



**Asia-Pacific
Economic Cooperation**

2016/EPWG/SDMOF/014

The El Niño Phenomenon: Efforts to Increase Resilience for Food Security

Submitted by: Peru



**10th Senior Disaster Management Officials Forum
Iquitos, Peru
8–9 October 2016**

ASIA – PACIFIC ECONOMIC COOPERATION PERU - 2016

Iquitos, october 2016

**10th
SENIOR DISASTER MANAGEMENT
OFFICIALS FORUM**







El Niño
Southern Oscillation
2015 -2016



‘EL NIÑO’ SOUTHERN OSCILATION - ENSO

SUMMARY


ENSO GENERALITIES	CHARACTERISTICS	REGIONS	ANOMALIES
NATIONAL STUDY ENSO - ENFEN	SINAGERD	RISK CALENDAR	PROJECTIONS PROPOSED SCENARIO
NATIONAL COUNCIL MANAGEMENT DISASTER RISK - CONAGERD	URGENCY DECREE	COEFEN	
ACTION PLAN MULTISECTORAL	OBJECTIVES	PRECEDENTS	PREVENTION ACTIVITIES 2014 2015
AGRICULTURE AND IRRIGATION ACTIONS	ACTIONS	EARLY ALERT	METALLIC BARRIERS
MULTISECTORIALS ACTIONS	Acciones		



‘EL NIÑO’ SOTHERN OSCILATION - ENSO

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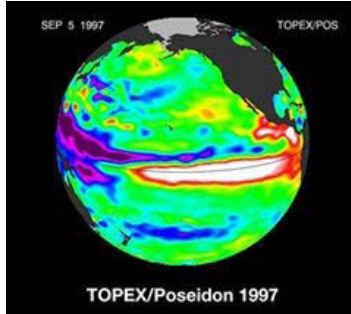
MINAGRI
MINISTERIO DE AGRICULTURA Y RIEGO

‘EL NIÑO’ SOUTHERN OSCILATION - ENSO

IT IS AN EVENT THAT IS DEFINED BY THE WARMING OF THE SEA COASTS FROM PERU AND CLIMATE CHANGE GIVING RISE TO REGIONAL AND GLOBAL

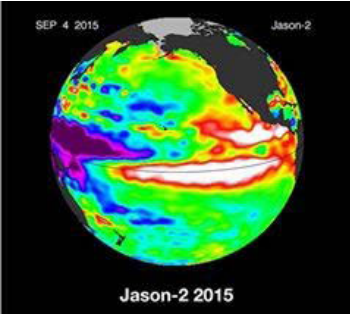
➔

EXIST PROJECTION OF THE PRESENCE OF THE PHENOMENON ‘EL NIÑO’ IN THE PERIOD 2015 - 2016




SEP 5 1997 TOPEX/POS

TOPEX/Poseidon 1997



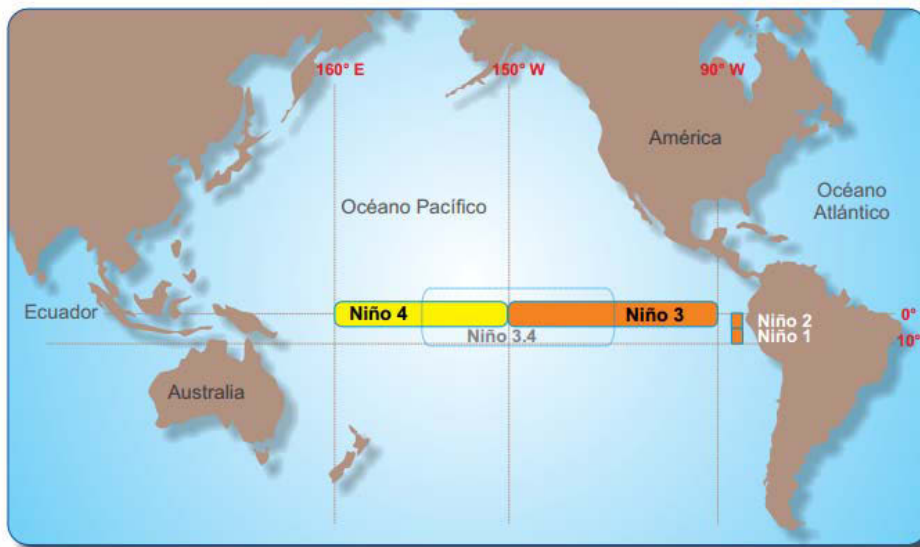
SEP 4 2015 Jason-2

Jason-2 2015



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PACIFIC OCEAN FOUR REGIONS IN WHICH SCIENTISTS FOCUSES

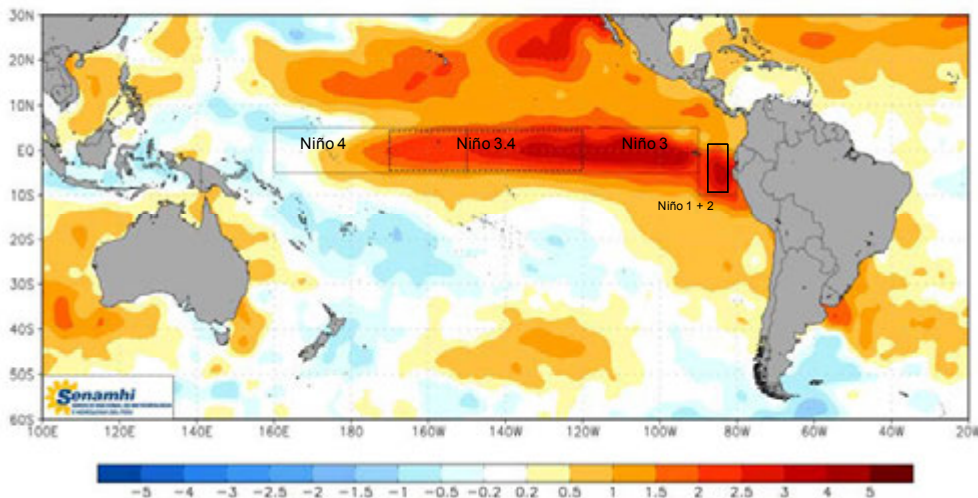


Fuente: NOAA



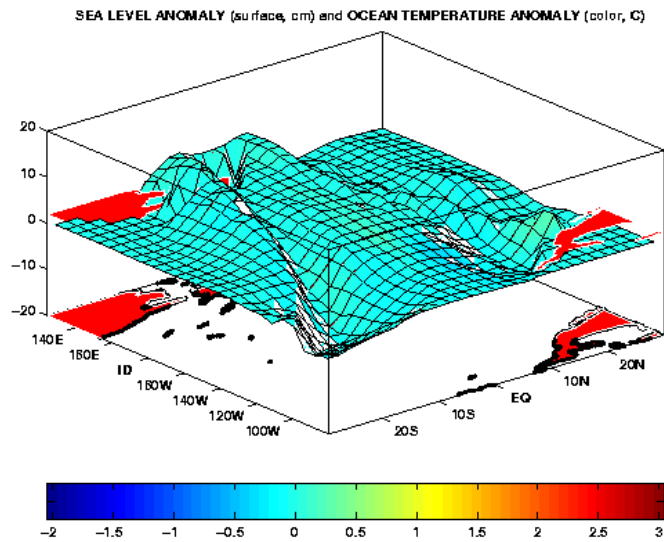
PACIFIC OCEAN FOUR REGIONS IN WHICH SCIENTISTS FOCUSES

SENAMHI/DGM/DMS
Reynolds - ANOMALIA DE LA TEMPERATURA SUPERFICIAL DEL MAR (°C) - CLIMATOLOGIA (1981 - 2010)
Setiembre de 2015



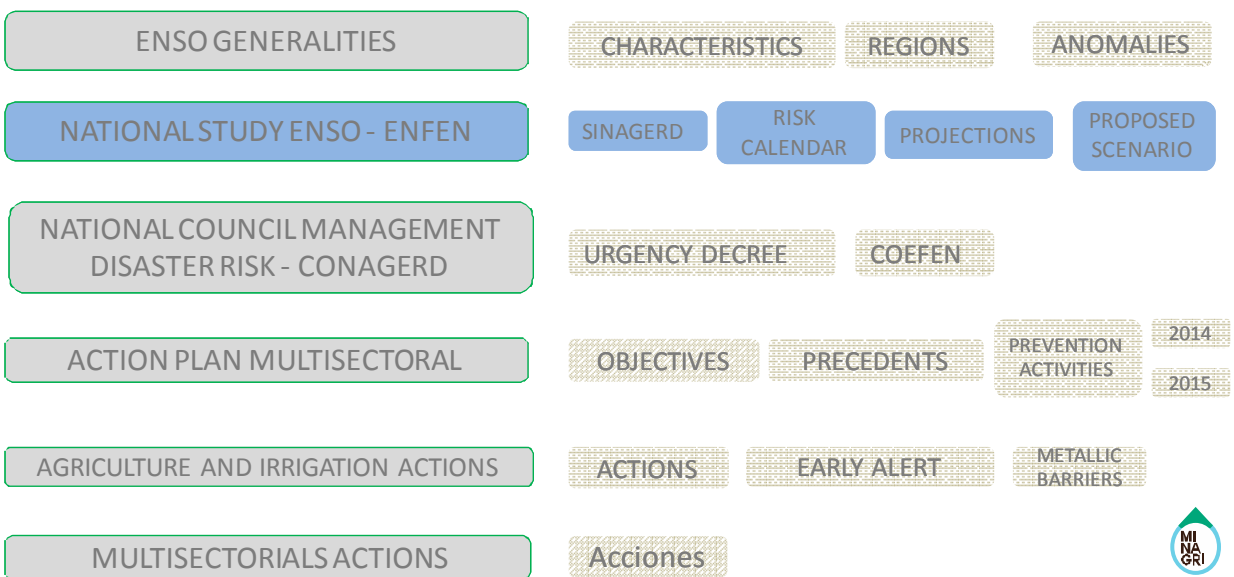
SEA LEVEL ANOMALY AND T° OCEAN

- ❖ Weather phenomenon
- ❖ Equatorial Pacific
- ❖ Frequency 2-7 years.
- ❖ Global consequences
- ❖ Warm phase 'El Niño'
- ❖ Cold phase 'La Niña'.
- ❖ Alteration of the effects of the Humboldt current.
- ❖ Loss / increase certain fish species.
- ❖ Wet periods.
- ❖ Low atmospheric pressure.
- ❖ Mass displacement generation.
- ❖ Losses agriculture sector.
- ❖ Affection focused on food security.



'EL NIÑO' PHENOMENON - ENSO

SUMMARY





RISK CALENDAR

FENÓMENO	COCHA	SERRA	SERRA	VERANO			OTOÑO			INVIERNO			PRIMAVERA		
				DIC	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SET	OCT	NOV
LLUVIAS		■	■	●	●	●	●	●				●	●	●	
INUNDACIONES	■	■	■	●	●	●	●	●							
HUAYCOS / DESLIZAMIENTOS	■	■	■	●	●	●	●	●							
GRANIZADA / NIEVE		■		●	●	●	●	●				●	●	●	
HELADAS		■						●	●	●	●	●			
FRIAJES			■					●	●	●	●	●			
BAJAS TEMPERATURAS	■							●	●	●	●	●	●		
INCENDIOS FORESTALES	■	■	■							●	●	●			
VIENTOS FUERTES	■	■	■								●	●	●		
OLEAJES ANÓMALOS	■			●	●	●	●	●	●	●	●	●	●	●	

MI N A GRI
H H N E T I E R O
D E A G O S T O E T I R A
Y S E C O

NATIONAL STUDY 'EL NIÑO' PHENOMENON



Autoridad Nacional del Agua
NATIONAL WATER AUTHORITY



NATIONAL SERVICE OF METEOROLOGY AND HYDROLOGY



INSTITUTE OF THE SEA PERU



MANAGEMENT HYDROGRAPHY AND NAVIGATION PERUVIAN NAVY



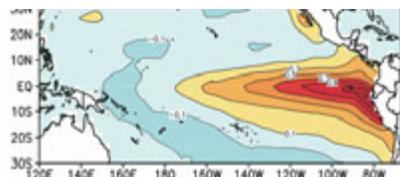
GEOPHYSICAL INSTITUTE PERU



INSTITUTO NACIONAL DE DEFENSA CIVIL



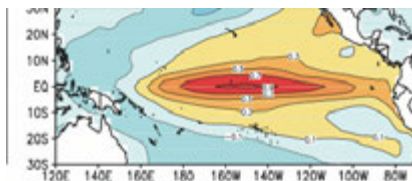
'El Niño' in the eastern Pacific



Increased rainfall in the northern and central coast

55% probability

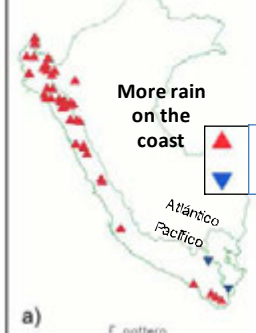
'El Niño' in the central Pacific



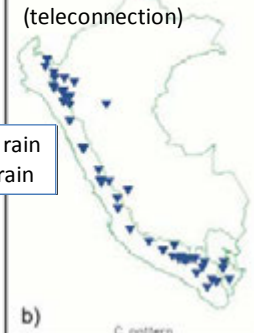
Less rains in the Andes and Amazon. But the effect is less robust than on the coast

80% probability

Local effect



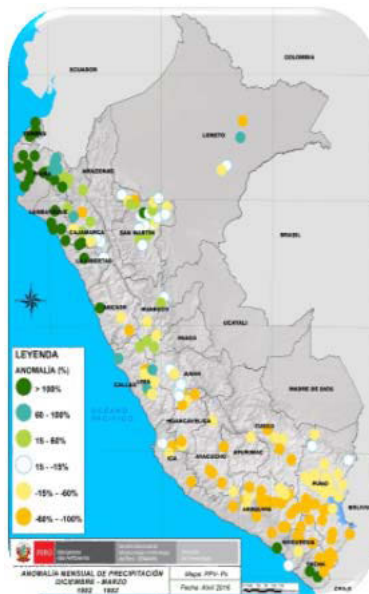
Remot effect (teleconnection)



PERU IS CONSIDERED ONE OF THE MOST VULNERABLE COUNTRIES TO THE ENSO...



North coast



South mountains



'ENSO' THREATS ON THE DIFFERENT BASINS IN THE COUNTRY ARE DIVERSE ...

Location of hazards associated with 'ENSO'



Departments/regions impacted by the ENSO 1997-1998

Fuente: CAF Elaboración: DGESEP

1,000 critical points

Located in areas at risk to flooding and erosion in rivers and streams.

500 vulnerable areas creeks

In 14 regions/departments.

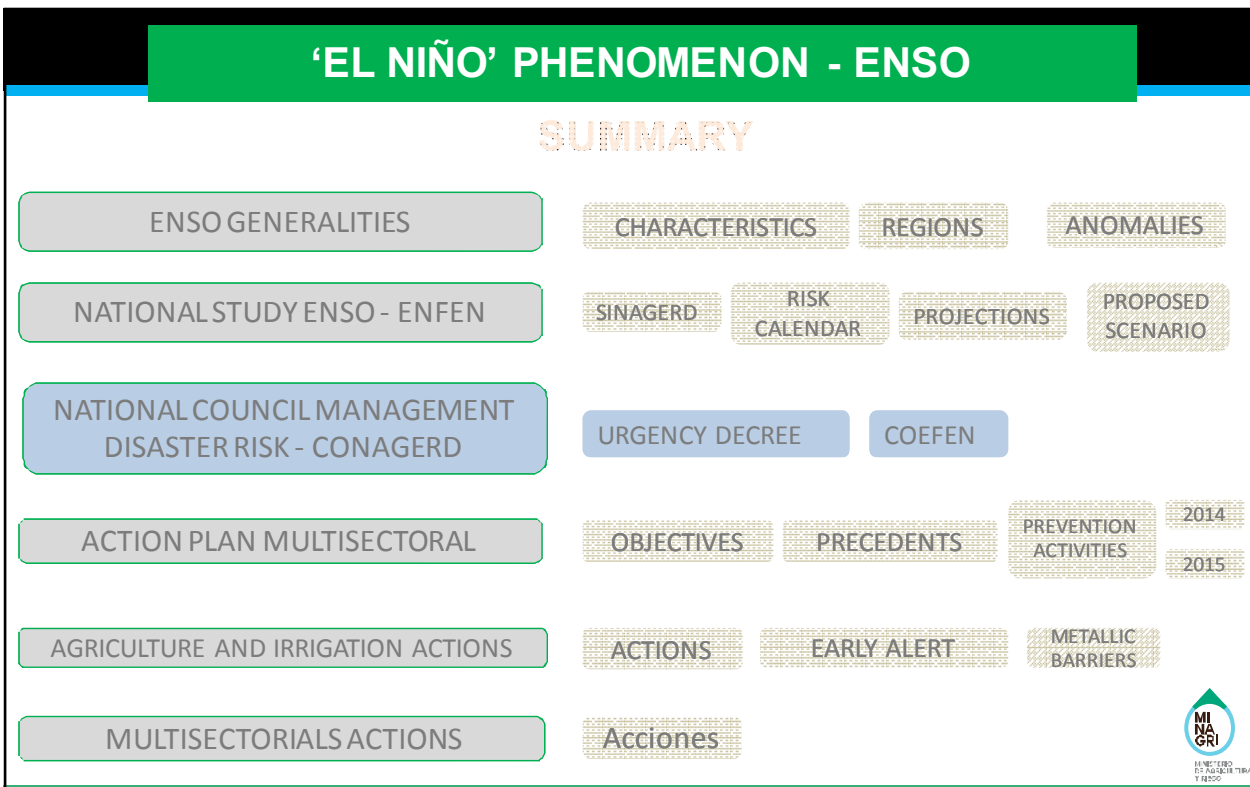
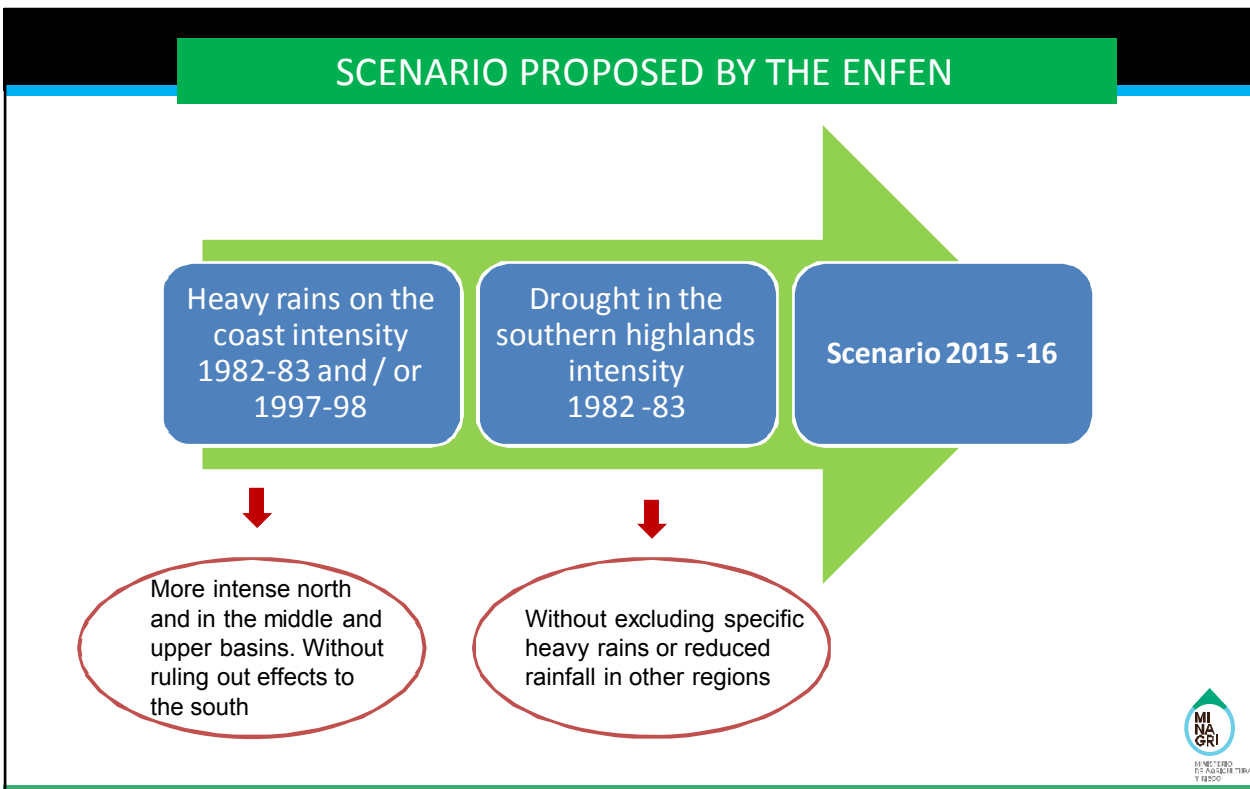
53,220 households

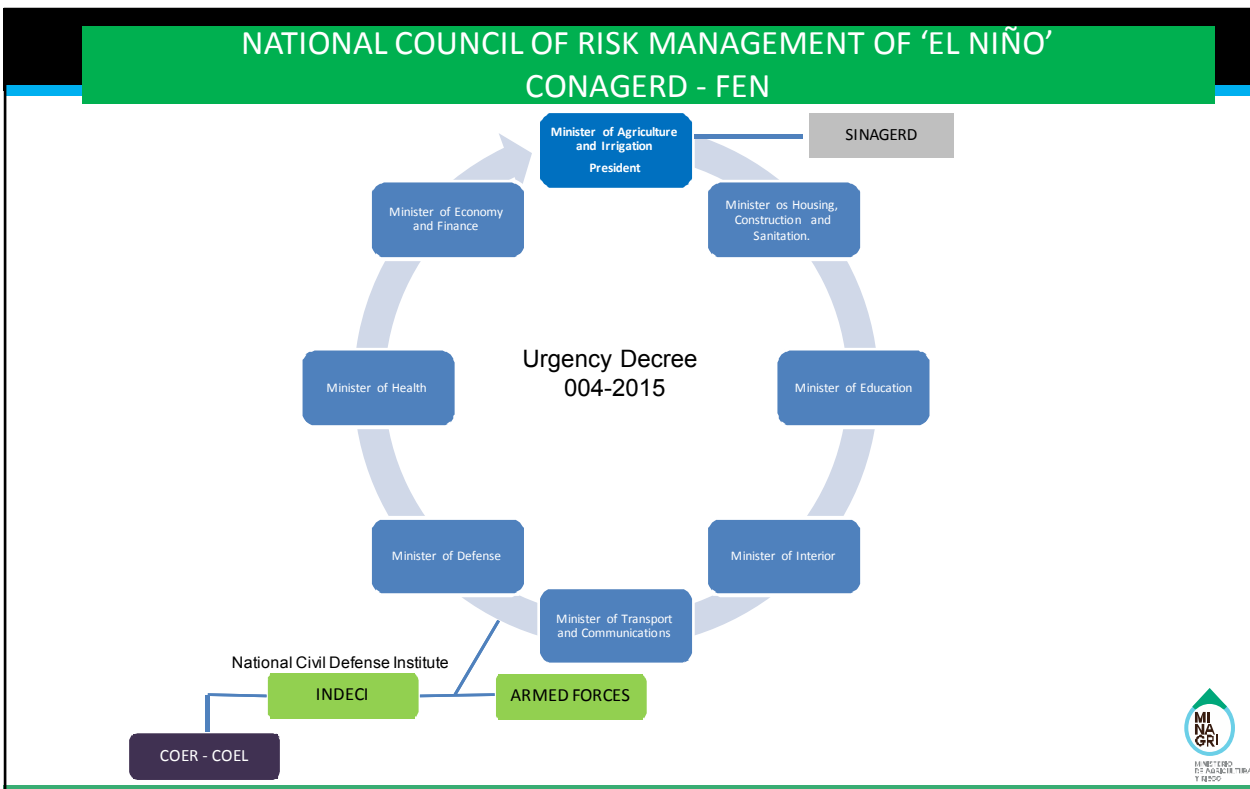
Exposed to heavy rains and flooding.

518,870 population

Potentially exposed to economic losses.

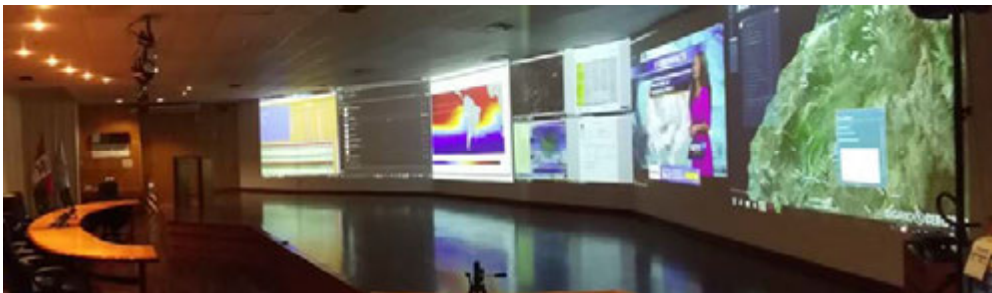






OPERATIONS CENTER 'EL NIÑO' PHENOMENON - COEFEN

DECISIONS ROOM



Simultaneous displays


Real-time connection (COERs)

V-Sat available for use

Independent power supply

Communications systems

Modeling scenarios - SIGRID El Niño


MINISTERIO DE AGRICULTURA Y RIEGO

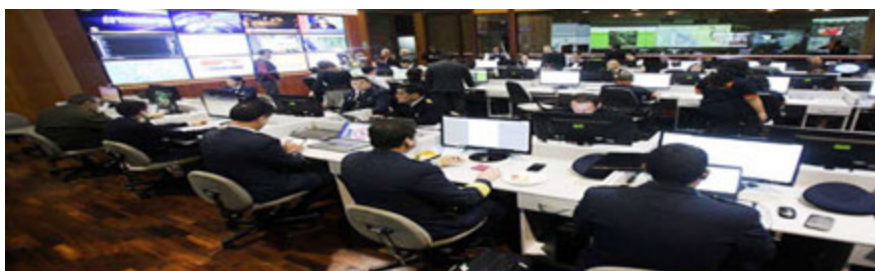
OPERATIONS CENTER 'EL NIÑO' PHENOMENON - COEFEN

DECISIONS ROOM



OPERATIONS CENTER 'EL NIÑO' PHENOMENON - COEFEN

INFORMATION ROOM



Compute modules for civil matters and military information (Armed Forces)

Houses dating from institutions such as SENAMHI, IMARPE, IGP, ANA, CENEPRED, INDECI and sectors involved

Data interaction between various institutions, including Armed Forces.



OPERATIONS CENTER 'EL NIÑO' PHENOMENON - COEFEN



INFORMATION SYSTEM FOR DISASTER RISK MANAGEMENT SIGRID-ENSO

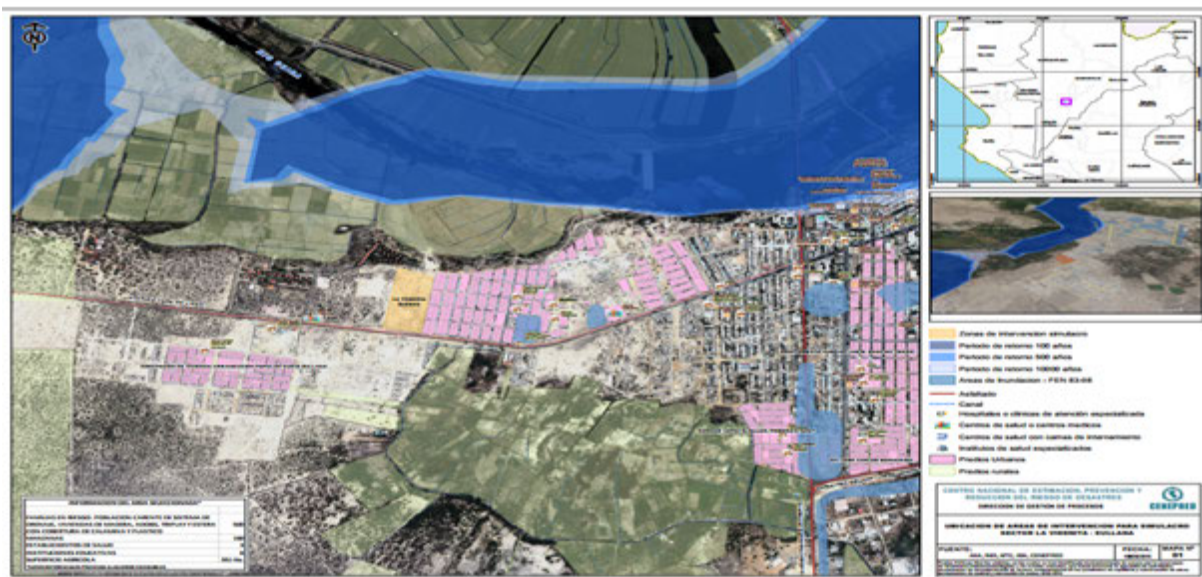
It provides interactive maps, technical papers and specialized tools to the FEN.

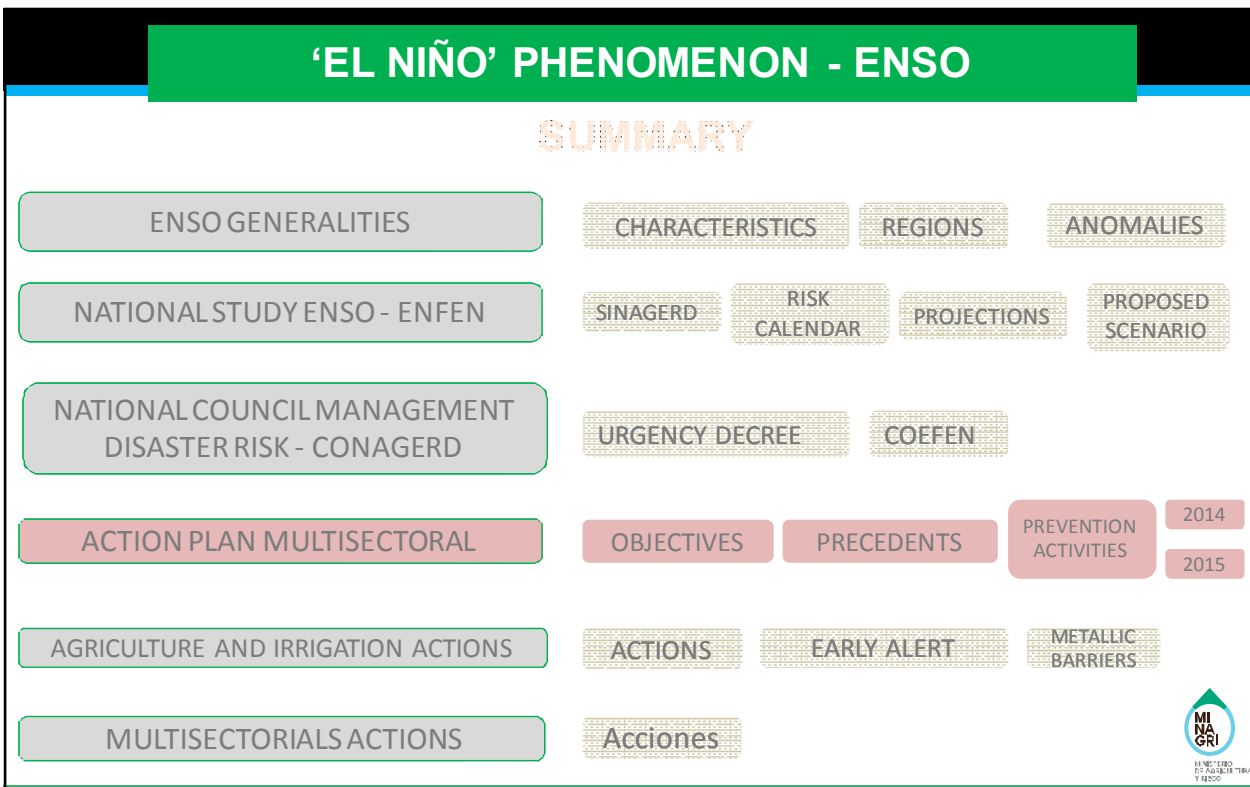
It has official information that technical authorities and other state agencies provide to the system

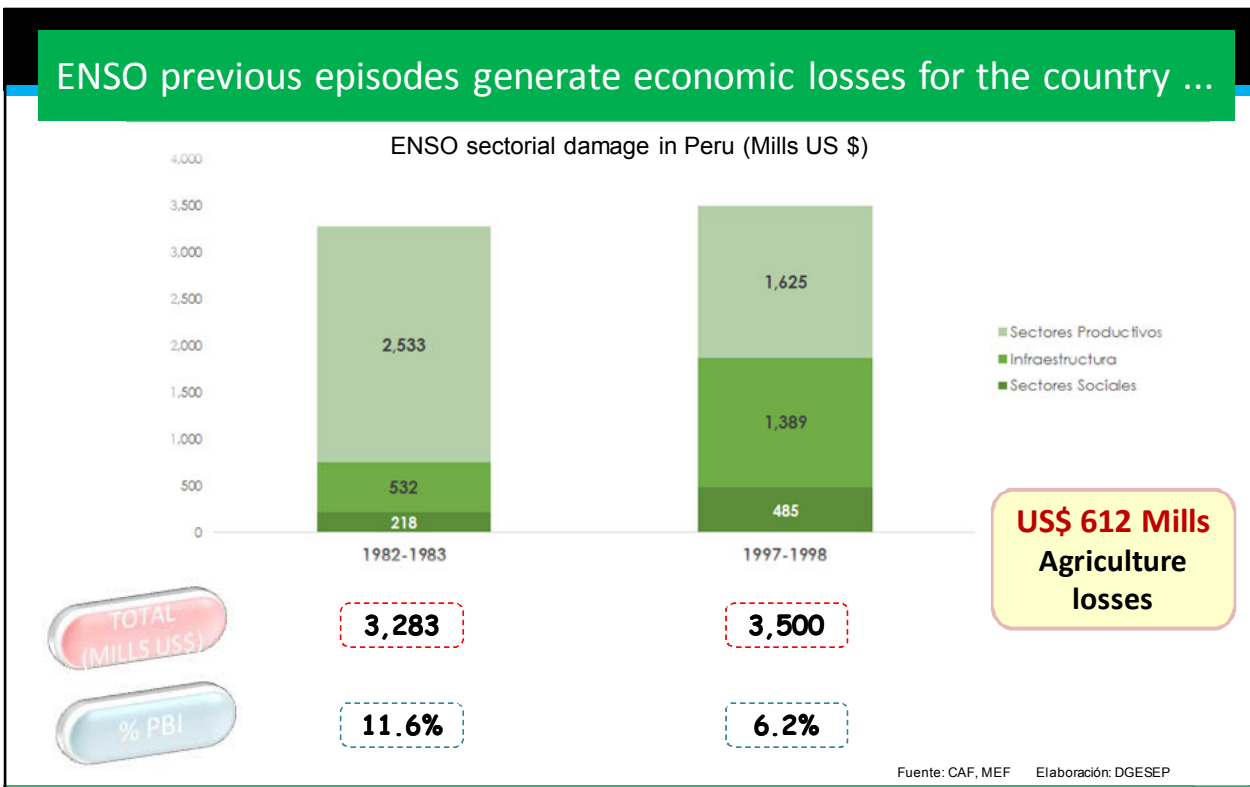


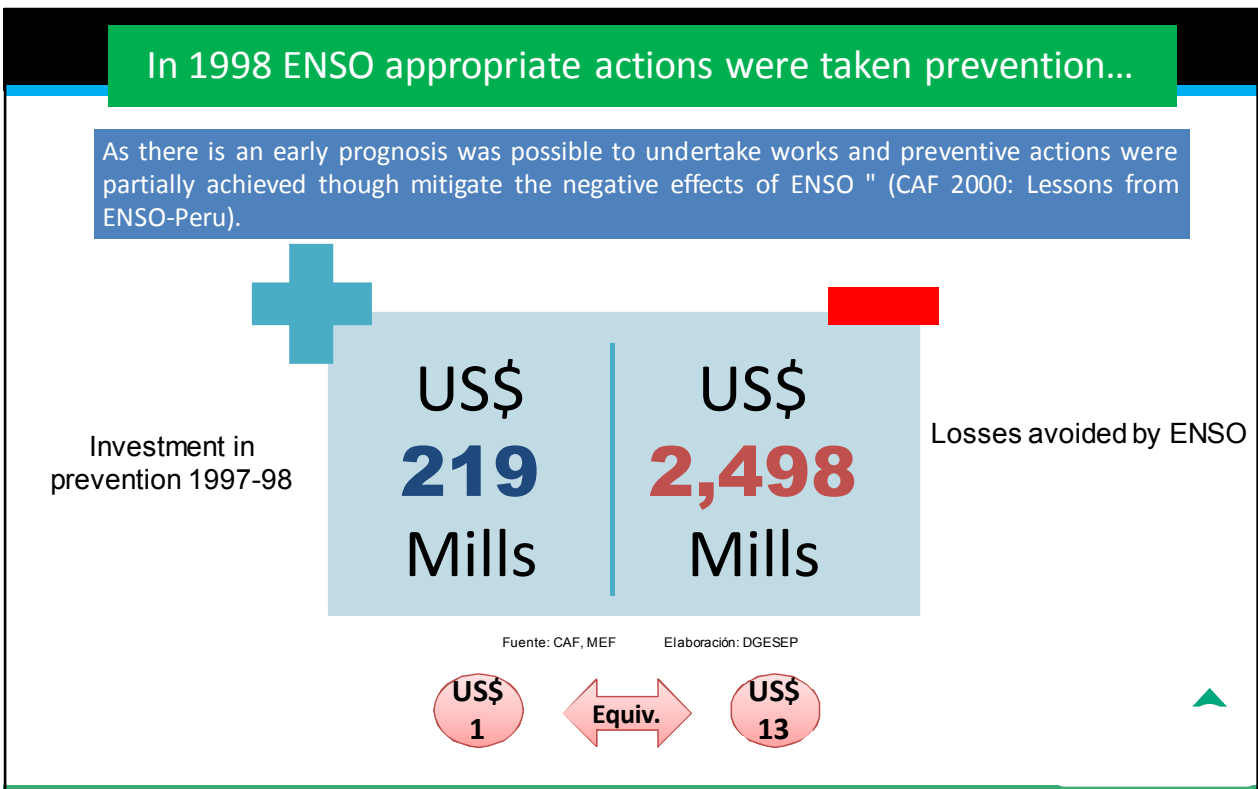
OPERATIONS CENTER 'EL NIÑO' PHENOMENON - COEFEN

Simulation charter floods













ACTIVITIES TO PERFORM - PREVENTION

<p>Recondition, strengthen and clean water infrastructure</p> <div style="border: 1px solid #00A0C9; background-color: #0056B3; color: white; padding: 5px; margin: 5px; text-align: center;">Ministry of Agriculture and Irrigation.</div> <div style="border: 1px solid #00A0C9; background-color: #0056B3; color: white; padding: 5px; margin: 5px; text-align: center;">Ministry of Housing, Construction and Sanitation</div>	<p>Delivery of temporary modules: Housing and classrooms</p> <div style="border: 1px solid #00A0C9; background-color: #0056B3; color: white; padding: 5px; margin: 5px; text-align: center;">Ministry of Housing, Construction and Sanitation</div> <div style="border: 1px solid #00A0C9; background-color: #0056B3; color: white; padding: 5px; margin: 5px; text-align: center;">Ministry of Education</div>	<p>Orienting the farmer about the crops you can perform</p> <div style="border: 1px solid #00A0C9; background-color: #0056B3; color: white; padding: 5px; margin: 5px; text-align: center;">Ministry of Agriculture and Irrigation.</div>	<p>Infrastructure Protection and furnishings: hospitals and schools</p> <div style="border: 1px solid #00A0C9; background-color: #0056B3; color: white; padding: 5px; margin: 5px; text-align: center;">Ministry of Health</div> <div style="border: 1px solid #00A0C9; background-color: #0056B3; color: white; padding: 5px; margin: 5px; text-align: center;">Ministry of Education</div>
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ACTIVITIES TO PERFORM - PREVENTION

Preventive actions to prevent crop pests and people (disease).

Ministry of Agriculture and Irrigation.

Ministry of Health

Providing food for animals that suffer consequences from frost


Ministry of Housing, Construction and Sanitation

Providing food for animals that suffer consequences from frost





Ministry of Agriculture and Irrigation.

Strengthen and maintain national roads, bridges and works of art, and the installation of Bailey bridges.

Ministry of Transports and Communications



ACTIVITIES TO PERFORM - PREVENTION

Volunteer programs

Ministry of Development and Social Inclusion

Ministry of Women and Vulnerable Populations

Support for the distribution of humanitarian aid

Ministry of Interior

Ministry of Women and Vulnerable Populations

Brigades organize search and rescue


Ministry of Interior

Ministry of Defense

Organizing awareness campaigns and guidance to the population

Ministry of Health

Ministry of Education



Preventive actions ENSO 2015 - 2016

**Year 2014
Law 30191**

- Total investment: USD 950 millions aprox.
- Government: USD 450 millions aprox.
- Regional governments: USD 490 millions aprox.

Regular Budget 2015

- They are USD 275 millions aprox. National Government.

Additional demand

- It has USD 525 millions aprox. multisectorial additional demand.



Actividades y Proyectos Ley N° 30191 – Año Fiscal 2014

	PRESUPUESTO	EJECUCIÓN	%
PROYECTOS	S/. 88.8 millones	S/. 74.7 millones	74%
ACTIVIDADES	S/. 98.2 millones	S/. 93.5 millones	95%
TOTAL	S/. 187.0 millones	S/. 168.2 millones	90%

Logros alcanzados:

394.8 kms
Descolmatación de Cauces, Tumbes, Piura, Lambayeque, La Libertad, Ancash, Lima e Ica.

575 Cobertizos
Para Resguardo de Ovinos y Camélidos

1,878 hectáreas
Tratamiento de Cuenca Altas

47,900 Kit
De Asistencia con Insumos para la Actividad Agrícola

8,351 Kit Veterinario
para la Actividad Pecuaria

4,202 Kit Alimentario Suplementario
para la Actividad Pecuaria


133
Proyectos Ejecutados
Para Protección de la Infraestructura de Riego y de áreas de cultivo de las amenazas existentes de huaycos, desbordes e inundaciones en épocas de lluvia



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SECTOR Agriculture and Irrigation




CLEANING RIVERBEDS	CLEANING DRAINS
CLEANING OF GORGES	DYKE REINFORCEMENT



SECTOR Agriculture and Irrigation



MONITORING AND PEST CONTROL

ORIENTATION SOWING

PROVISION OF FODDER FOR CATTLE

MICRORESERVOIRS WATER DRILLING AND HARVEST



SECTOR Agriculture and Irrigation

Prevention activities

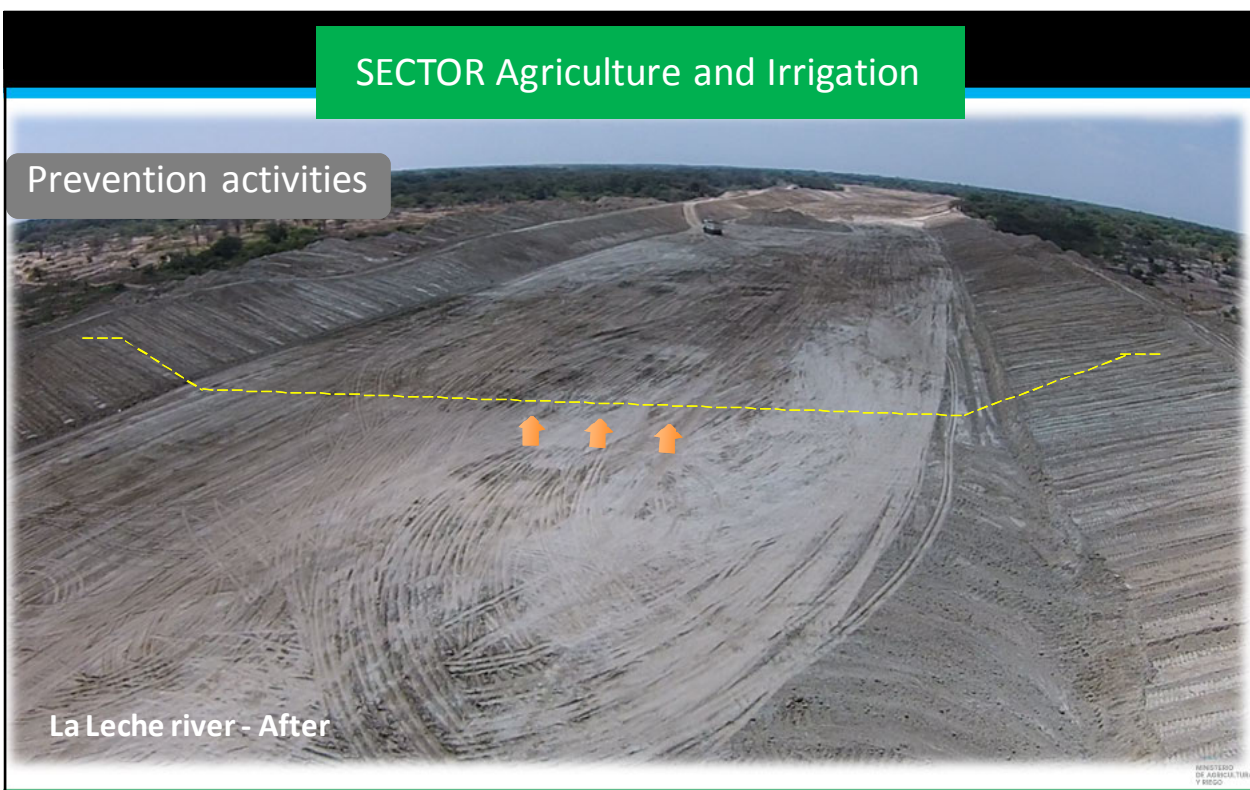
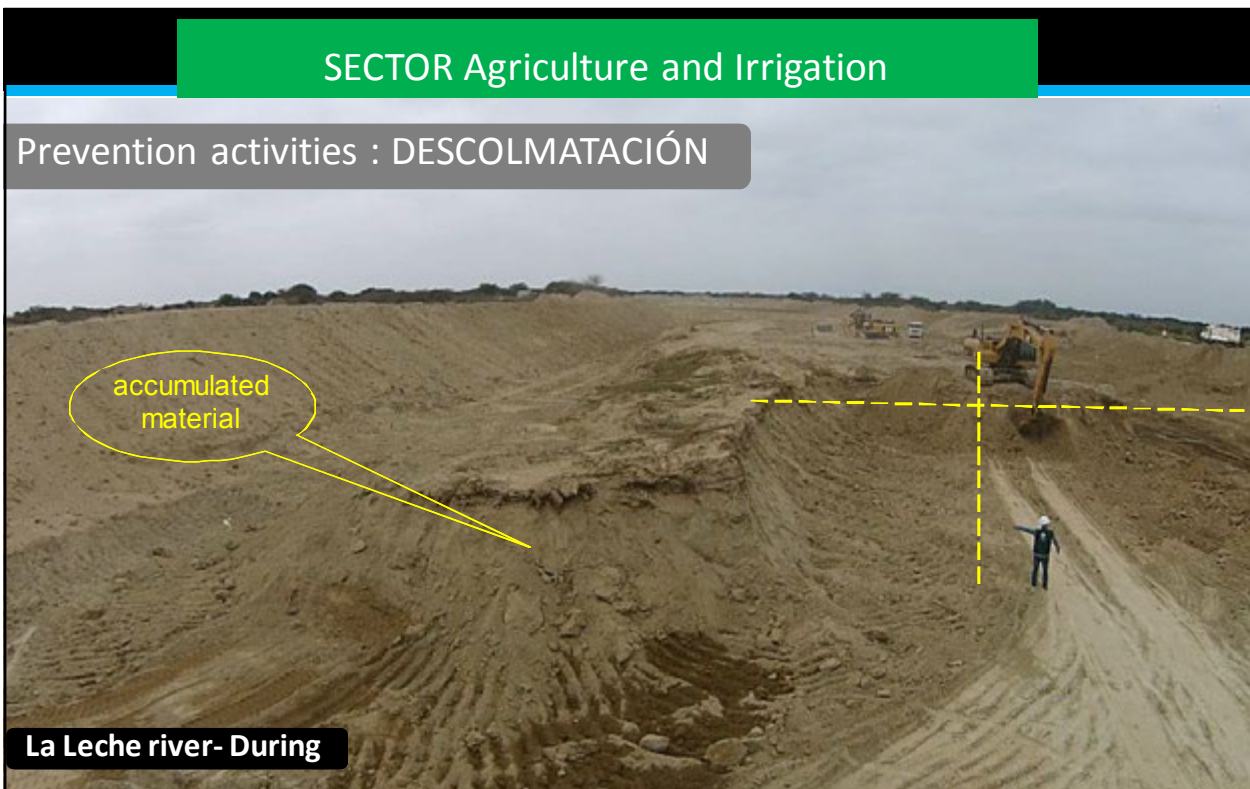
DEPARTAMENTOS	FIRST BLOCK		SECOND BLOCK		THIRD BLOCK		GRAND TOTAL	
	Nro. Activ.	Presup. (S/.)	Nro. Activ.	Presup. (S/.)	Nro. Activ.	Presup. (S/.)	Nro. Activ.	Presup. (S/.)
AMAZONAS	6	2,000,000	19	8,000,000	17	10,119,442	42	20,119,442
ANCASH			11	10,000,000	22	19,139,886	33	29,139,886
AREQUIPA	2	2,000,000	7	6,000,000	6	5,173,582	15	13,173,582
CAJAMARCA	2	2,000,000	9	8,000,000	11	9,697,794	22	19,697,794
CUSCO					3	3,866,024	3	3,866,024
ICA	3	2,000,000	9	9,000,000	13	13,043,057	25	24,043,057
JUNIN					5	3,511,300	5	3,511,300
LA LIBERTAD	53	20,000,000	31	20,000,000	18	12,820,647	102	52,820,647
LAMBAYEQUE	27	35,000,000	14	20,000,000	19	26,346,300	59	81,346,300
LIMA			12	12,000,000	10	15,050,613	21	27,050,613
PIURA	105	60,000,000	12	20,000,000	50	51,775,977	164	131,775,977
PUNO					6	3,908,926	6	3,908,926
SAN MARTIN	8	3,000,000	13	7,000,000	16	9,446,451	37	19,446,451
TUMBES	26	37,000,000	7	20,000,000	15	36,600,000	46	93,600,000
Total general	232	163,000,000	144	140,000,000	211	220,500,000	587	523,499,999

587 activities planned by USD 165 millions

USD 40 million transferred to the GOREs and GOLOs







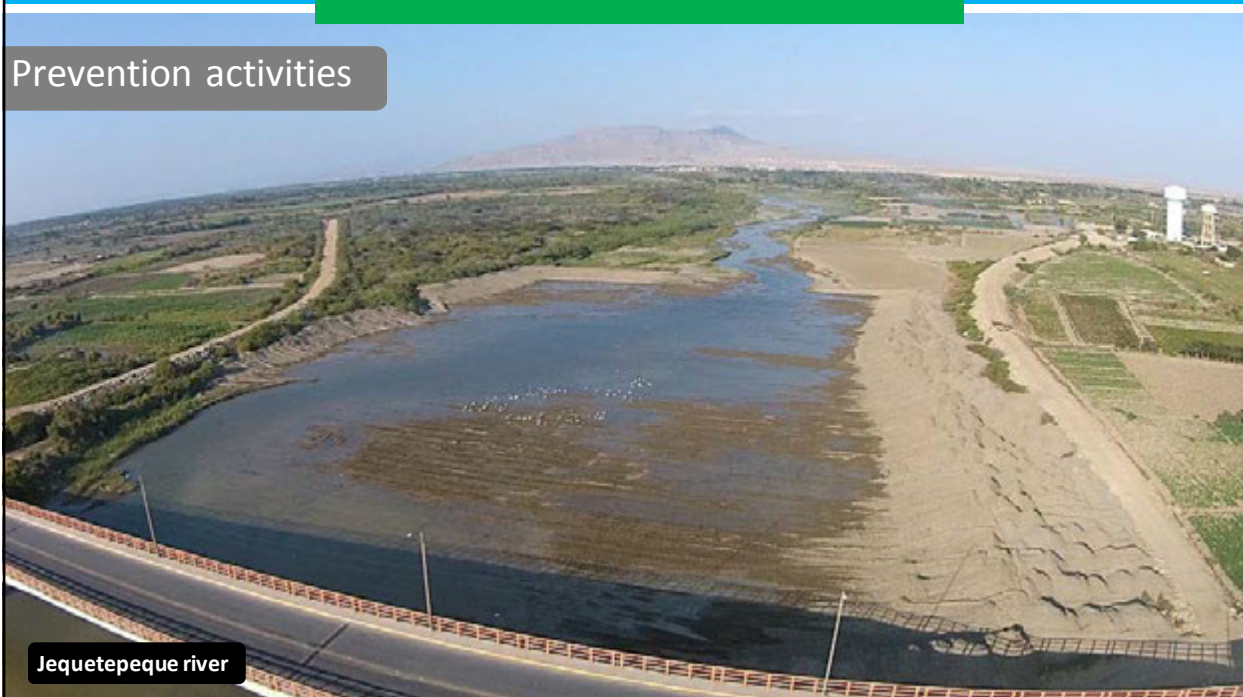
SECTOR Agriculture and Irrigation



La Leche river - After

SECTOR Agriculture and Irrigation

Prevention activities



Jequetepeque river

SECTOR Agriculture and Irrigation

Prevention activities



Siguas river– Lluclla sector

SECTOR Agriculture and Irrigation

Prevention activities



Pisco river– Bernales sector

SECTOR Agriculture and Irrigation

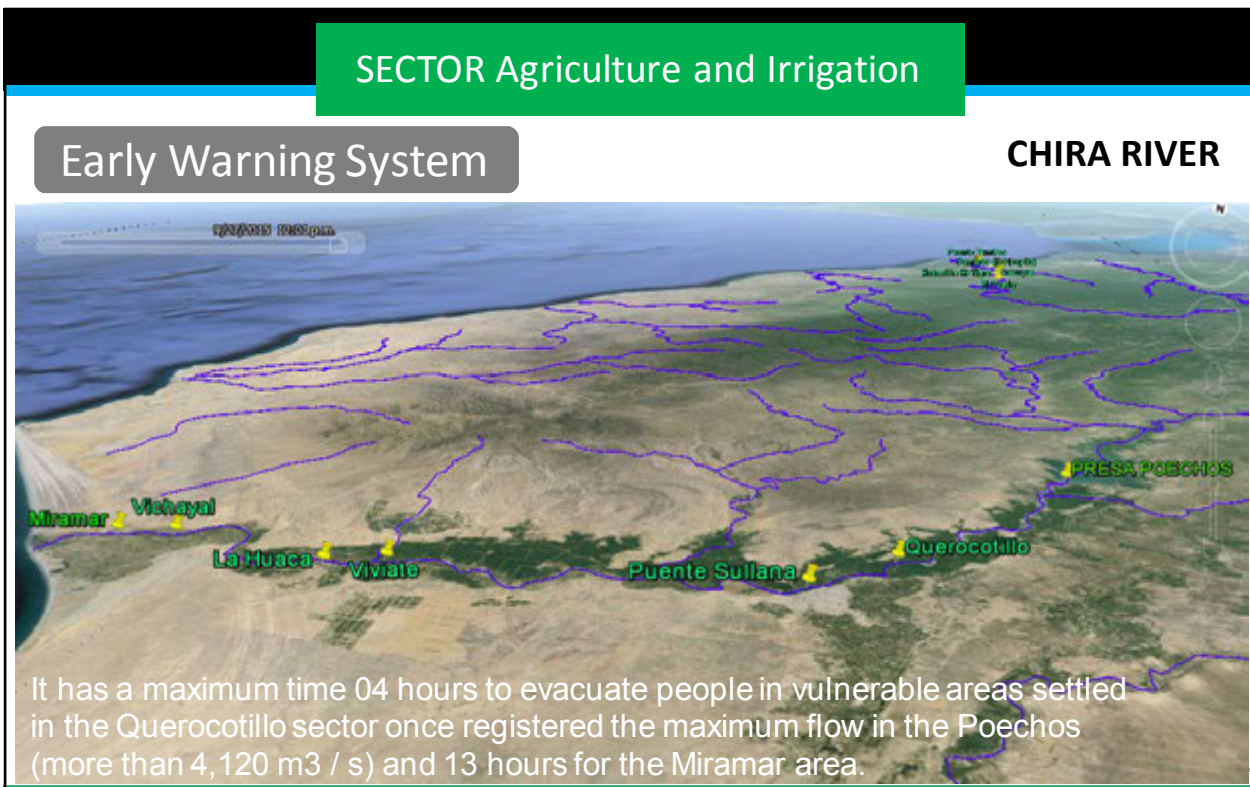
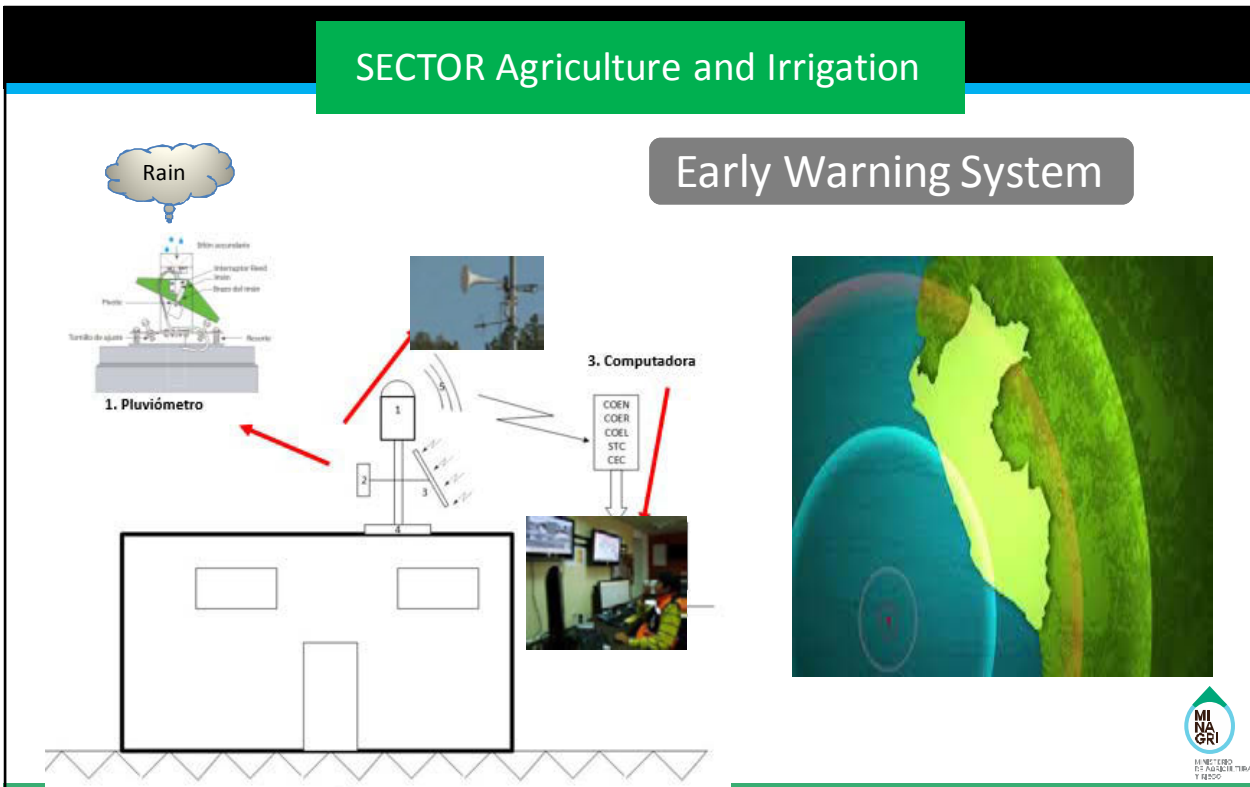
Prevention activities

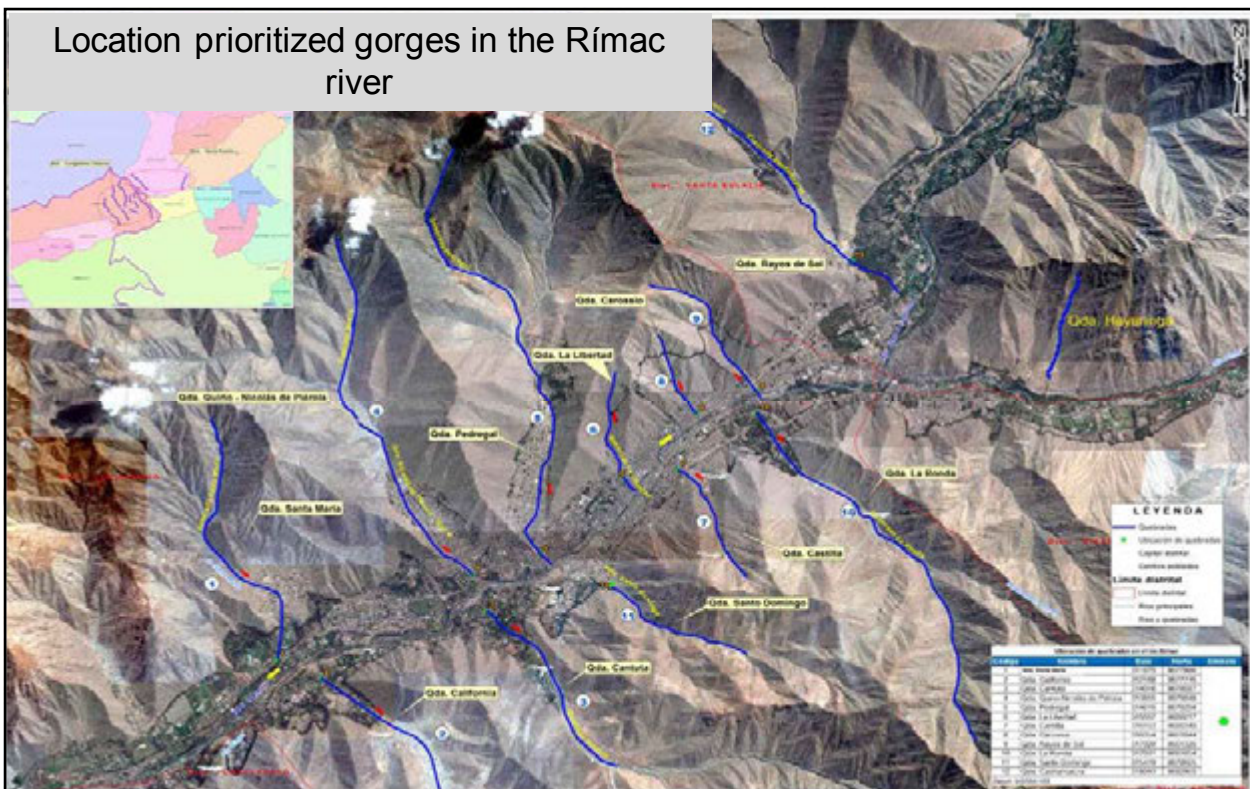


SECTOR Agriculture and Irrigation

Identification of evacuation routes and safe areas







SECTOR Agriculture and Irrigation

EARLY ALERT

LLUVIAS

PLUVIOMETER

RUTA DE EVACUACION

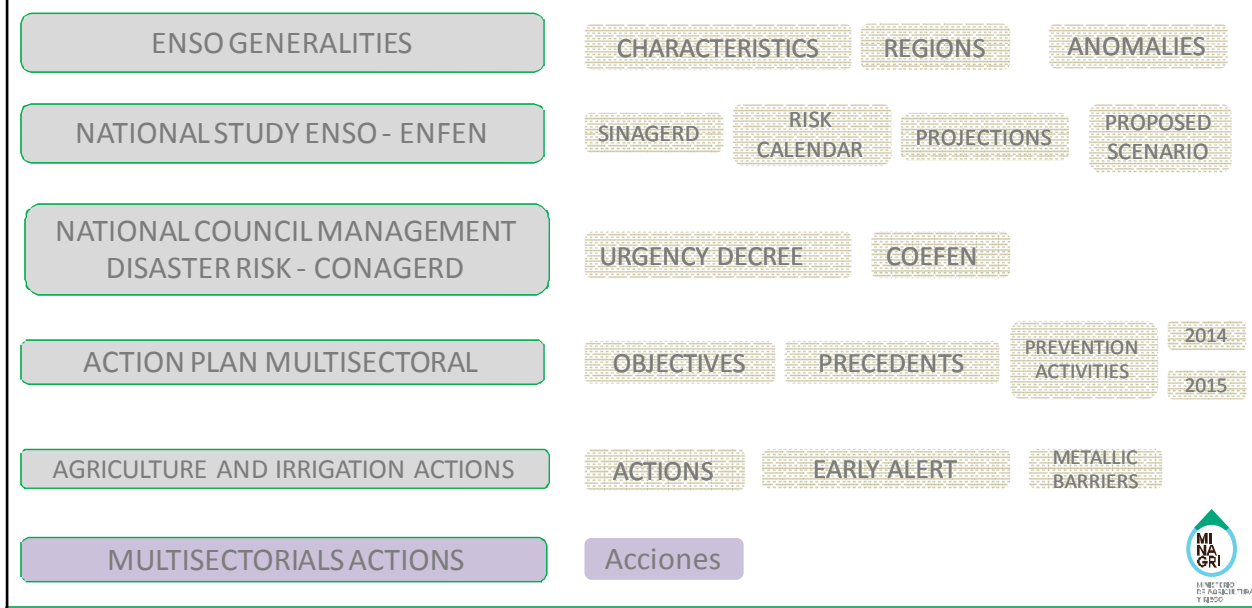


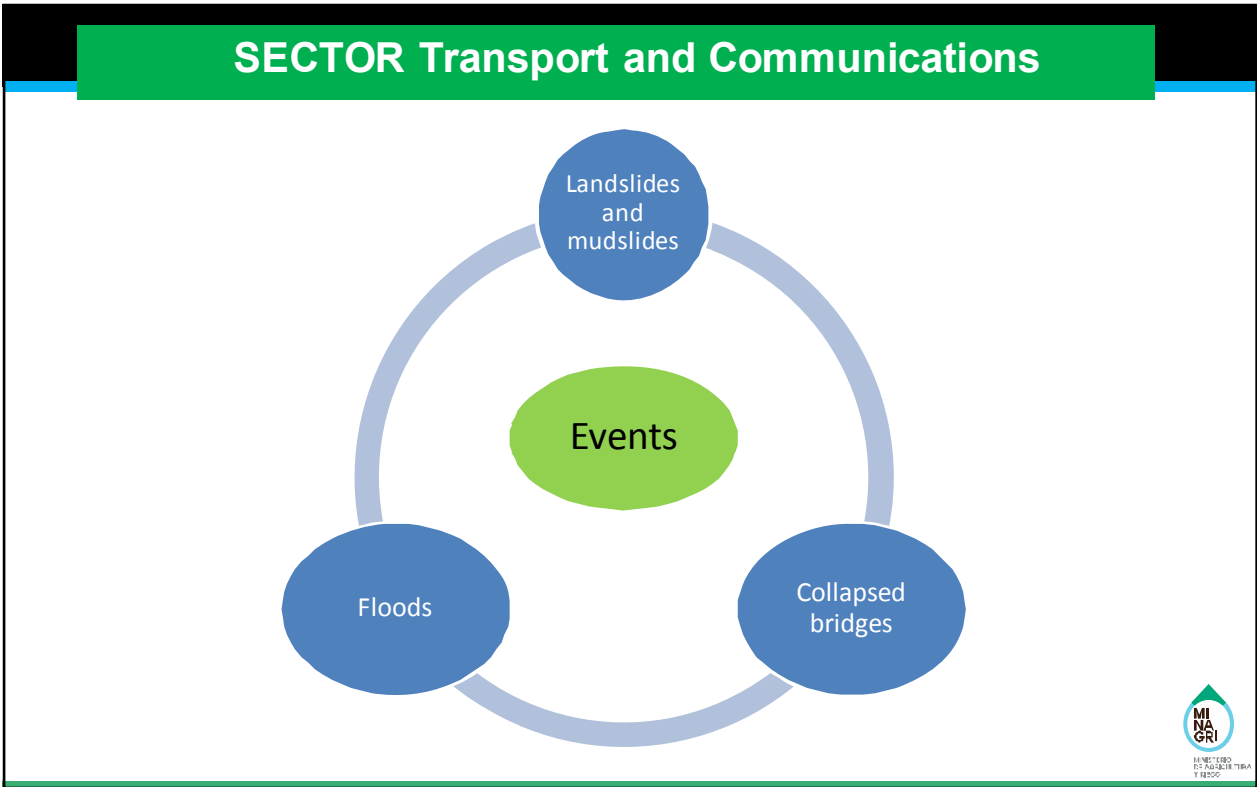


SECTOR Agriculture and Irrigation


'EL NIÑO' PHENOMENON - ENSO

SUMMARY






SECTOR Transport and Communications




LANDSLIDES AND MUDSLIDES



COLLAPSED BRIDGES

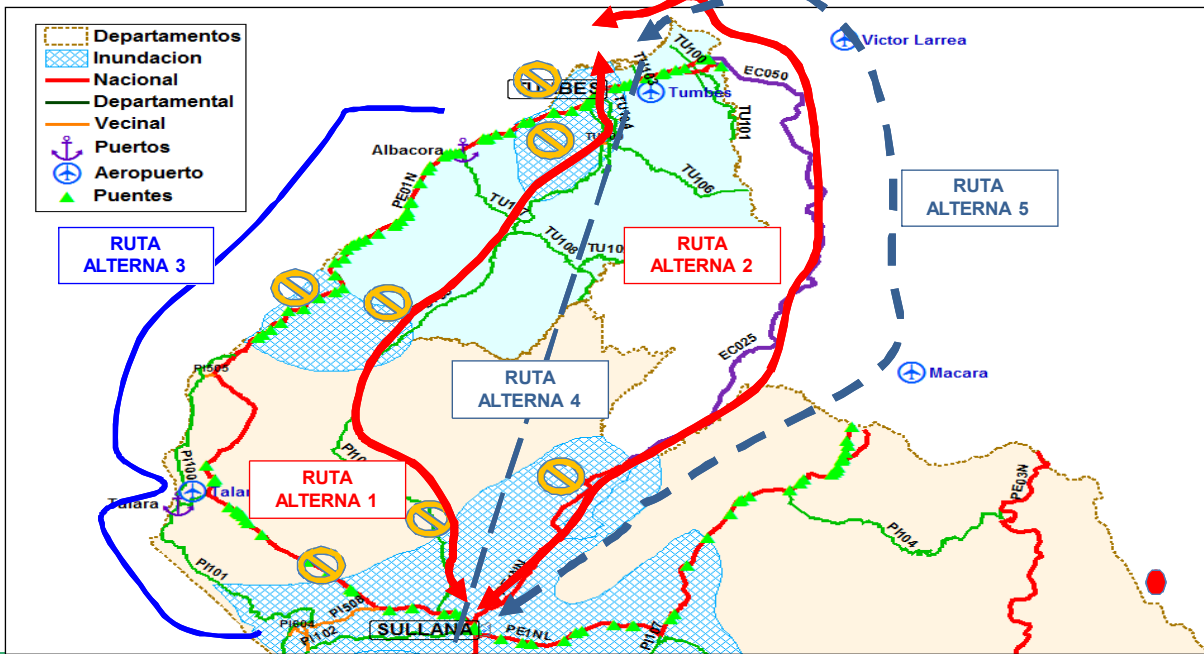
STRATEGY OF INTERVENTION



- C Camp PVN
- C Temporary Camp - PVN
- C Camp contractor service levels
- C Dealer camp

SECTOR Transport and Communications

RUTA 4: SULLANA - TUMBES



SECTOR Housing, Construction and Sanitation



CLEANING DRAINS AND CREEKS IN URBAN AREAS

INSTALLATION WATER TREATMENT PLANTS

ENABLING SYSTEMS FOR DISPOSAL EXCRETA

ENABLING EVACUEES SPACES

MODULES INSTALLATION OF TEMPORARY HOUSING



SECTOR Housing, Construction and Sanitation



SECTOR Housing, Construction and Sanitation

TAMBOS

The Tambos are the platform of services for sectors start their activities in the field. Tambos order to help reverse the current living conditions of rural villages as a result of the occurrence of natural phenomena.



TAMBOS POR DEPARTAMENTOS SEGÚN NIVEL DE RIESGO		
DEPARTAMENTO	TAMBOS INSTALADOS	TAMBOS EN DISTRITOS EN ESTADO DE EMERGENCIA D.S. N° 045-2015-PCM
AMAZONAS	5	3
ANCASH	10	10
APURÍMAC	18	
AREQUIPA	10	9
AYACUCHO	34	
CAJAMARCA	12	10
CUSCO	33	25
HUANCAVELICA	31	
HUÁNUCO	23	
JUNÍN	12	12
LA LIBERTAD	7	6
LORETO	9	
PASCO	7	
PIURA	6	3
PUNO	30	30
TACNA	1	
Total General	248	108



SECTOR Health



INFRASTRUCTURE PROTECTION

VACCINATION AND SPRAYING CAMPAIGNS

ORGANIZATION OF BRIGADES MEDICAL CARE

OUTREACH CAMPAIGNS TO PREVENT DISEASE

INSTALLATION HOSPITAL CAMPAIGN



SECTOR Health

Epidemiological surveillance

Environmental Sanitation



SECTOR Health

CONTINUITY STRATEGIES OF HEALTH FACILITIES AFFECTED

UNIT TYPE SHELTER



UNIT TYPE PANEL - BUILDABLE



Acquisition of 03 hospitals that joined the 03 WITH WHICH counted



SECTOR Education



INFRASTRUCTURE PROTECTION

PROTECTION OF FURNITURE

INSTALLATION OF PREFABRICATED CLASSROOMS

FOCUS ON EDUCATING ENSO



RESCHEDULING SCHOOL YEAR



SECTORS Defense and Interior



EVACUATION OF
PEOPLE IN
DANGER

SUPPORT WITH
HEAVY
MACHINERY

SEARCH AND
RESCUE BRIGADES

SUPPORT FOR THE
DISTRIBUTION OF
HUMANITARIAN
AID

COMBINED
OPERATIONS TO
KEEP PUBLIC
ORDER



SECTOR Women and Vulnerable Populations



VOLUNTEER
PROGRAM

SUPPORT OF
DONATED
HUMANITARIAN
AID



SECTOR Labour



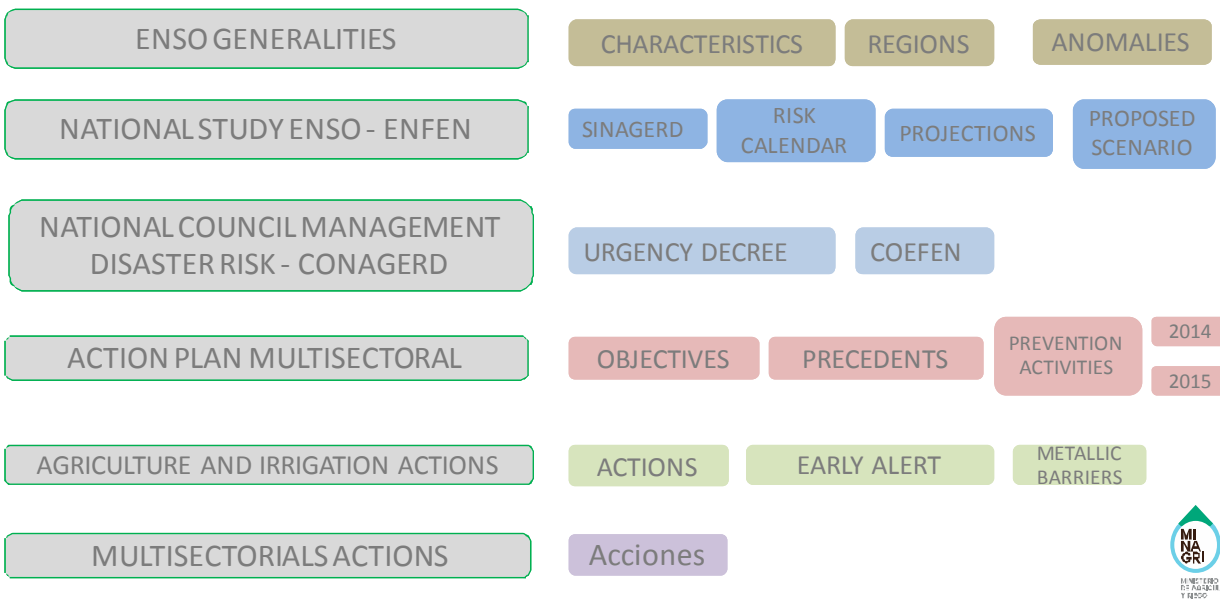
SUPPORT THE WORK OF PREVENTION PROGRAMS WITH TEMPORARY EMPLOYMENT AND YOUTH EMPLOYMENT

SUPPORT THE RECONSTRUCTION WORK WITH THEIR TEMPORARY EMPLOYMENT PROGRAMS AND YOUTH EMPLOYMENT



'EL NIÑO' SOUTHERN OSCILATION - ENSO

SUMMARY



ASIA – PACIFIC ECONOMIC COOPERATION PERÚ - 2016

Iquitos, october 2016

10th
SENIOR DISASTER MANAGEMENT
OFFICIALS FORUM



El Niño
Southern Oscillation
2015 -2016

