



Africa Adaptation Programme

# Wireless Applications for Research in Africa – Experience of the African Adaptation Programme

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**Component Manager**

Workshop on Wireless Networking for Science in Africa ICTP,  
Trieste, 11 – 22 March, 2013

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**“We all know that in the recent tragedy communications were a major problem. Communities did not get enough information, could not find it and did not receive adequate warning”.**



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# Content

- Background - Nature of the capacity problem
- Need for Innovative Approaches (examples from AAP)
- Products and Services
- Capacity Development
- Summary and Conclusion

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# Background

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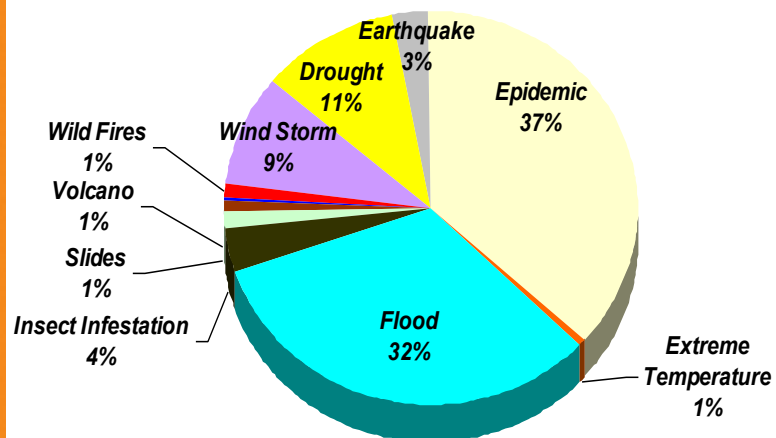




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# Disasters Caused by Natural Hazards & their Impacts in Africa (1980-2007)

Number of disaster events - 1980-2007 (RA I)



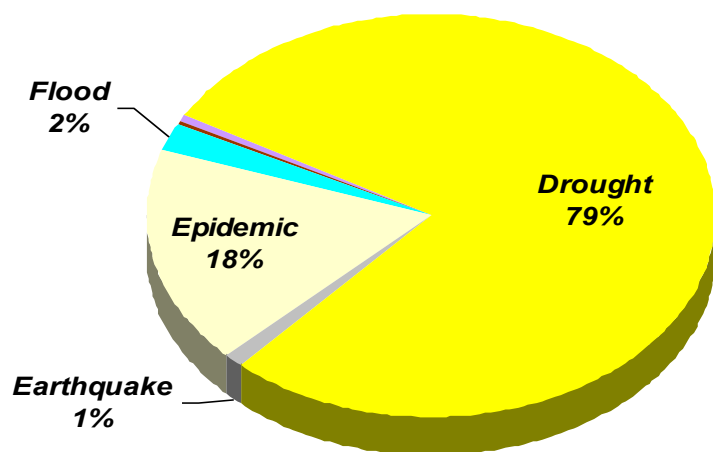
96 % of events

99 % of casualties

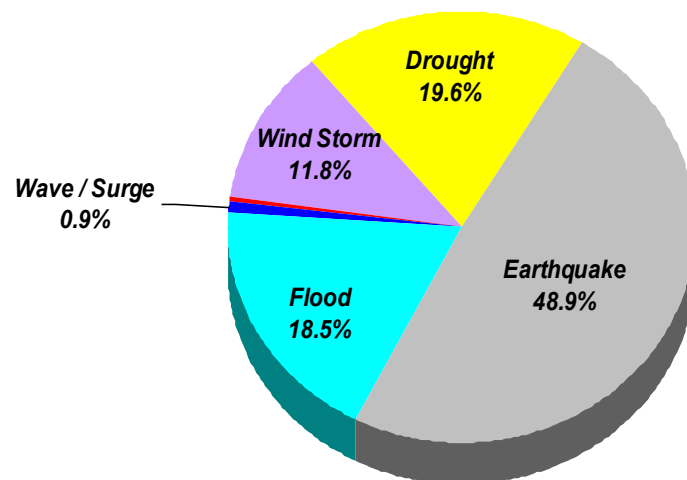
50 % of economic losses are related to hydro-meteorological hazards and conditions

*Source: The OFDA/CRED International Disaster Database*

Casualties - 1980-2007 (RA I)



Economic losses - 1980-2007 (RA I)



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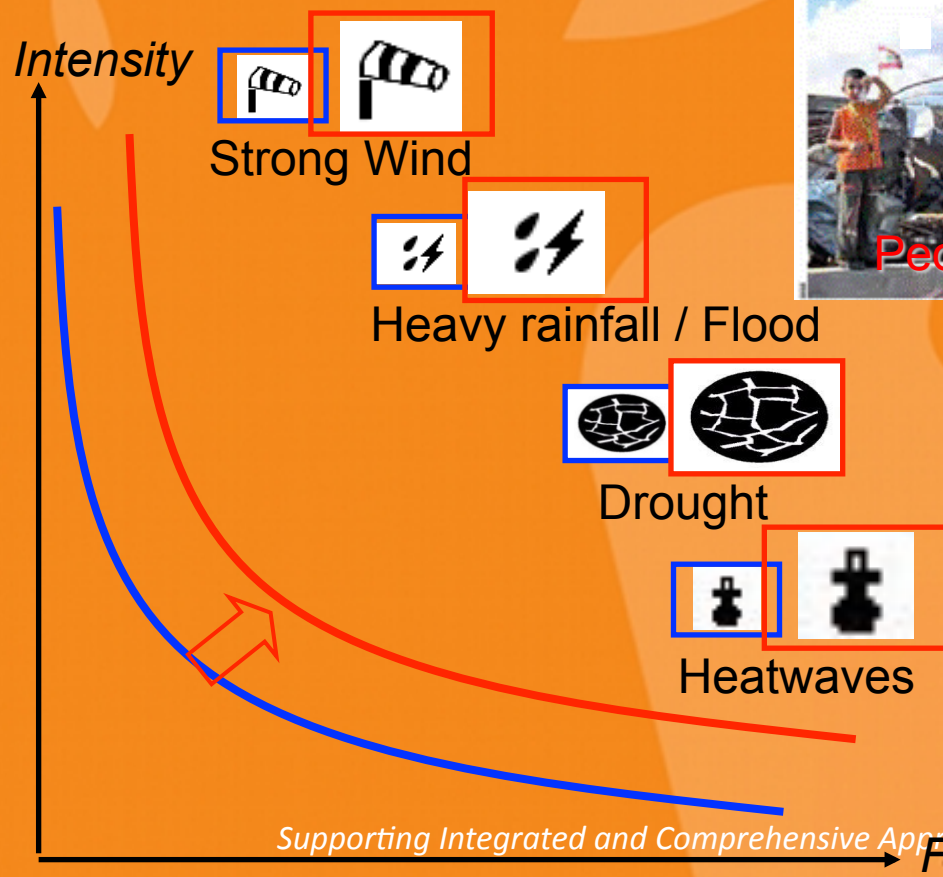




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# Impacts of Climate-Related Extremes on the Rise !

Hazard intensity and frequency increasing linked to climate variability and change!



Vulnerability and exposure on the rise !

Need for long-term planning to manage multi-sectoral risks

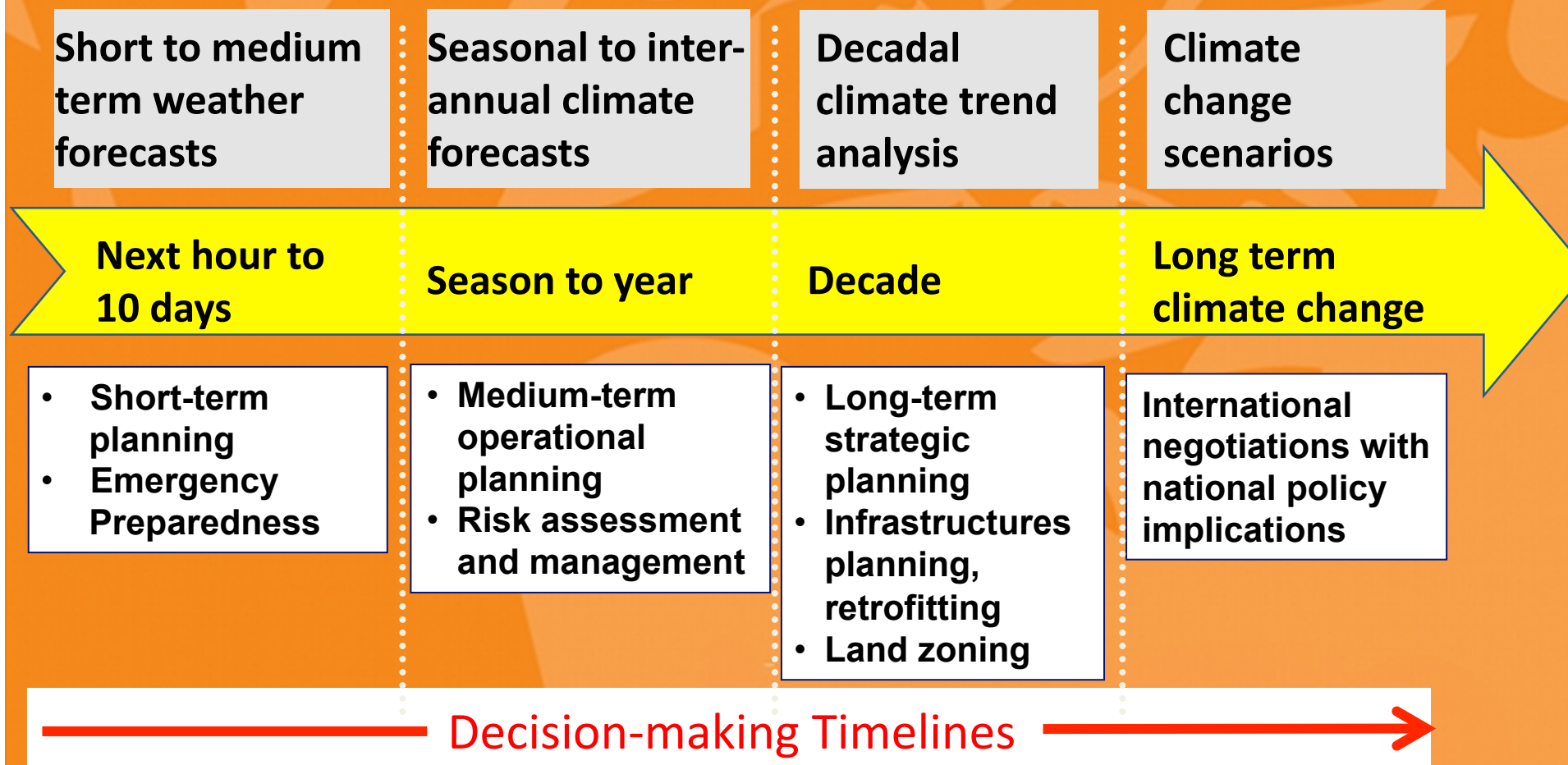
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# Data and Information for Adaptation Planning



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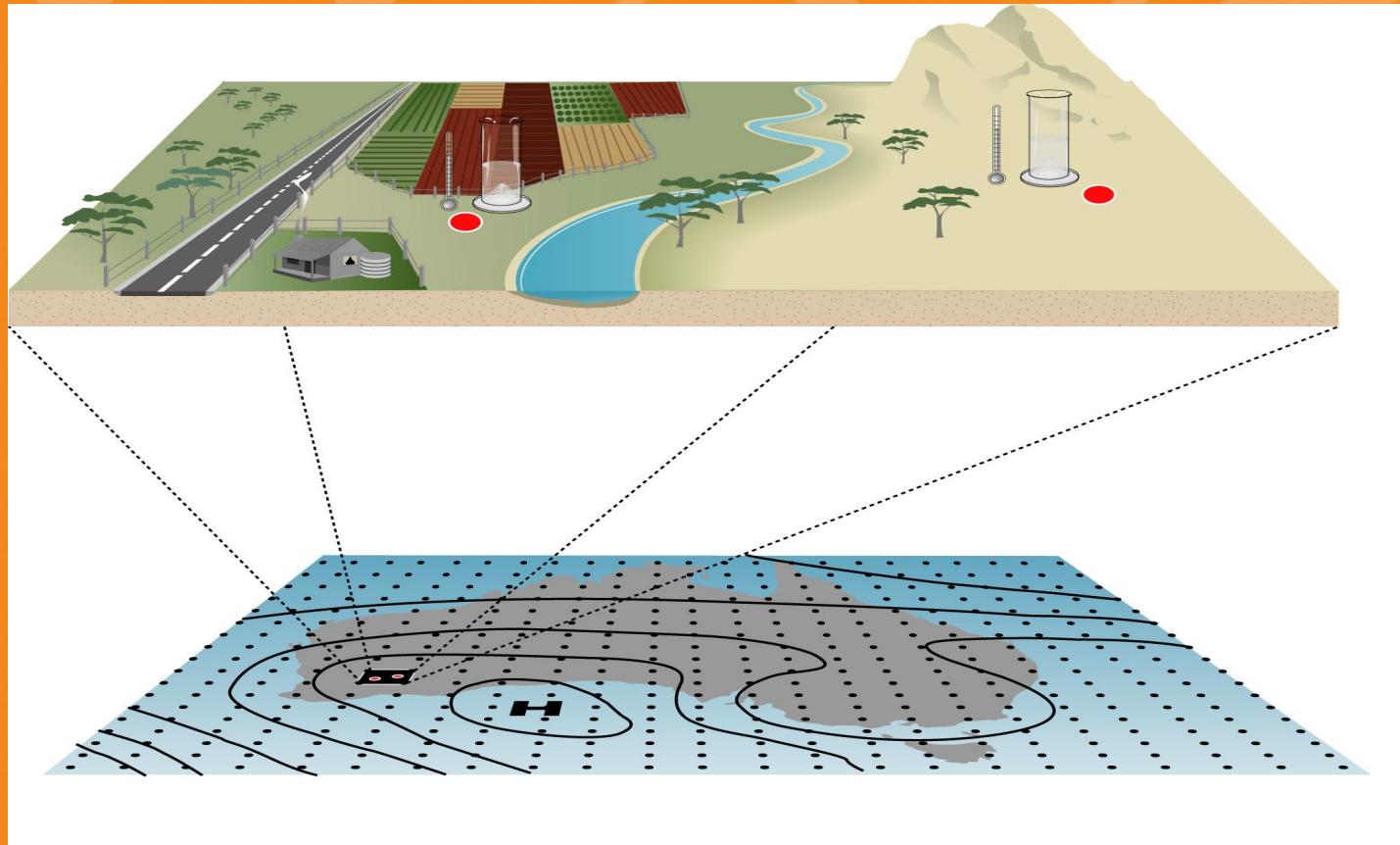






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# Downscaling Challenges



**... from a global climate model (GCM) grid  
to the point of interest.**

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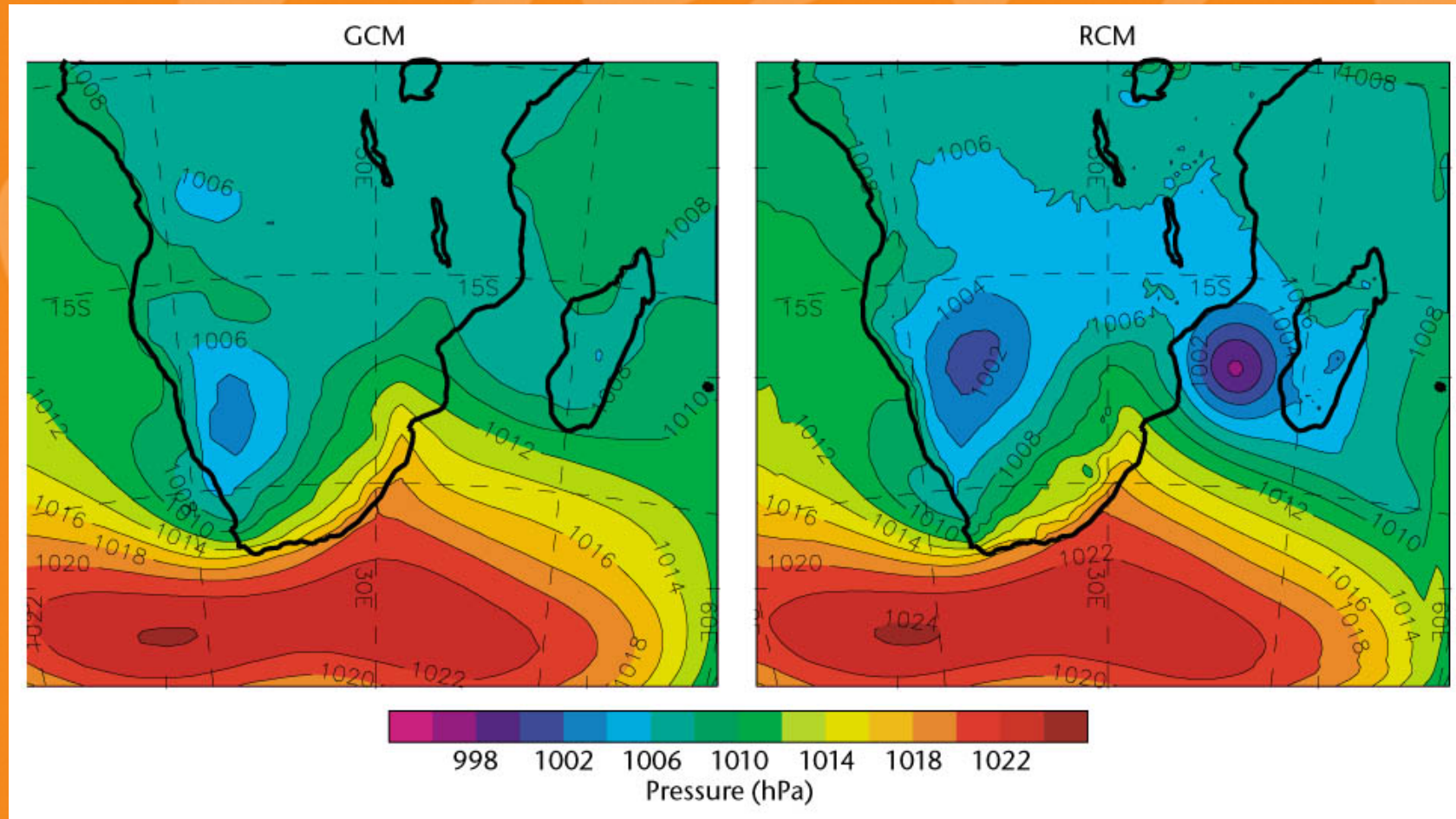






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# High Resolution Climate Models



Requirement for simulating extreme events e.g. tropical cyclones

© Crown copyright Met Office

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# Nature of the Problem

- Over 88 % are challenged in delivering climate products and services
- 92% lack appropriate software
- 96% need upgrading of operational infrastructure
- 92% need training on climate products and services
- 85% say lack of effective co-ordination with other agencies impacts negatively on operations

Source: 2006 WMO Country-level DRR survey)

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# Need for Innovative Approaches

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# Data and Information Management Approach

- Support African countries to develop **Integrated and Comprehensive Approaches** to Climate Change Adaptation
- Data and information management support to countries to enable long-term Adaptation Planning

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## Key DIMC Functions

**Facilitate access to the best available data and information to support dynamic adaptation planning**

**Strategy:**

- Assist in the early analysis, design and implementation of national project activities.
- Assist in accessing, collecting and analyzing data on climate change and its impacts.
- Build capacities of countries to establish and use e-infrastructure (**ICT, data, tools & network of institutions**)

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# Climate Products and Services for Adaptation Planning



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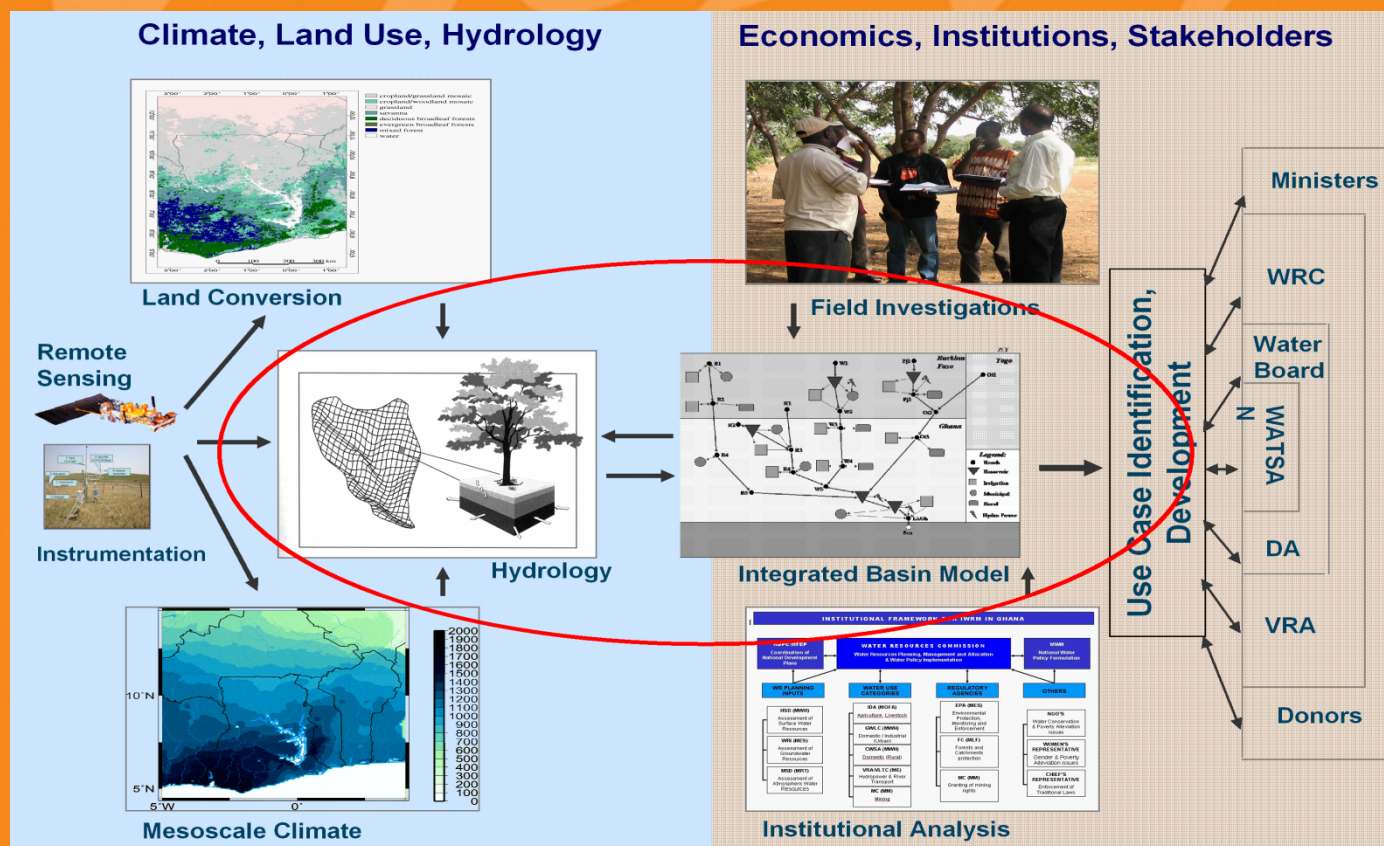






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# Integrated Geo-Spatial Data Management Framework



## Platform-independent Geo-Spatial Data Server (RAMADDA & THREDDS)

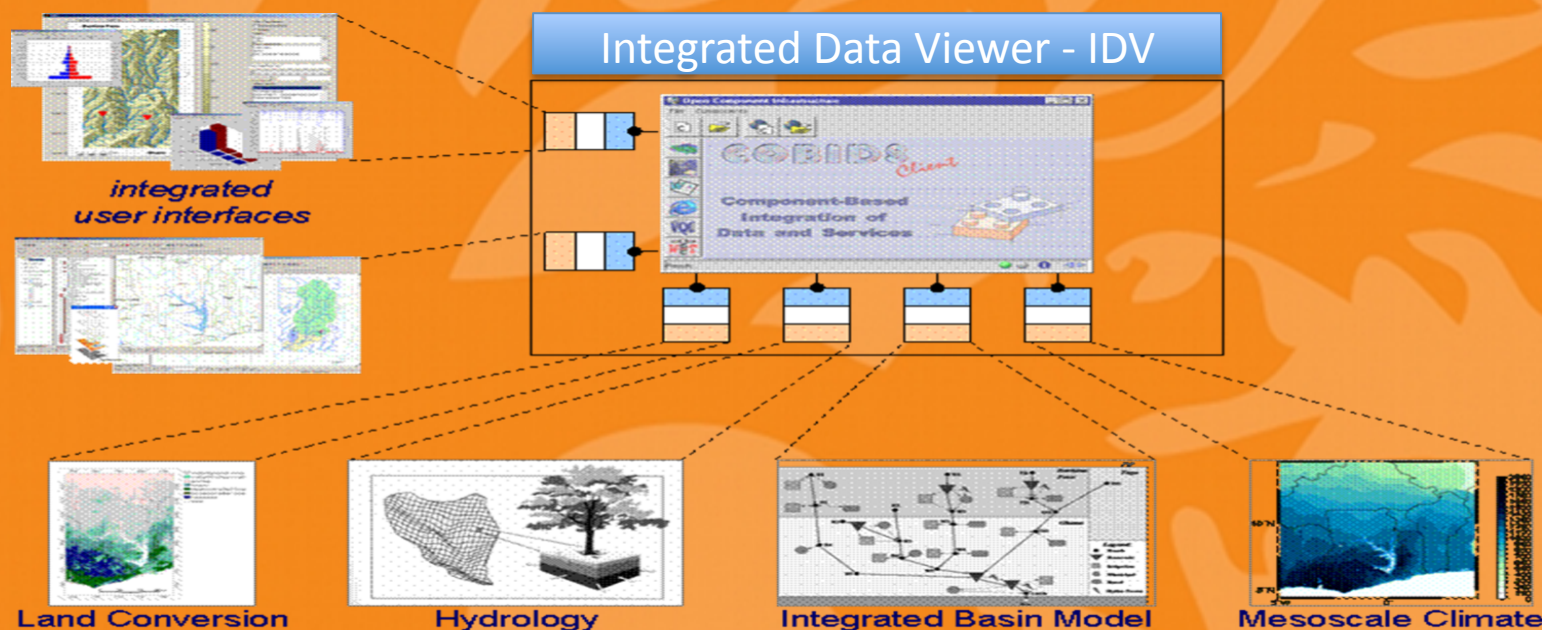
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# Integrated Early Warning and Decision Support Systems



- Decision Support Tools for multi-sectoral adaptation planning (MDGs and PRS)
- Support for development of Early Warning Systems (Automated hydro-met stations and remote-sensing)

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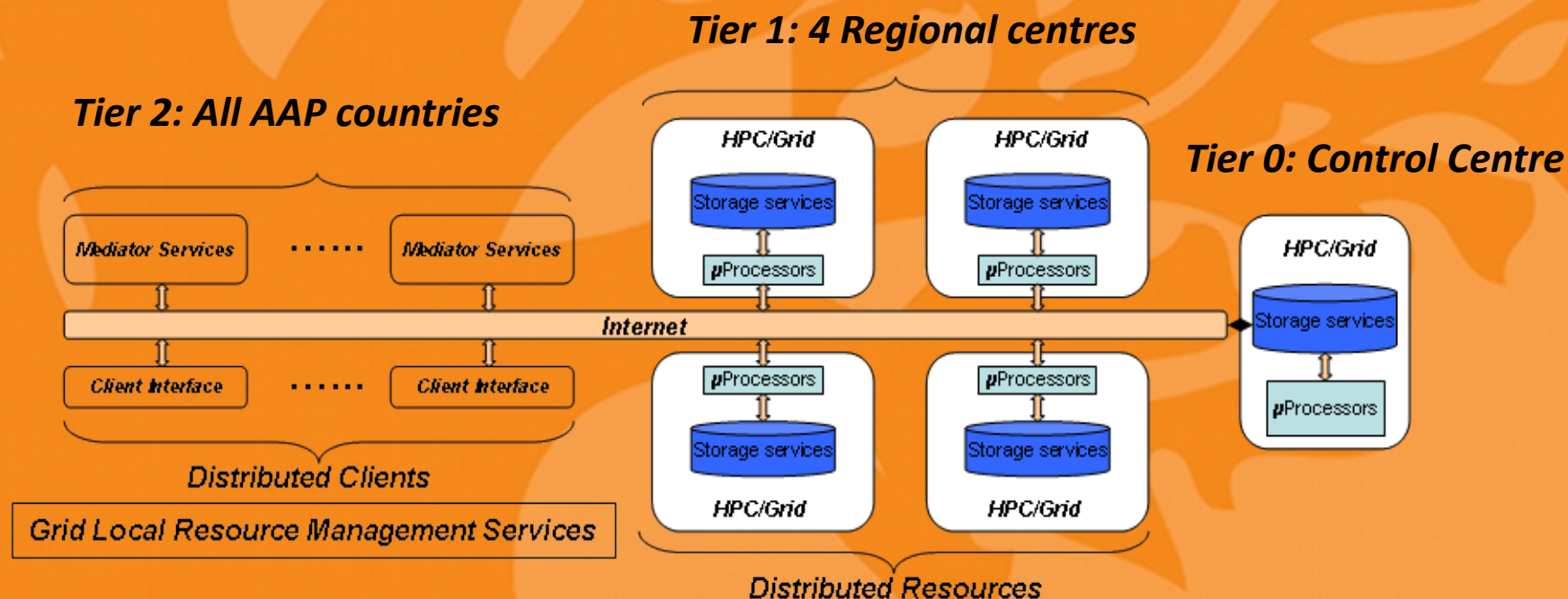






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# AAP Climate Data storage and Computational Infrastructure



Tier 0: Contains all open source data and tools

Tier 1: Regional Centres with combined data and tools similar to Tier 0

Tier 2: All AAP countries accessing infrastructure via web interfaces



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# Implementation of Strategy

- Built and strengthen strategic networks at different levels  
- national, regional and international
- Developed a Helpdesk to enable rapid resolution of problems
- Established a local network of problem-solvers, mentors and advisors

In-country technical support has mostly focused on:

- Data collection, analysis, e-infrastructure, application of tools and methods
- Acquisition, use and management of early warning and decision support systems

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# Examples of in-country Implementation

- Mauritius

- MU : <http://aap-server.uom.ac.mu:8080/repository/entry/show>
- GOC : <http://ccic.gov.mu:8080/repository>
- AREU/Agric: <http://host01.adcon.at>

- Mozambique : <http://hpc.inam.gov.mz/repository/entry/show>

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# DIMC Products and Services - Areas of Potential Research

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# Weather Index Insurance

**Support countries to pilot rainfall-indexed insurance to improve farmers' input investment and crop yields:**

- to assess the viability of the concept based on demand curve derived from pilot studies and on basis of CC risk;
- to pilot the concept in 4 AAP countries
- to share findings with commercial/public insurance institutions to develop strategic partnership; and
- to scale up use of the product in other suitable countries

Interventions will vary the exposure to climate risk.

Insurance payout depends on weather/rainfall data collected.

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# Socio-Economic Data Collection, Analysis and Management

**To facilitate access to the best available information on socio-economic data to support long-term planning:**

- to provide practical training and hands-on experience on post-survey data management and analysis to staff from key sectors
- to review survey methodologies employed to collect available national and regional socio-economic datasets; and also
- discuss vulnerability assessment methodologies that inform development of climate-resilient strategies.

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# Climate products and services

**To facilitate generation and access to the best available data on climate extremes to support climate risk management:**

- to provide hands-on training on the generation and application of climate extreme indices
- To provide the data, tools and methods for climate modeling and analysis
- to review methodologies for generation of robust climate information for decision making
- discuss application of methodologies to inform climate-resilient development strategies

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# Integrated Water Resources Management (IWRM)

**To build capacity for countries to undertake integrated water resources management:**

- provide practical training on the generation of climate products and their application to IWRM;
- provide the data, tools and methods for undertaking biophysical, socio-economic and stakeholder analysis;
- review methodologies for generation of robust hydro-climatic information for decision making
- discuss vulnerability assessment methodologies that inform development of NAPA/NATCOM/NAMAs

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# Climate Information Centres

**To facilitate access to early warning & climate risk information to support community-based livelihoods:**

- Climate observatories using e-infrastructure
- Multi-sectoral themes - lives and livelihoods
- Crosscutting themes – environment, social and economics (gender, knowledge management, organisational management, economic diversification)
- Socio-ecological system and sustainable development oriented
- Locally managed and inspired

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## E-infrastructure

**Design and implementation of e-infrastructure (ICT, data, methods, tools and network of institutions) for adaptation planning:**

- Build capacity of countries to generate and manage heterogeneous datasets and platforms
- Build capacity of countries to use integrated data analysis tools to provide information for decision making
- Strengthen ability of countries to integrate national and international datasets for adaptation planning
- Strengthen ability of countries to generate and publish information for wider access by various stakeholders and users

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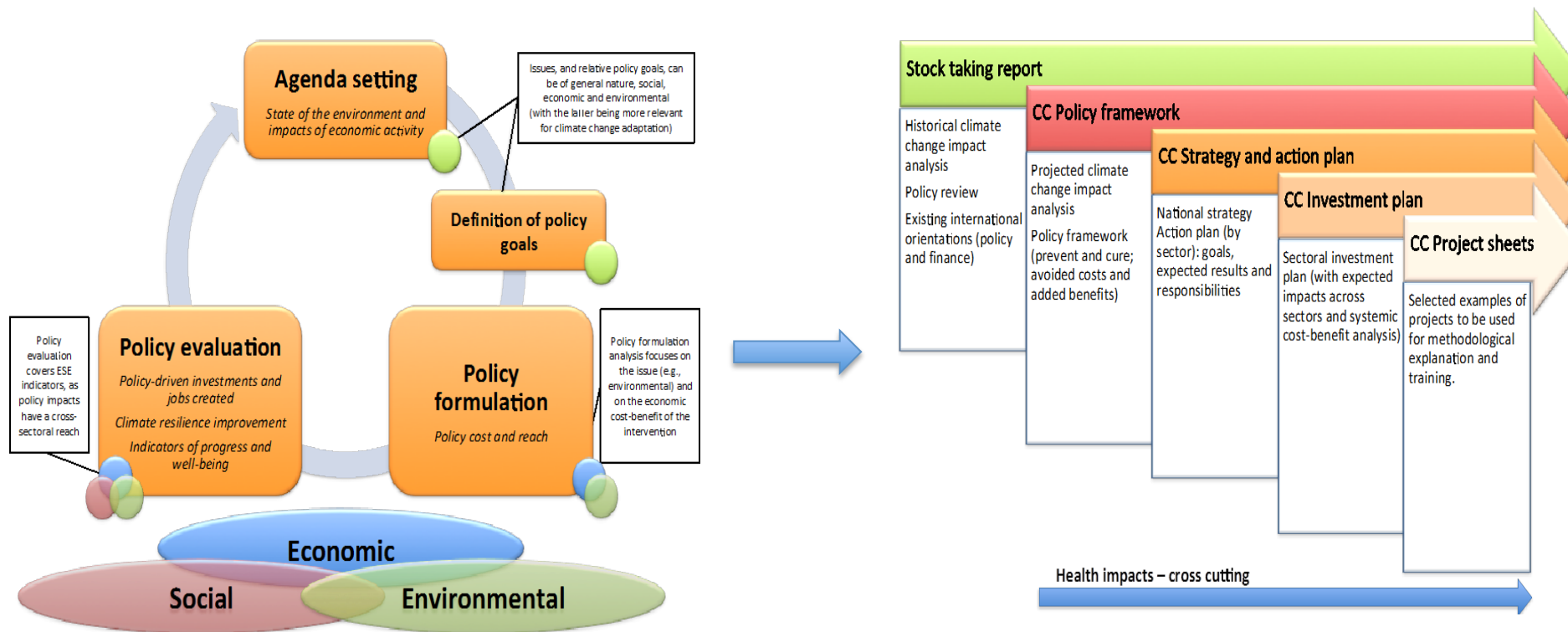






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# Multi-Sectoral Adaptation Planning for Climate-Resilient Development



Mauritius, Congo, Nigeria, Burkina Faso, Kenya & Lesotho

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# Capacity Development

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# Capacity Building

- Workshop on the use of climate scenarios for IWRM for the SADC and IGAD regions, ICPAC, Nairobi, Dec 2010
- Workshop on generation of climatic extreme indices for the IGAD region, Nairobi, March 2011
- Workshop on multi-sectoral adaptation planning, Nairobi, March 2011
- CORDEX –Africa data workshop, ICTP, Trieste, March 2011
- CORDEX-Africa workshop, Cape Town, November, 2011

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## Capacity Building

- Targeted Training on e-infrastructure for AAP countries – ICTP/Trieste, May and July 2011
- Workshop on climate products and services for West, Central and North Africa, Accra, 22 – 31 August 2011
- Regional workshop on economics of adaptation and climate finance, Accra, March 2012
- In-country workshops on scenario generation and AAP e-infrastructure - installations, training and mentoring (Ghana, Congo, Lesotho and Burkina)

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# Planned Activities

- CORDEX-Africa workshop on Interpreting and Communicating Climate Information for Decision Making, Burkina Faso, May 2012
- Workshop on Integrated Water Resources Management – Mozambique, June 2012
- Workshop on design of Socio-economic Surveys and Data Analysis – Ghana, Congo & Mozambique
- 2 ClimDev-Africa workshops on Interpreting and Communicating Climate Information for Decision Making – Kenya & Congo
- Workshop on Early Warning and Hazard Mapping – Lesotho, Namibia & Mauritius

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# Planned Activities

- Extensive procurement & recruitment – All countries
- In-country installation and training on e-infrastructure & Automatic Weather Stations
- Remote technical support and services
- Further development of the AAP e-infrastructure
- Project proposal development – sustaining the legacies of AAP

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## Special initiatives

- African Climate and Health Initiative (AAP ,ACPC, IRI, WMO,WHO).
- Engagement/support of African reps/negotiators at the UNFCCC processes (COP, LEG, SBSTA, NWP).
- CORDEX-Africa Consortium (next IPCC report)

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# Summary and Conclusion

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# Summary of Key Results



- First time an e-infrastructure has been widely applied across Africa
- Trained over 500 people (20 countries) data collection, analysis and use
- Trained over 200 people (20 countries) on the development, management and use of e-infrastructure
- Extensive deploying of e-Infrastructure and observational networks
- Strategic partnerships globally

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# Summary of Key Results



- Multi-disciplinary Community of Practice and Social Network around e-infrastructure (e.g. Teamworks)
- Part of CORDEX-Africa: coordinating Africa's contribution to IPCC report
- Extensive data and information management support to countries and WMO regional climate centres in Africa

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# Outlook

- Support all countries to achieve full implementation by end of 2012
- Support multi-disciplinary community of practice and social network established around e-infrastructure to promote use of innovative technologies for development
- Contribute to the next IPCC report through the CORDEX-Africa initiative
- Support foundational partnership with ICTP, WMO regional climate centres and related institutions in Africa
- Significant progress made - momentum need to be sustained through on-going and future UNDP projects

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# Thanks You



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# Thank You

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## Multi-Channel & Multi-Hazard Early Warning System

- Media – Radio, TV, internet
- Word of mouth
- Radio (UHF/VHF)
- Multi-channel
  - Landline
  - SMS**
  - email



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## Short Message Service (SMS)

*“ A text messaging service component of a mobile communication systems, using standardized protocol that allow the exchange of SMS between mobile phone “*

*--- Wikipedia*

- Now Value-added service
  - News alerts
  - Financial information
  - Mobile banking
  - Weather forecast
  - Early Warning





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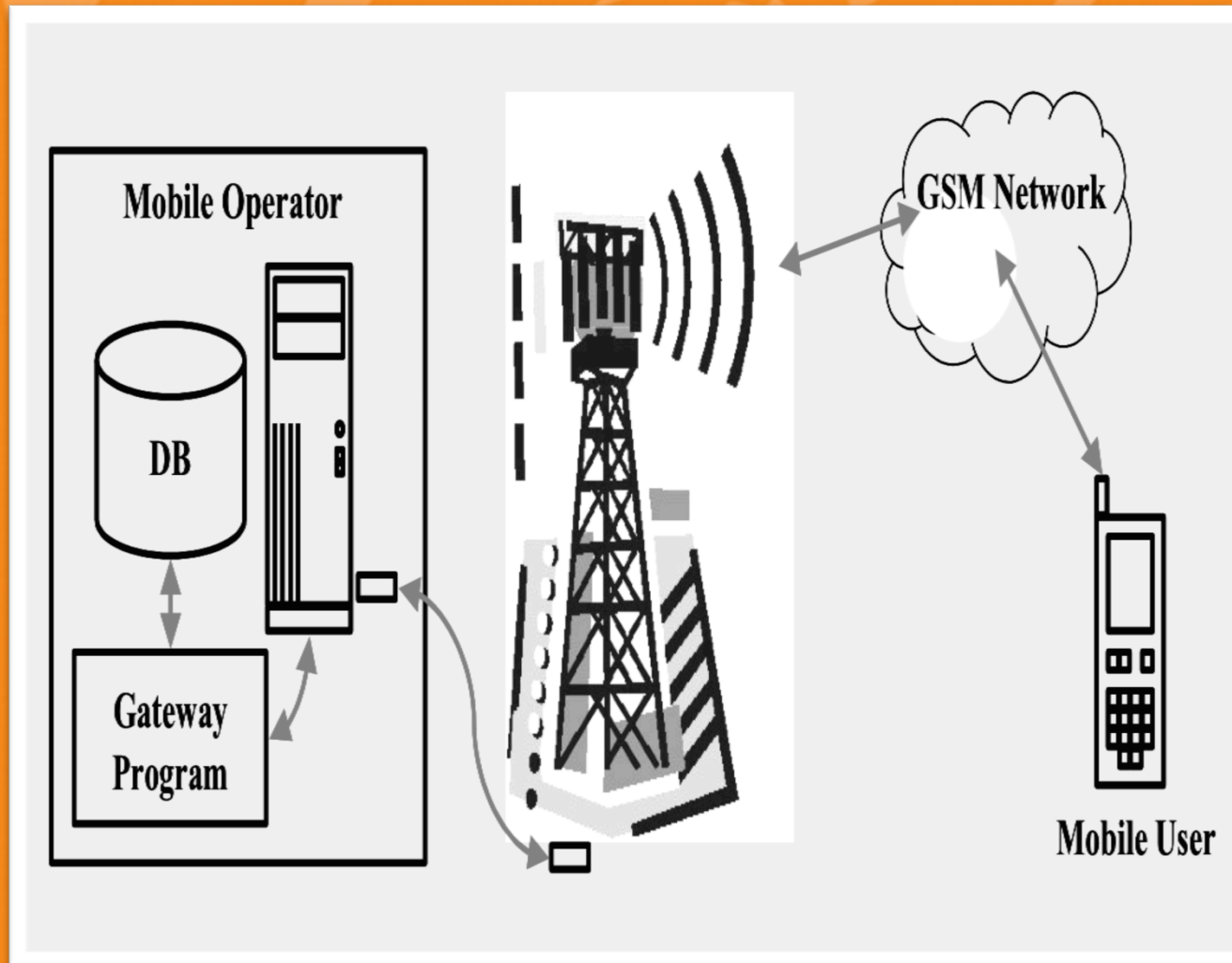
## SMS2DB

- GSM networks for instant warning via **SMS to Database (DB) gateways (GW)**;
- **Request and Receive** information from a DB
- Two types
  - Usually run by **mobile operator** as value added services
  - Operator Independent sms2db



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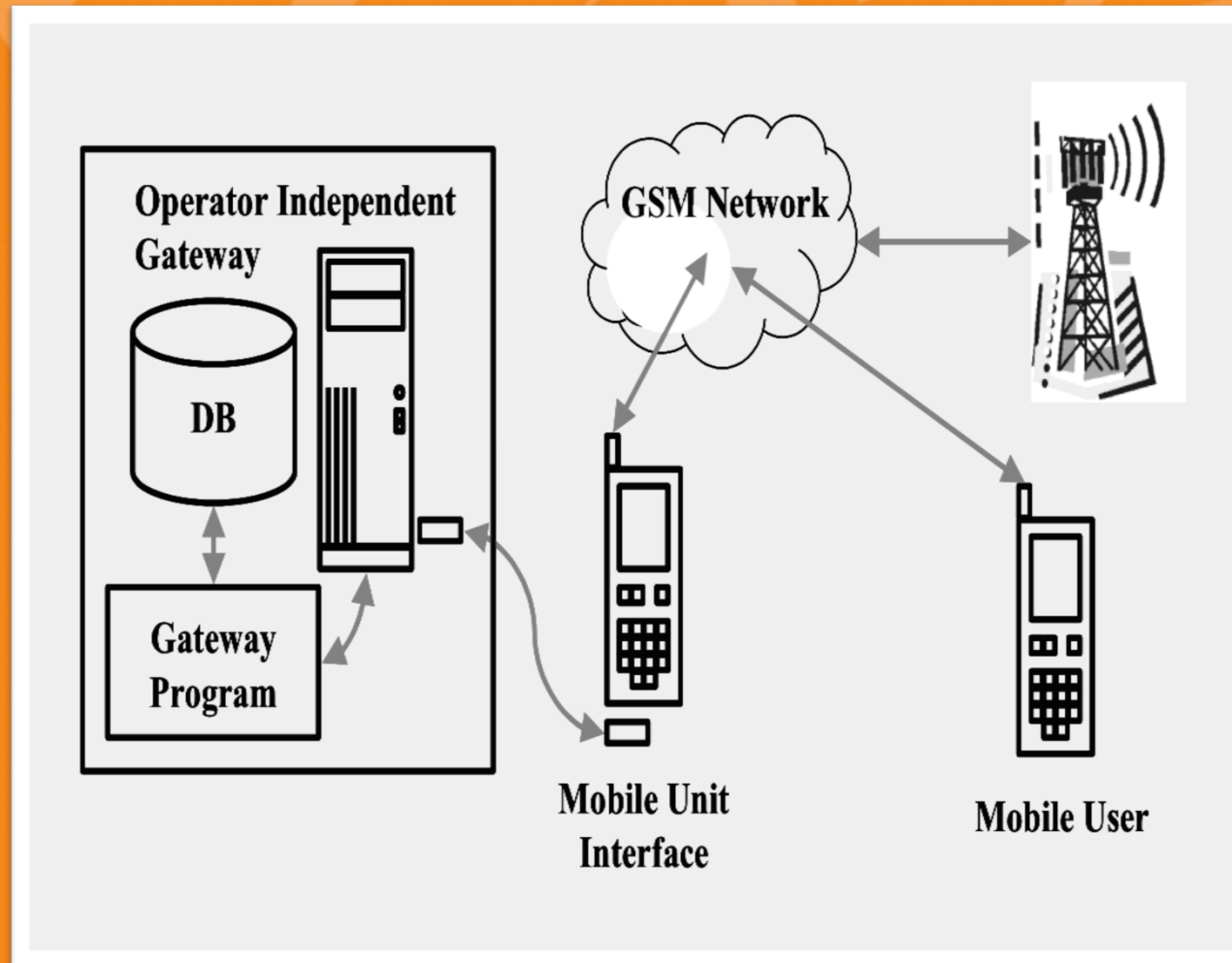
# SMS2DB run by mobile operator





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# Operator Independent sms2db



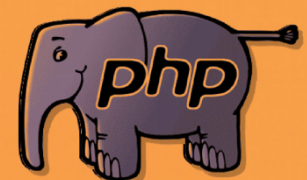




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# Solution

- Linux, Apache, MySQL
- Web based interface
- Gammu –smsd = SMS GW





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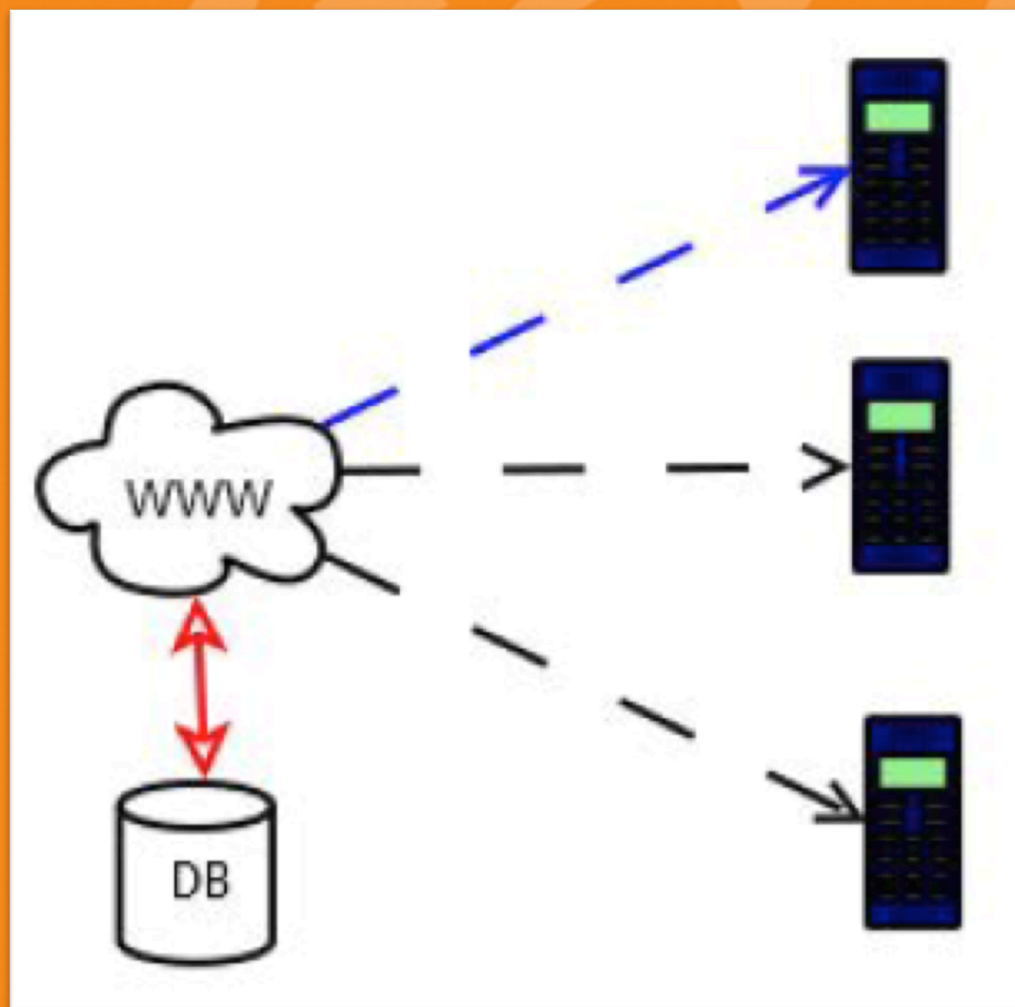
# How to trigger warnings

- Web2mobile
- Mobile2web
- Mobile2mobile



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# Web2mobile










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# Web2mobile



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HOME | PREFERENCES | CONTACT | LOGOUT

**Login: admin**  
**Status: Administrator**

[Home](#)

[My Account](#)

- [Message template](#)
- [Send SMS](#)
- [Send broadcast SMS](#)
- [Inbox](#)
- [Incoming SMS](#)
- [Outgoing SMS](#)
- [Preferences](#)

[Administration](#)

- [All inbox](#)
- [All incoming SMS](#)
- [All outgoing SMS](#)
- [Manage user](#)
- [Main configuration](#)

[Tools](#)

- [View log](#)
- [View SMS queue](#)
- [Send from file](#)
- [Phonebook](#)
- [Manage SMS rate](#)

[Feature](#)

[Gateway](#)

[Logout](#)

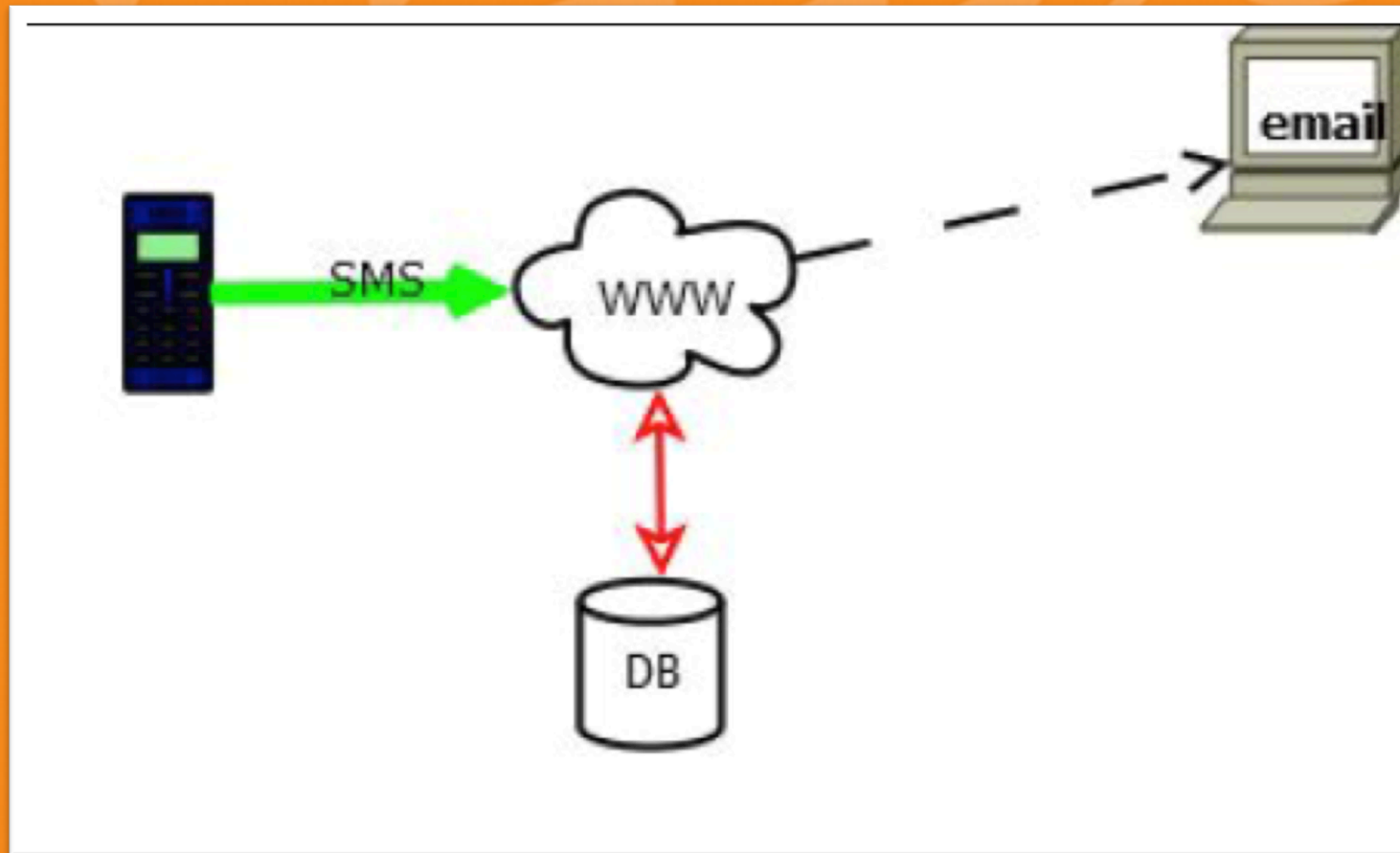
### Send broadcast SMS

SMS sender ID: 000  
SMS footer: - dma -  
Send to group:   
Or:  (Group code)  
Message template:   
  
Your message:  
  
SMS character:   
☐ Send as flash message  
☐ Send as unicode message (<http://www.unicode.org>)



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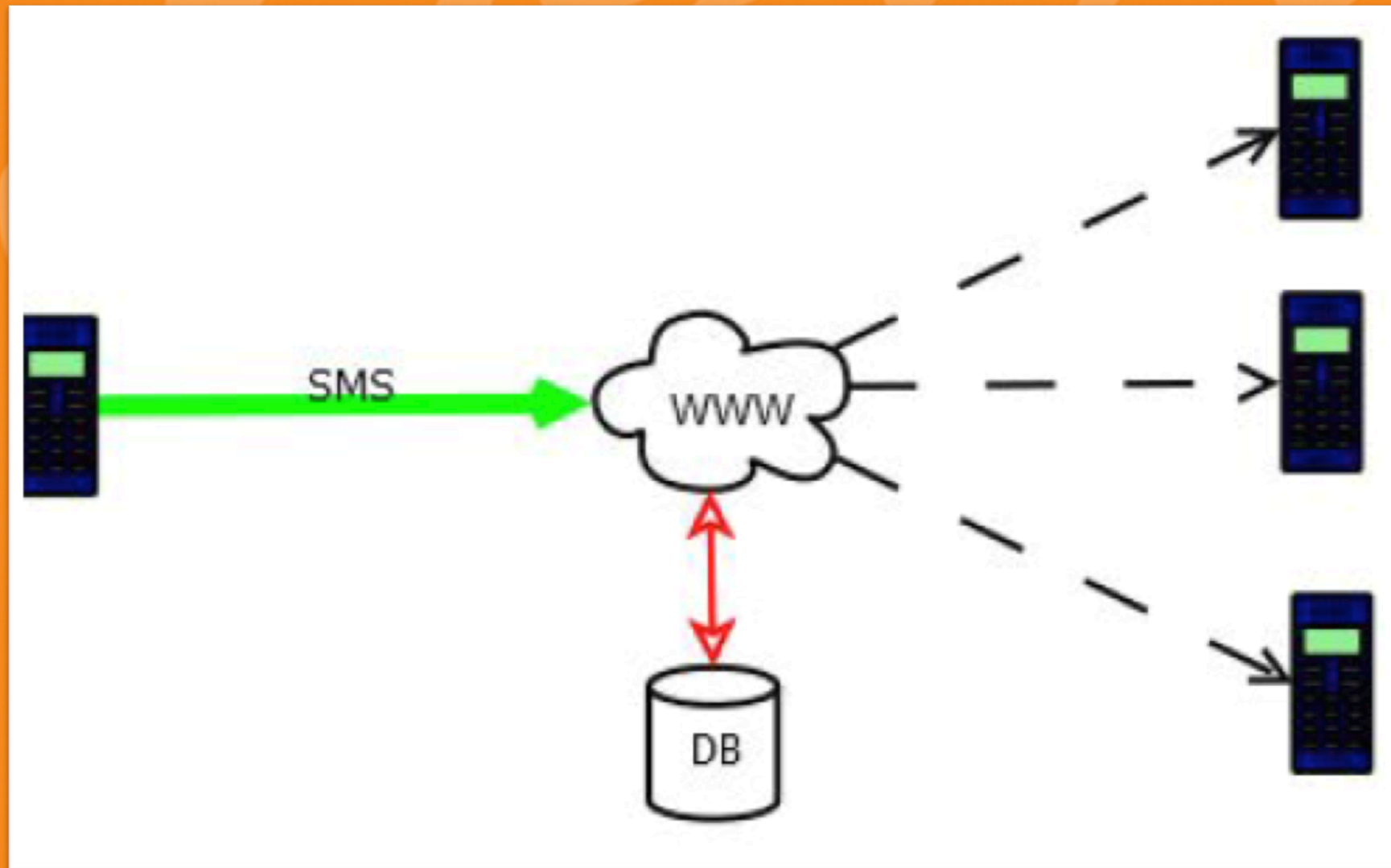
# Mobile2web





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# Mobile2mobile



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DIP







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# Group management

HOME
PREFERENCES
CONTACT
LOGOUT

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**Status: Administrator**

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**My Account**

- [Message template](#)
- [Send SMS](#)
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- [Phonebook](#)
- [Manage SMS rate](#)

**Feature**

- [Gateway](#)
- [Logout](#)

## Phonebook

Create group
Add number to group
Export all

**Group: Highlands - code: HL**

*	Name	Number	Email	
1.	Eti	+26658913192		<input type="checkbox"/>
2.	ithabeleng	+26663120881		<input type="checkbox"/>
3.	Khopotso	+26663731788		<input type="checkbox"/>
4.	Malineo	+26663246409		<input type="checkbox"/>
5.	Nthomeng	+26664038082		<input type="checkbox"/>
6.	Ntoetsi	+26657445023		<input type="checkbox"/>
7.	Rampai	+26658025981		<input type="checkbox"/>

Select action: Edit selections Go

**Group: MOKHOTLONG - code: MOK**

*	Name	Number	Email	
1.	Ntoetsi	+26657445023		<input type="checkbox"/>
2.	Rampai	+26658025981		<input type="checkbox"/>

Select action: Edit selections Go

**Group: QACHA'S NEK - code: QAC**

*	Name	Number	Email	
1.	Eti	+26658913192		<input type="checkbox"/>
2.	ithabeleng	+26663120881		<input type="checkbox"/>

Select action: Edit selections Go



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# Template Management

[HOME](#)
[PREFERENCES](#)
[CONTACT](#)
[LOGOUT](#)

**Login: admin**  
**Status: Administrator**

- Home
- My Account
  - Message template
  - Send SMS
  - Send broadcast SMS
  - Inbox
  - Incoming SMS
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  - Manage user
  - Main configuration
- Tools
  - View log
  - View SMS queue
  - Send from file
  - Phonebook
  - Manage SMS rate
- Feature
- Gateway
- Logout

**Selected message template has been deleted**

**Message template**

Add message template

	Name	Content	
1.	<a href="#">Flood01</a>	Flood within	<input type="checkbox"/>
2.	<a href="#">Snow01</a>	we are expecting heavy snow on	<input type="checkbox"/>
3.	<a href="#">Wind01</a>	strong winds expected on	<input type="checkbox"/>

Select action : [Delete selection](#) [Go](#)

Add message template