, lightweight and harmonized to better operational efficiency is a major current expressed need.** Funds to address and respond to specific disasters are in place, in particular: the Fund for Floods, the Agricultural Disaster Fund, and the National Solidarity Fund. But their mobilization procedure and, particularly, the operating procedures of their use, seem too heavy for the emergency actors, causing delays in relief and emergency responses delivery. According to *the PRSP Annual Review report 2009*, to cope with the 2008 floods, the resources earmarked by the Government, amounted to nearly 6 billion FCFA<sup>78</sup>, which included 2.35 billion FCFA<sup>79</sup> mobilized through the national solidarity Fund, hosted by the Ministry of National Solidarity.

**Advantage and possibility of adopting risk transfer measures for the populations and to improve the financial protection of the State<sup>80</sup> could be explored, based on Senegal’s own experiences and the World Bank’s experiences in Senegal and worldwide.** Senegal has undertaken for over a decade a series of studies on the feasibility of an agricultural insurance system, which in 2008 led to the creation of the National Agricultural Insurance Company of Senegal (CNAAS). From Ministry of Finance’s request the World Bank conducted a feasibility study on index-based crop insurance in Senegal, and provided recommendations for its development.

### 3. Integration of DRM in Development Strategies

**Disaster and Risk Management is a priority of Senegal. The second generation of PRSP (Poverty Reduction Strategy Paper) covering the 2006-2010 period, stated “Disaster and Risk Prevention and Management” as a priority pillar, and promotes its systematic integration in sectoral plans and programs linked to Social protection. It recognizes that disasters are a blocking factor for the country development<sup>81</sup> and that disaster and risk management is one best tool for accelerated growth and sustainable reduction of poverty. It was thus included as a major element of the third PRSP axe/pillar “social Protection, disaster and risk prevention and Management” and a**

<sup>76</sup>Formulation of a National Integrated Program for Fight against coastal erosion” - Final Report - January 2008 - Ministry of Environment, Nature Protection, Retention Basins and Artificial Lakes / Directorate of Environment and Classified Establishments - Senegalese Company for Natural Resources Operation - Senior Consultants Associates.

<sup>77</sup>Short term (1-2 years), medium term (2-5 years) and long term (more than 5 years).

<sup>78</sup>PRSP annual review Synthesis report – final version – July 2009; Or about USD 13 million (for 1USD=FCFA 430).

<sup>79</sup>Or about USD 5million (for 1USD=FCFA 430). This amount was about 2 billion FCFA in 2007 (or about USD 4million for the same rate).

<sup>80</sup>It consists in the preservation of the State/Country financial resources against the financial consequences of natural disasters. The idea is to look how to combine the various instruments available to protect the fiscal balance of the state and improve its responsiveness. There are several funding mechanisms relating to 2 categories of financial cover strategy adopted: (i) the risk retention strategy, including the use of mechanisms such as reserve funds / contingency funds, budget restructuring/re allocation, credit lines, emergency credit, donors’ contribution; and (ii) the risk transfer strategy: including mechanisms such as traditional insurance, parametric insurance and catastrophe bonds.

<sup>81</sup> The 2003 and 2004 PRSP Progress reports, reported significant progress in the implementation of the strategy in the PRSP priority sectors, which enabled the Government to achieve most of the measures accompanying the “wealth creation” pillar, and thus to put the national economy in a dynamic growth acceleration. However, the impact of this progress on poverty reduction would have been reduced because of shocks, mainly disasters experienced by the populations, such as: off-season rains, drought and floods (PRSP II).

major component of the National Strategy for Social Protection. The PRSP calls also for the development of a National Program for prevention and management of major risks aiming among other at promoting strategies and mechanisms to prevent and manage risks and disasters, in support of national plans.

**Disaster and Risk Management is not yet fully mainstreamed into the major development strategies, plans and programs at national level.** In the PRSP, some sectors already include disaster risk reduction in their priority actions, such as agriculture sector which will intervene for strengthening the management of risks and disasters, and natural resources. Some sectors contribute to disaster risk reduction in other sectors, such as natural resources and environment sector, through the fight against desertification and the preservation of fauna and flora, as well as marine and coastal environment safeguarding actions. In general, all the sectors contribute to disaster risk reduction, but they are often not systematically protected against the impacts of potential disasters. They would need systematic identification of risks threatening sectors and the mitigation to be undertaken subsequently. The funds mobilized by the Government to carry out emergency response increased in recent years, demanding better long term treatment of underlying risk factors to these recurrent disasters (mainly floods). To ensure emergency response to 2003-2004 floods, the Government has mobilized nearly USD 2 million<sup>82</sup> and for 2008 floods nearly 6 billion FCFA<sup>83</sup> (about USD 14 millions<sup>84</sup>) have been mobilized. **At the decentralized and local levels, its integration into development plans is not yet acquired**, despite the transfer of competencies operated by the Central Government. Strengthening current efforts of capacity building is highly recommended.

**According to World Bank Country Assistance for the Republic of Senegal (2007-2010), the Government and the World Bank share a common vision on the overall objectives to be achieved in Senegal** over the next few years. The World Bank is involved and contributes to Disaster Risk Management through its sectoral projects and through some specific projects. Under the Pillar 3: "Rural and Urban synergies: Urbanization/Migration", the World Bank provides analytical support to the Government in launching a series of studies aiming at identifying actions to reduce vulnerability of the rural population to major natural risks (such as weather-based and crop insurance schemes). The Ministry of Finance has requested that the World Bank conducts a feasibility study on index – based crop insurance in Senegal. The World Bank is strongly engaged in water resources and environment management but also in the implementation of the National Strategy for Social Protection. A major engagement is through the Africa Emergency Locust Project (AELP) which provides support to reduce West African countries vulnerability to locust invasion in strengthening prevention and early warning strategy and in impacts reduction at national and regional levels.

**For the UN System in Senegal, the 2007-2011 UNDAF recognizes the importance of both crisis and natural disaster prevention, and quick response.** The UNDAF integrates it into its various components, especially by the natural resources protection, the creation of sustainable livelihoods, as well as the development of disaster risk management (DRM) capacities at the higher and lower levels.

DRM is integrated in the "Governance and promotion of partnership for development" cooperation domain. It is included in the UNDAF outcome 3: "The participation of all stakeholders, the efficiency, the transparency, the gender the equity, the promotion of human rights and the sustainable development, are enhanced in the definition, the implementation and the evaluation of development policies and programs".

Finally, DRM is part of the following UNDAF programme effect: "The capacity of the communities and national and local institutions, to better anticipate crises, natural disasters and epidemics, and to respond quickly are strengthened".

## 4. Key Donor Engagements

Word Bank and Other Donor-Supported Projects related to DRM in Senegal		
Ongoing Projects and Organizations	Indicative budget <sup>85</sup> , years	HFA areas <sup>86</sup>
<b>WORLD BANK PROJECTS/STUDIES</b>		
Climate Change and the Changing Role of Children in Household Risk Management Strategies (ESW)	\$210,000 Approval date: 3/2011	4

<sup>82</sup> National Strategy for Social Protection and Risk Management (2006-2010)..

<sup>83</sup> PRSP Annual Review – Summary Report - Final version - July 2009.

<sup>84</sup> For an indicative exchange rate of 1 USD = FCFA 430

<sup>85</sup> Indicative Exchange rate used : 1USD = FCFA 430

<sup>86</sup> Hyogo Framework of Action.

Rapid Response Child-Focused Social Cash Transfer and Nutrition Security Project	- 2009-2011	2,4
Managing Risks in Rural Senegal- Rural Livelihoods in the Groundnut Basin (ESW)	\$463,000 2006-2009	4
Bringing Vulnerability into Policy Focus -Vulnerable Youth and Children in Senegal (ESW)	\$172,000 2006-2009	4
Nutrition Enhancement Program II	\$15 million 2006-2012	4
Integrated Marine and Coastal Resources Management Project	\$10 million (IDA), \$5 million (GEF) 2004-2011	4
Senegal Long-Term Water Sector Project	\$125 million 2001-2009	4
Africa Emergency Locust Project <sup>87</sup> (Burkina Faso, Chad, Gambia, Senegal, Mauritania, Niger and Senegal)	\$60 million 2004-2010	5
Sustainable Land Management Project	-	
PSAOP - Climate Change Component	-	
Emergency response, recovery, reconstruction and long term prevention, following the 2009 floods (through PDLP project – CDD project)	\$ 4 million (2009-.....)	1,4,5
Study for the elaboration of a 'concept note' about the economic study of adaptation to climate change and coastal erosion	-	1,2,3 ,4,5
<b>SELECTED DONOR PROJECTS</b>		
UNDP: Support to the National Program of Prevention and Reduction of Disaster Risks	\$700 000 2006-2009	1,2,3 ,4,5
Japan - UNDP: Mainstreaming Adaptation to Climate Change into Sustainable Development in Senegal (INTAC).	\$ 3 103 000 (2009-2011)	1,4
UNDP / GEF - UNESCO / IOC: ACCC Project - Adaptation to climate change - response to coastal change and its human dimensions in West Africa in the context of integrated coastal management (Cape Verde, Gambia, Guinea Bissau, Mauritania, Senegal).	- (2007-2011)	1,2,3 ,4,5
UEMOA-SAPCO-PRIVATE: Implementation of management and planning options for Saly expansion areas	200 million FCFA (~USD 465,116)	4
GEF/CSE: Land Degradation Assessments in Drylands project (LADA) (Pilot Studies in Argentina, China, Cuba, Senegal, South Africa, Tunisia)	- (2006-2010)	3,4
CRDI/CSE: Participatory Adaptation to Climate Change Platform for Local Communities Project (INFOCLIM Project)	-	1,2,3 ,4
CSE: High environmental and social risk area Project (ZARESE Project) <sup>88</sup>	-	2,3,4
CSE: Local governance and decentralized natural resources management Project (GL/GDRN Project) <sup>89</sup>	-	1,2,4
UE (European Union): Integrated Risk Management of Africa (IRMA Project): (Regional project: Morocco, Senegal, Mozambique, South Africa, Cameroon)	€ 3 533 633.00 (2008-2011)	1,2,3 ,5
BEI : Study for the development of the liquid sanitation (sewerage) Master Plan for Dakar region (horizon 2025)	€ 40 Million (2009 – 2011: Under preparation)	1,2,3 ,4,5
UNEP/RISOE: DARE Climate Change Adaptation project on vulnerability reduction to Climate Change (CC) <sup>90</sup>	-	1,2,3 ,4
EU: Coastal erosion Project	-	
PCRPE / JAXXAY Plan (Senegalese Government: Realization of rainwater drainage infrastructures in suburban areas of Dakar.	-	4,5
BADEA : Rain water Drainage infrastructure in Pikine	- Ongoing (until the end 2010)	4,5
AFD : Study of a Master Plan for mobilization of Water Resources for the AEP in Dakar and la Petite Côte for the period 2011-2025.	- Ongoing (till the end 2009)	1,4
AFD : Institutional Study of the Water Sector and Sanitation	- Ongoing (till October 2010)	1,4
EU (9 <sup>th</sup> FED) : Travaux de réalisation d'un émissaire en mer pour l'évacuation des eaux épurées par la STEP de Camberene	- Ongoing (till 2010)	4,5

<sup>87</sup> Projet Africain de Lutte d'Urgence contre le Criquet Pèlerin

<sup>88</sup> Projet Zone A Risque Environnemental ET Social Elevé

<sup>89</sup> Gouvernance Locale et Gestion Décentralisée des Ressources Naturelles

<sup>90</sup> through three pilot projects: (i) component integration of CC into national planning, (ii) agriculture component, (iii) component use of coastal space with the Directorate of Land Use Planning and Management.

EU (10 <sup>th</sup> FED) : Projet d'extension de la station d'épuration de la STEP de Camberene	- 2009-2012	4,5
USTDA : Sanitation Study of la Corniche Ouest of Dakar	- Ongoing (till the end 2009)	4
AFD : Complementary Study APD / DAO Baie de Hann	- Ongoing (till the June 2010)	4
Netherlands : Consolidation of Rufisque and Mbao (fight against coastal erosion project)	1 billion FCFA (~USD 2, 325,581) (ongoing)	4
Netherlands: Finalization of Porte du Millénaire (fight against coastal erosion project)	400 million FCFA (~USD 930,233) (ongoing)	4
Netherlands: Enhanced technical and financial capacities enhancement of structures in charge of managing the fight against coastal erosion.	250 million FCFA (~USD 581,395) (ongoing)	1, 4,5
Netherlands: Advisory support to the Direction of Environment and Classified Establishments (DEEC).	50 million FCFA (~USD 116,279) (ongoing)	1,4,5
Netherlands: Supporting the control and the monitoring of coastal protection works.	250 million FCFA (~USD 581,395) (ongoing)	4,5
AFD/ French GEF/CILSS: Global Environment Regional Initiative to Fight against Desertification Project	3 billion FCFA (~USD 6,976,744) (ongoing)	4
Italy/CILSS: The Italy-CILSS Fund to Fight against Desertification for poverty reduction	10 billion FCFA (~USD 23,255,814) (ongoing)	4
<b>Ongoing GFDRR funded activities:</b>		
Spatial Analysis of Natural Hazard and Climate Variability Risks in Peri-Urban Areas of Dakar (GFDRR Track II)	\$93,000 2008-2010	2
Community Co-Management for Disaster Risk Management of Marine Resources in West Africa (GFDRR Track II: Cape Verde, Gambia, The, Ghana, Guinea, Guinea-Bissau, Liberia, Mauritania, Senegal, Sierra Leone)	\$900,000 2008-2010	1,2,4
<b>Proposed GFDRR funded activities (past):</b>		
Community-Based Climate Adaptation (GFDRR South-South Project: Senegal, Burkina Faso, Niger, Nigeria, Madagascar; PROPOSED)	\$435,000 (proposed)	2,4,5
Collaboration of Civil Defense Agencies (GFDRR South-South Project: Senegal, Madagascar;	\$500,000 (proposed)	1

## 5. Disaster Risk Management Action Plan

UNDP is the main agency undertaking actions in all the five priority actions of the Hyogo Framework (HFA). The future "National Program of Prevention and Reduction of Major Risks and Natural Disasters Management" designed with support from DPC's UNDP funded project, is supposed to cover all the five HFA priorities and use outputs from this project. It will be submitted soon to donors for resource mobilization purpose. .

Hyogo Framework For Action	Major Partner	Comment
<b>1. Policy, Strategy and Institution building</b>		
Master Plan, Policy, NAPA, Regulations	UNDP	*UNDP undertook a study for analyzing the status of the legal framework. <b>*GFDRR (1A) to fund:</b> <i>The update of the Disaster Risk Management (DRM) Section of the National Strategy for Social Protection and Risk Management (if decided<sup>91</sup>), and the support to its implementation.</i>
Coordination capacity enhancement	UNDP	*UNDP supported: the development of training modules and manual – the realization of training to local authorities, through a partnership with ADM (Municipal Development Agency) – the creation of a Network of Parliamentary active in DRM – and the realization of training for communication officers from the public administration. *GFDRR Track I is planned to finance the collection of information for inventory of existing national coordination mechanisms, legal frameworks and national plans for DRR and CC adaptation for ECOWAS sub region, including Senegal. <b>*GFDRR (1B) to fund institutional strengthening of coordination structures and mechanisms, including:</b> <i>(i) Support to the Direction of Civil Protection (DPC) reform and its capacity strengthening – (ii) Support to the improvement of the overall national DRM system functioning, through an exhaustive institutional review – (iii) Support for strengthening local authorities' capacities (including local collectivities and government decentralized technical services/departments).</i>

<sup>91</sup>Because the National Program of Prevention and Reduction of Major Risks and Natural Disasters Management might serve as the strategic framework for DRM intervention, from 2010

<b>2. Risk Identification, Assessment and Monitoring</b>		
Climate trends and Hazard Risks mapping	CSE – ANM – DGPRE – UNDP – IRMA project (UE/CSE)	<p>*UNDP financed the development of a methodology for flood risk mapping and its application to the regional level in the Dakar region.</p> <p>*IRMA project: aims at demonstrating the capacity of standardization low cost interoperable ICT solutions to effectively mitigate disaster risk, by addressing all phases of disaster risk management; It intends to set up a platform of reference appropriate to the management of natural and environmental risks in Africa. This Platform would allow stakeholders to develop and use personalized models and tools for DRM.</p> <p>*GFDRR Track II financed a pilot study on a spatial and institutional approach of DRM, using new tools of risk spatial analysis based on GIS data, covering Dakar.</p> <p>*GFDRR Track I planned to strengthening National Platform capacities for risk assessment and mapping through discussion of data-sharing protocols through sub regional training workshops on the integration of DRR and CC adaptation, and/or use of hydro meteorological and geo-spatial information and data.</p> <p><i>*GFDRR to support: (2A) the improvement of the performance of the National Agency of Meteorology for rainfall forecasting – (2B) Improving the performance of the Directorate of Water resources management and planning, for hydrologic monitoring – (2C) the development at the national level of a Geographic Information System for Disaster and Risk Management (GIS for DRM): focusing on flooding risk at the beginning, covering a given area. But would be later, multi hazard, with a national coverage – Will include the fulfillment of a complete risk analysis and mapping (combining hazard analysis and vulnerability analysis, with geo referenced inventory of vulnerable assets and elements. The likely impacts according to developed scenarios, considering different climate change scenarios would be also included) – Will use, capitalize, complete results from works already undertaken above mentioned.</i></p>
Early warning system	ANM – DGPRE – CSE – UNDP – WFP	<p>*UNDP funded a study on the Early Warning System for floods, industrial accidents and maritime disasters, conducted by the DPC and its support project.</p> <p><i>*GFDRR will support (2D) Early Warning System strengthening, through support for the establishment of an early warning coordination and monitoring Unit, multi hazard with focus on floods -and- for strengthening performance and functioning of a national floods early warning system.</i></p> <p><i>All the above mentioned previous proposed actions 1A, 1B, 2A, 2B, 2C include components contributing to enhance early warning system.</i></p>
<b>3. Education and Awareness to build a Culture of Resilience</b>		
DRM School Education programs	UNDP	*UNDP supported the development of an action plan for the integration of DRM in secondary and primary school curricula, which would be implemented through the future National Program of Prevention and Reduction of Major Risks and Natural Disasters Management.
Community and stakeholders' awareness	UNDP – ADM – PNDL	<p>*UNDP supported: the establishment of a Women's leaders Network in DRM – the establishment of the journalist's Network on DRM – and the provision of training on crisis communication.</p> <p><i>*GFDRR (3A) to support the implementation of a public and stakeholders' awareness raising campaign in collaboration with ADM and PNDL-CDD/Decentralized project (complementing ongoing awareness raising initiatives they are implementing).</i></p>
<b>4. Reduction of Underlying Risk Factors</b>		
Revision of Hazard Norms - Risk Mitigation using revised infrastructure norms		Could be undertaken within the Integrated flood protection Program, mentioned below..
Flood protection	BEI – AFD – EU – CRDI – BADEA	<p>*BEI is funding a study for developing a Liquid Sanitation (sewerage) Master Plan for Dakar Region (horizon 2025).</p> <p><i>*GFDRR to finance (4A) the development and support for the implementation of an Integrated flood protection Program.</i></p>
Coastal erosion protection	UNDP – GEF – JAPAN– Netherlands– UEMOA– GEF	<i>*GFDRR to finance (4B) Technical support and accompaniment of the National Strategy for the Protection and the Fight against Coastal and Marine Erosion implementation.</i>
DRM financing and risk transfer		<i>GFDRR (4C) to support DRM financing mechanism strengthening (at central and local levels).</i>
<b>5. Strengthening Disaster Preparedness for effective response</b>		
Emergency preparedness	UNDP - WFP	<p>*The World Bank is making available over 4 million US\$ IDA through the PDLF project (a CDD operation). The Bank intervention will be charted in three phases: (i) emergency support consisting in pumping water out of the inundated areas to the natural spillway in order to mitigate immediately the severity of immediate floods, in the remainder of this rainy season; (ii) recovery and reconstruction which will be based on a light post disaster needs assessment with the eventual support of GFDRR; and (iii) long term prevention of floods which could be done in the forthcoming CAS.</p> <p><i>*GFDRR to support(5A)Strengthening of national disaster preparedness status and emergency response mechanism (with initial focus on flooding), including two main components: (i)-Preparedness plan development, testing and improvement –and – (ii) Strengthening material and technical capacities of the National ORSEC Plan operational conception and command's institution, specifically the National Fire Brigade or GNSP</i></p>
Post Disaster Needs	UNDP – WFP	<i>GFDRR to support (5B) capacity strengthening for recovery implementation, including post disaster</i>

Assessment / Response	– UN Agencies – EU	needs assessment (mainly post emergency).
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The eight (8) indicative proposed actions for GFDRR funding, are listed by priority order in the table below (the main activities to be undertaken for each proposed action for GFDRR funding are presented in Annex 1).

Proposed actions for GFDRR funding	Potential partnership	Indicative budget for GFDRR funding (USD)	Potential outcomes and comments	HFA Areas
(1)- Strengthening capacities of key institutions, structures and mechanisms (technical, organizational and material).	DPC – GNSP – National Agency of Meteorology – Directorate of Water resources management and planning – UNDP – ADM – PNDL – SONATEL – Decentralized Collectivities – Decentralized technical Services/Departments – Ministry in charge of Decentralization	<b>1,600,000 (2010-2014)</b>	<b>---GO (Global Objective):</b> Optimizing effectiveness of DRM system's key institutions, structures and mechanisms, in the implementation of their roles and responsibilities.  <b>---SO (Specific Objectives):</b> <b>1</b> Institutional review for an effective optimization of the overall DRM system/mechanism functioning (USD50,000) – <b>2</b> Ensuring that the Directorate of Civil Protection (DPC) can effectively implement its mobilization, coordination and facilitation missions through support to its reform and capacity strengthening (USD125,000)- <b>3</b> Strengthening national disaster preparedness status and emergency response mechanism (with initial focus on flooding), including three sub components: <b>3-1</b> : Strengthening material and technical capacities of the National ORSEC Plan conception and command's institution, specifically the National Fire Brigade or GNSP (USD450,000); <b>3-2</b> : Preparedness plan development, testing and improvement (USD 125,000); <b>3-3</b> : Strengthening Early Warning System (through <b>**Support for the establishment of an early warning coordination and monitoring Unit, multi hazard with focus on floods -and- **Support for strengthening performance and functioning of a national floods early warning system<sup>92</sup></b> ) (USD150,000) – <b>4</b> Improving the performance of the National Agency of Meteorology for rainfall forecasting (USD250,000)– <b>5</b> Improving the performance of the Directorate of Water resources management and planning, for hydrologic monitoring (USD200,000) – <b>6</b> Ensuring that local authorities can effectively implement DRM at local level through strengthening of their capacities (including local collectivities and government decentralized technical services/departments) (USD250,000)	1,2,3,4,5
(2)- Implementation of a public and stakeholders' awareness raising campaign.	DPC – UNDP - ADM – PNDL – Local authorities.	<b>250,000 (2010-2013)</b>	<b>---GO:</b> Improving the knowledge and understanding, by all categories of DRM stakeholders at all levels, of the DRM concepts and aspects in Senegal, and their respective roles and responsibilities,  <b>---SO:</b> (1) Developing an awareness raising and communication Plan, targeting all categories of DRM stakeholders in Senegal, including local vulnerable populations, authorities at all levels, including decentralized levels; and Civil society and private sector – (2) Supporting the implementation of the designed awareness raising and communication Plan.	1,2,3,4,5
(3) - Strengthening post-emergency assessment and recovery implementation capacity	DPC – UNDP – all concerned stakeholders (national and international)	<b>200,000 (2010-2013)</b>	<b>---GO:</b> Improving the management and implementation of appropriate post-emergency recovery responses.  <b>---SO:</b> (1) Strengthening the technical capacity of all institutions involved in post-emergency responses implementation <sup>93</sup> – (2) Setting up an improved mechanism (organization) for post-emergency assessment and recovery implementation – (3) Optimizing the operational efficiency of the improved mechanism for post-emergency assessment and recovery implementation.	1, 2, 3, 4,5
(4)- Strengthening Disaster and Risk Management (DRM) financing Mechanism.	DPC – Ministry in charge of Economy and Finances – Local Authorities	<b>150,000 (2010-2012)</b>	<b>---GO:</b> Facilitating and optimizing the mobilization and use of government funds, allocated to DRM, including post-disaster responses funding.  <b>---SO:</b> (1) Informing Senegalese authorities and technicians on the types of funding mechanisms that can be adopted and their efficiency – (2) Defining and supporting the implementation of a more appropriate improved DRM funding mechanism – (3) Exploring the advantage and the possibility of using risk transfer measures, to improve the State financial protection and supporting their implementation if adopted -(4) Exploring disaster insurance mechanisms that can be implemented for the population in Senegal. It will build on the previous World Bank's experience and activities on agricultural insurance schemes in the Sahelian countries and other relevant experiences worldwide.	1, 2, 3, 4,5

<sup>92</sup>General organization, and organization and implementation of warning production, diffusion and reception (technical and material aspects).

<sup>93</sup>Will include the provision of trainings post-emergency needs assessment, including economic assessment of post-disaster damage and needs according to the DALA methodology (Damage, Losses and Needs Assessment – DALA/UNECLAC) and other specialized training on recovery, which would be recommended and planned after the diagnosis of needs carried out previously.

(5)- Development of a Geographic Information System for Disaster and Risk Management (GIS for DRM) (dynamic, online, accessible to all).	DPC – CSE – UNDP – WFP - UE (IRMA project)	<b>500,000<sup>94</sup></b> <b>(2010-2014)</b>	<p><b>--GO:</b> Improve disaster and risk management (DRM) in Senegal, through the provision and use of appropriate and updated disaster risk information for decision making, planning and early warning uses.</p> <p><b>--will be carried out in three steps:</b> (1<sup>st</sup> step in 6 to 8 months): pilot for one hazard in one given area. Proposed hazard: floods – Proposed area: Dakar; (2<sup>nd</sup> step): pilot replication (i) for all risk-prone areas within the country for the same hazard (floods) or (ii) for the same one area (Dakar) but extended to all the other threatening natural hazards (in addition to floods); (3<sup>rd</sup> step): national coverage for all natural hazards.</p> <p><b>--SO:</b> (1) Carrying out complete risk assessment<sup>95</sup> and mapping, capitalizing/using the existing initiatives and results – (2) Setting up an online Geographic Information System (GIS) for DRM accessible to all (DRM geo spatial database and website) – (3) Promoting utilization of risk knowledge and risk information from the established GIS for DRM – (4) Ensuring sustainability of the GIS for DRM and its extension to the entire Senegal territory (one hazard: floods and/or all main natural hazards).</p>	1,2,3 .4,5
(6)- Development and support for the implementation of an Integrated flood protection Program.	DPC – All concerned Ministries – All technical and financial partners involved in DRM – Local Authorities - PNDL – ADM – UNDP – WFP	<b>1,000,000</b> <b>(2010-2015)</b>	<p><b>--GO:</b> The recurrent floods issues are addressed through medium and long terms integrated sustainable approach and solutions.</p> <p><b>--SO:</b> (1) Developing and promoting the adoption by all concerned stakeholders of a multisectoral Integrated program for medium and long terms floods prevention and reduction – (2) Supporting the implementation of the priority action Plan (part) developed during the 2009 Post Disaster Needs Assessment (PDNA) exercise (see details in Annex 2) which is not yet validated, and the related integrated program. This priority action Plan would cover the following aspects: Clarification of the floods management institutional framework - Development of regulatory framework - Financial aspects - Information Education and Communication - Optimizing emergency response - Early Warning System - Priority Capacity Building – and other priority measures. <i>Some actions of that PDNA priority actions Plan might be covered in other actions proposed to GFDRR funding in this indicative DRM Country Note action plan<sup>96</sup></i></p>	1,2,3 .4,5
(7)- Technical support and accompaniment of the National Strategy for the Protection and the Fight against Coastal and Marine Erosion implementation.	DPC– Ministry of Environment – Local authorities – All technical and financial partners involved in the domain	<b>1,200, 000</b> <b>(2010-2015)</b>	<p><b>--GO:</b> Supporting Senegal to implement its vision and commitment for the fight against coastal erosion.</p> <p><b>--SO:</b> Contributing to the achievement of the strategic axes and action Plan for the implementation of the National Integrated Program of Fight against Coastal Erosion through: (1) Financing one phase among those in the proposed action Plan – (2) Financing feasibility studies for technical solutions implementation in specific vulnerable sites – (3) Provision of high level technical assistance, to strengthen and optimize the national implementation team – (4) Supporting the development of land use management master plans for vulnerable areas – (5) Implementation of some accompanying measures to the interventions for fighting against human causes of coastal erosion, especially against the illegal extraction of marine/coastal sand – (6) Implementation of an integrated coastal erosion management pilot project (including community component and infrastructure component).</p>	1,2,3 .4,5
(8)- Update of the Disaster and Risk Management (DRM) Section of the National Strategy for Social Protection and Risk Management (if decided).	DPC – UNDP – all Ministries – all local authorities – all stakeholders involved in DRM	<b>100,000</b> <b>(2010-2012)</b>	<p><b>--GO:</b> Defining common global vision and roadmap, to be used as a reference framework, for the implementation of disaster and risk management and reduction (DRM), for all hazards in Senegal (multi-hazard), for the next five years (from 2010).</p> <p><b>--SO:</b> (1) Developing and adopting a National Strategy for disaster and risk management (DRM)<sup>97</sup> for Senegal – (2) Developing and adopting a National Action Plan for disaster and risk management (DRM) for Senegal – (3) Launching and supporting the implementation of the adopted Senegal National Action Plan for disaster and risk management<sup>98</sup>.</p>	1, 2, 3, .4,5
<b>TOTAL :</b>		<b>5, 000,000</b> <b>(2010-2015)</b>		

<sup>94</sup>Corresponding to the indicative budget, needed for its application to the entire country, for flooding. But for the beginning, USD 150,000 would be sufficient for its development for a pilot site (Dakar) for one hazard (floods) in 6 to 8 months.

<sup>95</sup>Including hazard analysis and vulnerability analysis, with a geo referenced inventory of exposed assets and elements but also an evaluation of the potential socio-economic damage and losses according to predictions and probable developed scenarios (including the likely impacts of different climate change scenarios).

<sup>96</sup> According to the adopted process, activities to be undertaken will be only accurately defined when the proposed PDNA priority action Plan is validated.

<sup>97</sup> We call "National Strategy for DRM", the "DRM Section/Component of the National Strategy for Social Protection and Risk Management".

<sup>98</sup>Its implementation could be done through one or several DRM programs.

**ANNEX 1: Main activities to be undertaken for each proposed action for GFDRR funding.**

Proposed actions for GFDRR funding	Main activities include :
<p>(1)- Strengthening capacities of key institutions, structures and mechanisms (technical, organizational and material).</p>	<p><b>–For SO1:</b> *Diagnostic analysis of the existing national DRM system/mechanism in place in Senegal, including institutional and legal framework and mechanisms: weaknesses, strengths, constraints, and strengthening needs to enable its optimal functioning. - *Preparation, submission and validation of a more appropriate, streamlined institutional framework/mechanism, with the tools for its implementation, the steps and approaches to be adopted for setting it and making it operational - *Diagnostic analysis of the existing legal and regulatory framework that supports the existing institutional framework, and identification of the strengthening and adaptation needs allowing to implementing the new improved institutional framework/mechanism - *Preparation, submission and validation of an adequate legal and regulatory framework - * Support to the establishment and the operationalization of the designed improved institutional and legal frameworks, including the development and adoption of an action Plan for the establishment and operationalization of the designed improved institutional and legal frameworks, and the support to the implementation of the proposed and validated Plan: financing of one or all parts of the Plan and/or supporting mobilization of other technical and financial partners (participatory process required, involving all stakeholders).</p> <p><b>–For SO2:</b> *Diagnostic analysis of organizational, technical and material needs (i) for its transformation into Directorate General of Civil Protection (DPC), and (ii) to make it fully operational in its new position - *Development of a support and capacity strengthening Plan (organizational, material and technical) with the detailed description of actions to be undertaken with a proposed timeline - *Support the implementation support and capacity strengthening Plan.</p> <p><b>–For SO3:</b>  <b>(3-1):</b> *Establishment of permanent, coordinated and efficient Information and Communication Systems (will include diagnostic analysis of needs; development and support to the implementation of a proposal for strengthening technical and material GNSP's capacities, for communication, information system and coordination) - *Establishment of efficient and equipped central and advanced command posts (will include diagnostic analysis of existing equipment and materials in all central and advanced command posts; development and support to the implementation of a proposal to strengthen and improve central and advanced command Posts equipments and materials.</p> <p><b>(3-2):</b> *Capitalization of past experiences to guide preparedness interventions, including: participatory "lessons learned" exercises involving all stakeholders; definition of recommendations and concrete measures for properly ensuring adequate preparedness for an effective management of future disasters - *Regular verification and maintenance of response mechanisms effectiveness set up before disaster occurrence, including: regular simulation tests of developed preparedness plans through small scale test in rooms (using simulation software) and simulation exercises on the ground; regular simulation exercises assessment and updating of tested preparedness plans - *Establishment of a systematic, formalized preparedness approach between two crises/disasters including the setting up of a committee for monitoring the implementation of the defined planning.</p> <p><b>(3-3): (i)-</b> *Diagnostic analysis of the existing situation and the needs in terms of early warning coordination and monitoring (multi hazard) - *Development and validation of a proposal of profiles, mandates, roles and responsibilities, anchorage, organization and functioning modalities of a future permanent early warning coordination and monitoring Unit (for all natural hazards, with initial focus on floods), with a proposed setting up approach - *Support to the establishment and operationalization of the adopted early warning coordination and monitoring Unit. – <b>AND – (ii)</b>*Diagnostic Analysis of the national flood early warning system (strengths, weaknesses, strengthening needs), including organization, mechanism, technical and material capacities for production, dissemination, reception of alert, disseminated alerts quality (content, format, adequacy with the public and concerned technical departments needs, at all levels), actual use of alerts by people (reaction), and the media role and place within the local early warning system - *Development and support to implementation of a Plan to strengthen national floods early warning system.</p> <p><b>– For SO 4 and SO5,</b> for each institution: *Diagnostic analysis of the current technical and material capacities, regarding its mandates and responsibilities (strengths, weaknesses and needs) - *Development of a capacity strengthening Plan with detailed description of actions to be undertaken and a proposed timetable - *Support for the implementation of the designed capacity strengthening Plan.</p> <p><b>–For SO6:</b> *Diagnostic analysis of the existing technical and material capacities of local authorities regarding their mandates and responsibilities related to DRM implementation at the local level: weakness, strengths, needs, in terms of both equipment (material) and skills (technical) - *This should include a diagnostic analysis of the basic equipment necessary for local authorities to collect, manage and use DRM information, but also to plan, manage and monitor DRM interventions in their areas of responsibility - Basic trainings for local authorities (including local collectivities and decentralized technical services) about DRM concepts and their implementation, and some technical concepts necessary for the effective implementation of DRM, which might include: planning, organization, communication and information use and management - *Developing and supporting the implementation of a strengthening proposal/plan for local authorities' technical and material capacities for DRM implementation - *Establishment of resource centers at the local level (as a small library) with a compilation of basic documents and working supports reference (theoretical and practical).</p>

	<p>*Trainings for local authorities (including local collectivities and decentralized technical services) about DRM concepts and their implementation, and some technical concepts necessary for the effective implementation of DRM at local level - *Diagnostic analysis of local authorities' basic equipments needs for effective collect, management and use of DRM information, and for planning, management and monitoring of DRM interventions in their areas of responsibility - *Development and support for the implementation of a material strengthening proposal - *Establishment of resource centers at the local level (as a small library) with a compilation of basic documents and working supports reference (theoretical and practical) .</p>
(2)- Implementation of a public and stakeholders' awareness raising campaign.	<p>*diagnostic analysis of DRM related awareness raising and information interventions targeting populations and all stakeholders (strengths, weaknesses and needs) - *Development of a Plan for a systematic stakeholders' awareness rising, with the related communication plan - *Support for the implementation of the adopted Plan.</p>
(3) - Strengthening post-emergency assessment and recovery implementation capacity.	<p>– <b>For SO1:</b> lessons learned exercises with all stakeholders' participation, assessing the implementation of past post-emergency assessments and recovery interventions (strengths, weaknesses, strengthening needs : participatory evaluation) - *trainings in accordance with the identified needs, mainly related to<sup>99</sup>: post-emergency assessment of damage and required recovery actions; post-disaster economic assessment of damages, losses and needs; and recovery planning and implementation - *practical exercises related to the provided trainings.</p> <p>– <b>For SO2:</b> a diagnostic analysis of the existing system for post-emergency assessment and recovery implementation and the proposition of an improved more appropriate mechanism – *the development of improved standard tools and documents to be used for the post-emergency assessment and recovery implementation.</p> <p>– <b>For SO3:</b> regular practical simulation exercises testing the adopted mechanism for post-emergency assessment and recovery implementation, and using the developed and validated tools. - *regular evaluation exercises of the achieved simulation tests, to get lessons learnt and make improvements to the system and the tools - *Stakeholders' technical coaching by trainers, for the implementation of, at least the first two real cases, of post-emergency assessment and recovery implementation.</p>
(4)- Strengthening Disaster and Risk Management (DRM) financing Mechanism.	<p>– <b>For SO1:</b> presentation of and discussion on existing DRM funding mechanisms: available options and experiences worldwide.</p> <p>– <b>For SO2:</b> a thorough diagnostic analysis of the existing DRM financing mechanism covering national and decentralized levels, and the development of a proposition for an improved financing mechanism - *support to the implementation of the proposed new financing mechanism (if adopted).</p> <p>– <b>For SO3:</b> experience sharing between Senegalese authorities and technicians, and the Caribbean Catastrophe Risk Insurance Facility (CCRIF)'s responsible and initiator - *study on the feasibility, the advantages and disadvantages of implementing proposed risk transfer measures, including catastrophe insurance taking out for the country, and the approaches that can be adopted - *presentation and discussion of the study results and preparation of implementation stages, if agreed.</p> <p>– <b>For SO4:</b> presentation and discussion of worldwide experience on public disaster insurance types, for the same hazard and disaster types as in Senegal - *a diagnostic study of (i) the types of disaster insurance available to the population in Senegal (mechanism, weaknesses, strengths, needs, and recommendations for Senegal); and (ii) the types of insurance disaster that can be implemented for the public in Senegal, with their development modalities and approaches - *presentation and discussion of the study results and preparation of the implementation stages, if agreed.</p>
(5)- Development of a Geographic Information System for Disaster and Risk Management (GIS for DRM) (dynamic, online, accessible to all).	<p>– <b>For SO 1:</b> *Identification and analysis of targeted users' needs in terms of risk information and maps (about hazard, vulnerability and risk) - *Inventory and analysis of existing and available data (information and maps) on disaster risk in Senegal - *Production of the missing data in carrying out a more complete risk assessment and mapping, including: Hazards analysis and mapping, including the development or acquisition of models to be used - Vulnerability analysis and mapping, with an inventory and a geo referencing of exposed vulnerable assets / elements - Evaluation of the potential socio-economic damage and losses according to predictions and probable developed scenarios (including the likely impacts of different climate change scenarios).</p> <p>– <b>For SO2:</b> *Setting up at national level, a DRM geo spatial database composed of various risk information and maps, with clear visibility down to the commune level – *Identification and analysis of users' needs in terms of web site content, organization, structure and presentation - *Inventory and analysis of existing web sites, which contribution can be used for the development of the DRM web site - *DRM web site design and setting up.</p> <p>– <b>For SO3:</b> *Presentation and popularization of the web site and the GIS for DRM (content, structure, organization, products, and access) - *Users' training for an optimized handling and use of the DRM web site.</p> <p>– <b>For SO4:</b> *Definition and support to the implementation of plan and modalities for the regular updating of the information on the web site (information related to hazards, vulnerability and risk) –</p> <p>* Assessment of the established GIS for DRM (functioning and performance) - *Assessment of activities undertaken for the development of the GIS for DRM, and capitalization of the acquired experiences (bad and good) - *Definition of indicative approaches and process for the pilot replicating/reproduction for other hazards and areas and decision making on the next step - *Development and support for the implementation of the adopted action plan for the pilot replication.</p>
(6)- Development	<p>– <b>For SO1:</b> *Support to the mobilization of concerned stakeholders involved in the fight against floods to consult together and</p>

<sup>99</sup> Will include training on the DALA methodology (Damage, Losses and Needs Assessment – DALA/UNECLAC) and other recommended and planned specialized trainings.

<p>and support for the implementation of an Integrated flood protection Program.</p>	<p>jointly identify, through a comprehensive approach, the various sectoral measures to be adopted to effectively fight against flooding in the medium and long terms - * Sharing, discussing and validating the draft of the strategy for medium and long terms flood reduction proposal developed during the 2009 PDNA, with the related priority action plan - *Complementary studies as part of a situation diagnostic analysis and for identifying sustainable solutions proposals (enhancement needs for those ongoing initiatives - action proposals related to the sectors uncovered by ongoing sectoral initiatives) – * Finalizing the strategy for medium and long terms flood reduction, and the related priority action plan, and Developing the integrated multisectoral flood protection program proposal, based on the overall diagnostic study, the complementary sectoral studies results and the designed strategy - *Presentation, discussion and validation of the proposed strategy, priority action plan and integrated program.</p> <p>– <b>For SO2:</b> Support the implementation of priority action Plan (part) developed during the 2009 Post Disaster Needs Assessment or PDNA exercise, which is not yet validated, and the related integrated program. This priority action Plan issued from PDNA cover the following aspects: Clarification of the floods management institutional framework - Development of legal and regulatory framework - Financial aspects - Information Education and Communication - Optimizing emergency response - Early Warning System - Priority Capacity Building – Planning of primary drainage infrastructures (master plan study) - Landscaped treatment of basins and integration into the surrounding environment (see details in Annex 2). <i>Some actions of that PDNA priority actions Plan might be covered in other actions proposed to GFDRR funding in this indicative DRM Country Note action plan.</i></p>
<p>(7)- Technical support and accompaniment of the National Strategy for the Protection and the Fight against Coastal and Marine Erosion implementation.</p>	<p>The activities to be implemented under this proposed action (7) will be further determined together with the authorities (Ministry of Environment) and in consultation with other technical and financial partners involved in the field to ensure better synergy and complementarities. Once decided, these activities could be described in more details.</p> <p>But generally would include: (1) Financing one phase among those in the proposed action Plan – (2) Financing feasibility studies for technical solutions implementation in specific vulnerable sites – (3) Provision of high level technical assistance, to strengthen and optimize the national implementation team – (4) Supporting the development of land use management master plans for vulnerable areas – (5) Implementation of some accompanying measures to the interventions for fighting against human causes of coastal erosion, especially against the illegal extraction of marine/coastal sand, which could include: *environmental impacts study of the exploitation of other alternatives to marine/coastal sand; *awareness raising of the different stakeholders involved in the exploitation of marine/coastal sand; *promoting the use of alternative to marine/coastal sand (e.g. sand hill, dunes sand); *implementation of actions supporting the conversion of actors living from the exploitation of coastal/marine sand (lorry drivers, carters, etc.); *realization of infrastructure facilitating the use of these alternatives to coastal/marine sand, etc. –(6) Implementation of an integrated coastal erosion management pilot project (including community component and infrastructure component).</p>
<p>(8)- Update of the DRM Section of the National Strategy for Social Protection and Risk Management (if decided).</p>	<p>– <b>For SO1:</b>*an in-depth diagnostic analysis of the DRM situation in Senegal, which will include the diagnostic of strengths, weaknesses, gaps, challenges, constraints, needs, and the proposition of purposes, overall principles and approaches to be adopted by the country and strategic pillars / axes with the related strategic priority actions to be achieved<sup>100</sup> (participatory process) - *the design, writing and validation of a document of National Policy and Strategy for DRM<sup>101</sup>, based on the validated strategic priorities pillars/axes.</p> <p>– <b>For SO2:</b>*the participatory development of a DRM National Plan of Action for a 5 years period - *the design, writing and validation of the National Action Plan for DRM document.</p> <p>– <b>For SO3:</b>*the support for the implementation and monitoring of the National Action Plan for DRM.</p>

<sup>100</sup> The process will include consultations with all DRM stakeholders' categories involved at all levels of intervention.

<sup>101</sup>The DRM Section of the National Strategy for Social Protection and Risk Management

**ANNEX 2: Draft of the Priority Action Plan of a Strategy for Floods Management developed during the 2009 Post Disaster Needs Assessment (PDNA) (as of November 24, 2009).**

It has been designed based on strategic orientations.

Component	Objectives	Actions	Estimative Cost (\$)
Institutional Framework	Clarify the floods management institutional framework	Study of institutional aspects of floods management: *Institutional and organizational framework for the preparedness *Institutional and organizational framework for the emergency response *Institutional framework for the prevention *Concertation and validation workshop	150,000
	Clarify the institutional framework for the floods protection infrastructures and the drainage networks	Study of the institutional framework for the "maîtrise d'ouvrage" (executive management) of floods protection infrastructures and the drainage networks.	
Regulatory Framework	Complete the regulatory framework and adapt it to floods requirements	Diagnostic of the regulatory framework guiding the various floods aspects Definition of required amendments and complements to the urban planning texts Development of instruction and rules to improve floods resistance and adaptation of local constructions Amendment of the Public Procurement Code to provide appropriate procedures for goods and services purchase for emergency situations.	100,000
Financial aspects	Mobilize sustainable financial resources for infrastructures operating and emergency response	Definition of sustainable resources to cover operating expenses of drainage and pumping infrastructures Rehabilitate, calibrate, and define management procedures of the emergency fund	25,000
Information – Education – Awareness raising	Improve communication on floods	Diagnostic and review of current information and awareness raising on floods initiatives development, validation and implementation of a Communication on Floods National Plan	600,000
	Reduce health impacts of floods	Development, validation and implementation of an education program on health and hygiene issues during floods	
	Réduire les impacts des inondations par une plus grande résilience des populations et autres acteurs économiques	Development, validation and implementation of a awareness raising on behavior changes and floods preparedness (resilience) program	
	Prevent settlement in flood prone areas	Development, validation and implementation of a program of information on risks of building in vulnerable areas	
Emergency response <sup>102</sup>	Improve emergency response efficiency and coverage	Hydraulic study to optimize the pumping system in place	50,000
		Optimal dimensioning of materials dedicated to ORSEC Plan: *Inventory of equipment currently dedicated *Needs assessment and acquisition of necessary equipment according to the hydraulic study conclusions *Evaluation and acquisition of a needed spare parts and accessories stock	2,500,000
		Preventive maintenance of electromechanical equipment before wintering	50 000
		Opportunity study of the Thiaroye ground water pumping	50,000
		Validation and implementation of the adopted option for pumping Thiaroye groundwater.	
Early Warning System	Timely warn concerned departments and the populations	Conception of an early warning system adapted to Senegalese context and definition of a gradual implementation program	100,000
		Implement the priority tranche of the early warning system	500,000
Capacity Building	Strengthen capacities of all actors involved in floods	Capacity building needs assessment for all actors involved in managing the different floods phases	Will be estimated based on the needs

<sup>102</sup> The emergency response institutional measures are covered with the institutional aspects.

	management	<hr/> Strengthening DPC's capacity in its overall coordination role Strengthening capacity of communes, associations and other local actors. <hr/> Strengthening capacities of the ORSEC Plan's operational conception and direction team <hr/> Strengthening capacities of sectoral actors for emergency response (ONAS, CADAK, SONES, SDE, education, health, roads, agriculture, etc.) <hr/> Implementation of white operations simulation of preparedness plans and response plans and their improvement <hr/> Strengthening capacities of forecasting actors (ANMS, Hydrological Department)	assessment
Prevention by Urban Planning and Management	Reduce vulnerability through the prevention	Update of urban audits and a support to PUDs achievement (\$15,000/commune) <hr/> Mapping of areas at risk	315,000 <hr/> 300,000