National Program Against Drought (PRONACOSE)

"Predict, plan, prepare: how to stop drought becoming famine Seminar"

Rome, Italy, June 2017
Outline

• Introduction on the problem of drought in Mexico.
• Background of PRONACOSE.
• Transition from reactive to preventive approach.
• Conceptualization.
• Components of the program.
• Application of the program.
• Results of the program.
• Future work.
Vulnerability of Mexico due to geographic location

1. Northern latitude of Mexico 32° 43’ 06” N
2. Tropic of Cancer 23° 26’ N
3. Southern latitude of Mexico 14° 32’ 27” N
4. Equator
5. Tropic of Capricorn 23° 26’ S
Introduction on the problem of drought in Mexico, Río Bravo 1994-2003

Rio Bravo basin
March 2003
(MSDI (3 months): Precipitation-Soil Moisture-Runoff, MOSEMM)


Introduction on the problem of drought in Mexico, Cutzamala 2008-2010

Cutzamala Basin
March 2008
(MSDI (3months): Precipitation-Soil Moisture-Runoff, MOSEMM)

Cutzamala Basin
March 2008
(MSDI (3months): Precipitation-Soil Moisture-Runoff, MOSEMM)
Introduction on the problem of drought in Mexico, Cutzamala 2008-2010

System reservoir storage (hm$^3$)

C.I. = 526.1 hm$^3$

Alm reg. = 532.04 hm$^3$

24 months
Introduction on the problem of drought in Mexico, Cutzamala 2008-2010

System reservoir storage (hm³)

- NAMINO
- Simulación sin Red
- Simulación Red 12.5%
- Simulación Red 15%
- Simulación Red 20%
- Curva Índice 2005
- Curva Índice 2009

24 months

C.I. = 437.9 hm³

Alm reg. = 319.23 hm³
Introduction on the problem of drought in Mexico, whole country 2011-2012

Rio Bravo basin
December 2012
(MSDI (3months): Precipitation-Soil Moisture-Runoff, MOSEMM)

SPI Presa la Amistad (2011-2013)

Storage evolution of Presa La Amistad (2011-2012)

December 2012

Storage (Hm³)


1,792.25

0

758.61

200

400

600

800

1,000

1,200

1,400

1,600

1,800

2,000

0

500

1,000

1,500

2,000
From 2011 to 2012, the worst drought since 1941 was presented.

It affected about 90% of the country, caused losses of 1.2 billion of USD according to the U.S. Agriculture Department, and 11.6 billion of USD according to an estimation of the Mexican Agriculture Commission.

The North was the most affected region.

Because of the 2011-2012 drought, it was necessary to take measurements of social, economic and fiscal policies.

In that year it was implemented: “Strategy for attention of the states affected by drought” and in 2012: “Agreement of actions to mitigate drought effects through federal entities”.

Drought attention had two components: humanitarian and productive. Potable water supply, adequate water management and sustainable use of natural resources attended the humanitarian component, and the second one consisted on support to affected areas, maintain productive capacities, activation of insurance schemes and financing.

In 2013 was designed and implemented the National Program Against the Drought (PRONACOSE).

The principal objective is to identify actions that allow to make opportune decisions to prevent and mitigate drought affectations at River Basin Council level (Política Pública para la Sequía, 2014).
Transition from reactive to preventive approach

- The program was conceived in transition between governmental paradigms and instruments of management.
- In that moment drought was attended by traditional mechanisms of response with federal resources.
- At the same time it was defined the implementation of new policies with preventive approach with three lines: Programs of Preventive and Mitigation Actions of Drought (PMPMS), legal instruments to guarantee water for human consumption and attention by coordinate mitigation actions.
Social

Environmental

Economic

Global

Vulnerability maps with 24 indicators (2016)
**PRONACOSE**

**Components**

- Elaboration of PRONACOSE (to implement the guidelines)
- Drought monitoring
- Programs
- Interinstitutional Committee
- Committee of experts

**Prevention**

- Drought attention
- To develop the indicators of the drought condition
- Measures to prevent and face the drought at basin levels
- To monitor the actions of the government agencies to face the drought

**Mitigation**

- To evaluate PRONACOSE and to make recommendations

*(Política Pública para la Sequía, 2014)*
Application of the program
Under a condition of drought

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<th>Drought Monitor</th>
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<td>To get the results</td>
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<th>Information</th>
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<td>To generate relevant information for the River Basin Councils in drought condition</td>
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<th>Actions</th>
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<td>To match the local PMPMS with the intensity of drought</td>
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Application of the program
Case of Oaxaca (December 2016 - June 2017)

Evolution of drought area percentajes in the state of Oaxaca

Monitoring and preventive actions (COVI sessions)

Impacts assessment
The consequences were: the main reservoir of “El Istmo de Tehuantepec” the “Presas Benito Juárez” had 14% of its capacity, that reservoir supplies water to agricultural and domestic use.

“Benito Juárez” reservoir at 102% Of its capacity

Mitigation actions
Projected area for wells:

Because of the extreme situation there was necessary to take mitigation actions in order to reduce the affectations. So CONAGUA proposed to build and rebuilt wells.
Results

• **2013:** analysis of the aspects of monitoring and early warning; development of Programs of Preventive and Mitigation Actions of Drought (PMPMS, its acronym in Spanish); creation of Inter-institutional Committee of Droughts and Floods Attention; celebration of four Committee sessions.

• **2014:** improving of drought monitoring, Mexican Drought Monitor published every 15 days; PMPMS implementation; development of vulnerability of drought methodology; historical drought occurrence review; celebration of four Committee sessions.

• **2015:** 48 PMPMS developed and implemented at Basin Councils and Cities; updating of vulnerability methodology with 24 indicators; drought risk evaluation; celebration of four Committee sessions.

• **2016:** development of complementary tool of Mexican Drought Monitor, which increases the quality of drought monitoring: Mexican Multivariate Drought Monitor (MOSEMM, its acronym in Spanish); updating of drought vulnerability; application of preventive actions at basin council by awareness of drought occurrence and review of actions that could be applied; celebration of three Committee sessions.

• **2017:** celebration of ordinary and extraordinary sessions in order to attend the severe drought case of Oaxaca; evaluation of Federal Programs actions to reduce drought vulnerability of population.
Future work

• According to the Integrated Drought Management Programme (IDMP), the 3 pillars of national drought policy, which are part of integrated drought management, are:
  
1. Drought Monitoring and Early Warning Systems;
2. Vulnerability and Impact Assessment;
3. Preparedness and Mitigation Actions.

So the future work is focused on strengthening the corresponding actions to those pillars:
• Applying efficiently the complementary tool of drought monitoring: MOSEMM;
• Developing and apply an effective early warning system;
• Reviewing the Federal Programs actions in order to evaluate the impact that they had in drought vulnerability evolution;
• Improvement of risk evaluation in order to prioritize public policies applications and induce risk reduction;
• Reviewing, evaluation and updating of the PMPMS in terms of application and effectiveness;
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