Honduras: Early warning system of La Masica Municipality (#392)

Description

In 1997, the implementation of the La Masica Early Warning System (EWS) was launched with the support of the Organization of American States (OEA) and the Honduras Permanent Contingencies Commission (COPECO) through the Flood Vulnerability Reduction and Development of Small Valleys Early Warning System Project.

The Cuero River area was chosen for the implementation of the project since it is vulnerable to floods. More so, its rural population was unprotected from the impact of such natural phenomena as the focus was only based on evacuation at the when floods occurred in the basin's lower coastal zone.

Subsequently, work was continued on the basin through the Project by Strengthening Local Structures and Early Warning Systems (FEMID) of the German Technical Cooperation (GTZ) which consolidates the technical and social functions of the EWS. This also helps in developing the political, economic, technical and community sustainability of the system and further supports the development of models in other municipalities. The process was developed in three phases, and its last phase was concluded in 2003. The EWS area of influence is made up of approximately 30 small villages located in the high and low regions of the basin with an approximate population of 25,000 inhabitants that benefit directly and indirectly from the system.

Action taken

In 1995, the OEA's initiative for implementing the Community EWS´s in Honduras was initiated and was presented to and accepted by COPECO. These systems were first implemented in the Lean River basin located in the Arizona municipality since it met the requirements established by the project. This was the project's first phase which was successful upon initial implementation.

The OEA initiated a second phase with the implementation of the EWS - La Masica, located in the geographical unit of the Cuero River basin. The focus was on designing and executing social organization training, installation and teaching on the use of the rain gauges and scales as well as the installation of radios together with COPECO. Subsequently, the GTZ through the FEMID continued with the implementation of the EWS in La Masica as part of the Project for Strengthening Local Structures and Early Warning Systems (RELSAT). This project was financed by the Humanitarian Office of the European Economic Community. The office's work was in Central America and the Central American Natural Disaster Prevention Center was responsible for regional coordination. The main achievement of the RELSAT in the EWS - La Masica was the consolidation of technical and social organization through training and awareness-raising activities carried out from November 1998 to December 1999.

Lessons Learned

- In future EWS´s, special social training should be provided in order to form a leader group that promotes and consolidates the system's self-sufficiency.
- The EWS´s should be implemented as multiple warning systems in order to obtain greater social and economic benefits from the system.

- The EWS is successful when it has resulted in an evolution from a social organization of improvisation to a culture of preparedness and warning response.

Contact

Roberto Dimas Alonzo, Tegucigalpa, M.D.C, Honduras C.A.
+504-2210805
+504-235-7683
alonzomercado@hotmail.cm

For tools B1.09, B1.11, B2.02, C1.01

Main Text

Description

The Cuero River basin, where the community early warning system is located is found within the municipal territory of the La Masica municipality which composes 69% of the territory. The basin is located in the central region of the Honduran Atlantic coast.

The La Másica municipality borders the Caribbean Sea and is continually exposed to a series of meteorological events during the rainy season among which are hurricanes, tropical storms, eastern fronts and cold fronts. These generate intense rains during a period of ten months on average a year. The result is recurrent floods every two years in the Cuero River basin and in the municipality in general. When there are intense rains, it leads to rapid rise of the river's level in mountainous zones. This is due to the meteorological situation as well as the topographical characteristics of the Cuero River basin which is elongated and integrated in both a flat and well-defined steep mountainous coastal zone, generating large increases in the river's water level.

The occurrence of serious floods on the coastal zone contingent to the river has led to damages for the local communities in the past. The end result is the deterioration or destruction of economic means of survival i.e. causing damage to cattle farms that are dedicated to milk production. It should be noted that the Cuero River transports a substantial quantity of sediment that leading to reduction of its depths which in turn increases water levels in neighboring areas which become vulnerable to floods.

History of the Early Warning System's Implementation

In 1995, the OEA's initiative for implementing the Community EWS´s in Honduras was initiated and was presented to and accepted by COPECO. These systems were first implemented in the Lean River basin located in the Arizona municipality since it met the requirements established by the project. This was the project's first phase which was successful upon initial implementation.

The OEA initiated a second phase with the implementation of the EWS - La Masica, located in the geographical unit of the Cuero River basin. The focus was on designing and executing social organization training, installation and teaching on the use of the rain gauges and scales as well as the installation of radios together with COPECO. Subsequently, the GTZ through the FEMID continued with the implementation of the EWS in La Masica as part of the Project for Strengthening Local Structures and Early Warning Systems (RELSAT). This project was financed by the Humanitarian Office of the European Economic Community (ECHO). The office's work was in Central America and the Central American Natural Disaster Prevention Center (CEPREDENAC) was responsible for regional coordination. The main achievement of the RELSAT in the EWS - La Masica was the consolidation of technical and social organization through training and awareness-raising activities carried out from November 1998 to December 1999.

After the RELSAT was concluded, the need to continue the consolidation of the EWS for La Másica municipality's civil society was evident. To do this, a proposal was developed for FEMID/GTZ and named the Early Warning System Municipal Program (PROMSAT). It was approved and executed from 2000-2001. The main achievement of this program was gaining and consolidation of political, economic, technical, educational and social sustainability for the EWS as well as the de-politicizing of the system.

As a result of the impacts of tropical storm Michelle in the municipality in November 2001, the La Másica civil society's leader group prepared and presented a proposal to rehabilitate the municipality's damaged infrastructure. This proposal was expanded by GTZ in order to support the rehabilitation of fiscal works affected within the geographic context of the Municipal Association of downtown Atlántida (MAMUCA), that covers La Masica and four neighboring municipalities. The approved project was called PROMAMUCA and included the development of the Intermunicipal Program for Early Warning Systems (PRINSA) and with the main objective being to continue the consolidation of the EWS´s in operation and to implement new EWS´s. The execution of the new EWS´s occurred in the rest of the municipalities which lack a community early warning system and which have similar flooding problems, but which are generated by other rivers located in different basins than that of the Cuero River's basin.

The execution of PROMAMUCA lasted one year and concluded in March 2003. Its main achievement was the replication of the EWS - La Masica in neighboring municipalities. This was achieved through the existent technical and social capacity in the EWS - La Masica. During the implementation, consolidation and follow up of the EWS - La Masica project lasted from 1997-2002 and besides the municipal mayor's office has been managed by three different Municipal Corporations. The project's implementation and follow up was not affected despite the political changes that took place. A key factor was that the Leader Group of La Masica's civil society held meetings with popular election candidates before the election with the goal of explaining the EWS's importance for the population and the need to maintain the EWS's political and economic support. Likewise the implementation of the EWS was initiated in the San Juan community located within the La Masica municipality. Its promotion and execution has been carried out by the civil society Leader Group that participated in the implementation of the EWS for the Cuero River.

Early Warning System Beneficiaries

The EWS's social and technical organization's area of influence directly and indirectly benefits all the La Masica's municipality's population of approximately 25,000 inhabitants. Furthermore, it is used for social goals such as requests for help for transportation of the infirm, vaccination campaigns and the protection of 12000 heads of cattle. Cattle-rearing for milk production is the main economic contributor in the area.

Civil Society Leader Group

The initial selection process for local actors that have supported the EWS's implementation has been a relevant factor of the project as they were chosen at high municipal levels and their relevant performance and social service track record in the municipality were taken into account. These conditions resulted in the natural development of a Leader Group during the project's development. Presently, this is still maintained at a volunteer level within the framework of the Municipality's Emergency Commission (CODEM) and the EWS. This group supported the generation and consolidation of the EWS's self-sustainability in the political, economic, technical, educational and community realms. Additionally, it has prepared, managed and executed a proposal for the system's consolidation and follow up. These individuals have also participated in technology transfers to other municipalities in Honduras and at an international level.

The role of community and municipal participation

During the project's implementation, municipal and community participation has had two phases: For the period between 1997 and 1999, these bodies were receptors for the planning process and also active participants in the EWS training process carried out by national and international organizations. During 2000-2002, they were active in the planning and execution process for EWS's consolidation and self-sustainability and for the technology transfer to other municipalities at a national and international level.

It is important to mention that the population has maintained constant pressure so that the system is maintained in permanent operation and supports it through a solid social volunteer system. This is a reflection of the EWS's success which is the social empowerment of the EWS through the municipality's population. That is what the population considers it part of their daily lives.

EWS Operations

The functioning of EWS is based on the collection and analysis of river and precipitation data obtained through rain gauges. Also the transmission of data through radio communications managed by volunteers who are responsible for initiating the dissemination of the warnings through all available means at the moment as the alert is activated. Radio communications are carried our strictly within the Cuero River's basin area with the goal of sending flood warnings and communicating about other social ends.

Nature has provided the opportunity to test the effectiveness and technical and social functioning of the system through the direct or indirect impact of various meteorological phenomena of great intensity such as with the storm and hurricane Michelle in 2001. This natural meteorological event has partly resulted in the development of solid social empowerment for the system on the part of communities and civil society in general since it has produced tangible benefits in a very short time. This empowerment has generated social responsibility which has created and consolidated a solid social volunteer network defined in two areas of the Masica municipality's civil society. The radio operators, scale readers, rain gauges and Leader Group have supported the development of the system's self-sustainability.

The success of the EWS's functioning is defined by three main areas:

- Internally in the municipality: better technical and social organization for the management of emergencies influenced by meteorological phenomena that cause intense rains. In addition, the EWS supported the development of a solid social consciousness in the municipality and helped it move towards local risk management. In emergency situations, the EWS has become a critical juncture for human solidarity among the inhabitants of the basin's high and low areas.
- At a national level: The creation of technical and social capacity developed in order to replicate the EWS in other municipalities.
- At an international level: community experience exchanges about lessons learned with the goal of transferring knowledge so that other similar projects can be executed with success.

The role of the Municipal Corporation

The EWS is included within the Municipality's organizational chart. In 1999, the municipality assigned an annual budget for the EWS for its maintenance and operations, and in 2002 it increased its annual allocation by 66%. Since 1999, the EWS and CODEM programs have had a full-time staff. The staff functions are: a) receipt of daily information on precipitation and river levels b) document updating to reflect current data including those generated by the Municipal Emergency Committee and the Local Emergency Committees.

Initially, the main actors for the project's implementation were the OEA and COPECO, but at the end of 2002 after a five-year process, it was concluded that those with key roles were the Municipal Corporation, the civil society's Leader Group and the community population in monitoring and response zones.

Inclusion of the EWS in the municipality's formal education system

As of 1999, La Masica's civil society added risk management and the importance and functioning of the EWS as topics within the standard plan of study for the Undergraduate and Social Promotion program since some of the professors are part of the Leader Group and CODEM. This is financed by funds from the Gonzalo G. Rodríguez Institute and CODEM. After the training, the students in their final year of the Undergraduate on Social Promotion program transfer the acquired knowledge in risk management. The importance and functioning of the EWS for the La Masica Municipality communities through social field practice that lasts three months. In the entire northern zone of Honduras there are only two institutes whose official programs address the development of the Undergraduate programme on Social Promotion degree whose objective is to prepare individuals to work in rural areas on the topics of planning and the development of social projects. However, in the national arena, only the institute with an office in La Masica has this kind of permanent training for final year students in the Undergraduate on Social Promotion program.

Secondary support for the EWS

Rural telephone service represents decisive support for the EWS. It is through the national telephone service that CODEM and the central EWS office are able to have access to national information centers. The expansion of rural telephone service coverage in flood areas and in mountainous zones will be additional support that the Municipal Corporation could provide the EWS.

Reforestation Project

In regards to forest protection in the high areas of the Cuero River's basin, an experimental project called Certification of Forest Plantations in the Atlantic Coast of Honduras is being implemented. It consists of the submission of certificates to producers who own forest areas and requires them to have legal permission to cut their trees in order to obtain an economic benefit from their future use. The objective of the certification is to encourage producers to reforest high areas of the basin and take care of the trees until they are available for cutting and wood production, either for domestic or commercial uses. The Honduran Corporation of Forest Development (AFE-COHDEFOR) is the governmental institution responsible of issuing plantation certificates. The project execution is under the Honduran Foundation of Agriculture Research (FHIA). It is worth mentioning that certificates are not awarded in areas next to water sources.

Conclusions

Social and Educational

- The EWS implementation has generated a sense of unity, identification and social responsibility for the inhabitants of the Cuero River basin. The success of this project can be replicated for the development of other similar projects in the entire basin geographic area. For instance reforestation and conservation projects.
- The EWS implementation has changed the mentality of the social organization of inhabitants located in high-risk flood areas. Before the implementation of the EWS, their organization was based on the improvisation of initiating the population's response to an emergency when there was flooding in the low area of the Cuero River. Currently, the people are conscious since the response and attention to the alert occurs within a social organization. It is also properly developed through training and field experience obtained by analyzing the impacts of meteorological events.
- The EWS was initially designed, implemented and functioned as a flood warning system for the low areas of the basin but it is currently used for social ends due to necessity and as part of the population's social evolution. As a matter of fact, it is used for convening the population for vaccination campaigns. In addition, it provides alert for the population concentrated in mountainous zones where intense

rains can cause damage to access roads in their respective communities. Coupled with the above, a prevention culture has successfully been nurtured through the EWS in the Municipality's own culture and had addressed social, political, educational and in economic areas as well.

- The combination of technical capacity and social organization coupled with the proven effectiveness of the system that relies on easily maintaned technology and assimilation by the population, has created and developed a solid social volunteer system which is also efficient and permanent. It also benefits from a sense of responsibility on behalf of the inhabitants located in monitoring and response zones. This combination of factors has provided a basis for the system's self-sufficiency.
- The Project has helped in the evolution of the social mentality of the municipal authorities and of civil society from the perspective. This has now created a conscious regarding large construction works such as levees and relief channels (whose construction is outside of the economic context of the municipality) are not necessary to save human lives, but that community organization and municipal social development are key.
- Through the initiative of the Leader Group, the topic of risk management and the importance of the EWS for the Municipality have been inserted in the Undergraduate on Social Promotion program since this activity is self-sustaining through the municipality's high school education system and CODEM.
- Manuals and publications accessible to technicians and the general population have been produced on the topic of the EWS´s operated by inhabitants of rural communities.

Political and Self-sustainability

- The Municipal Corporation of political support for the EWS has materialized in a conclusive fashion with a municipality annual budget and especially assigning of a full-time staff person and a permanent physical space in the Mayor's office. In addition, the staff works in conjunction with the CODEM and Local Emergency Committees to supervise the activities for coordination and execution of the EWS.
- The EWS structure is legalized through a municipal agreement in the Municipal Corporation and through the CODEM and the Local Emergency Committees within the geographic context of the Cuero River's basin.
- The project is considered successful because it is self-sustaining. This sucess is a product of the joint and permanent efforts of the stakeholders involved such as: the municipal authorities, the municipality's civil society and international organizations.
- The future evolution of the EWS´s' social organization will be linked to the system's political and economic sustainability because it will depend on future impacts of meteorological events which will determine technical functioning, and, through it, the betterment of its social structure for preparedness and flood response.
- The implementation of this experience has resulted in COPECO's regional and national municipal independence for the development of preparedness and flood warning activities in this basin. Currently there are no normative guidelines for the installation and implementation of EWS on behalf of the national institution

responsible for emergency management. For this reason, standardization is being requested for national organisms with the help of international support.

Technical

- The radio communication infrastructure does not have lightning rods and stabilizing antenna structures used for protection during electrical storms.
- The hydrological study has not been able to be update with the rain data that various recent meteorological phenomena have generated, among which are Hurricane Mitch in 1998, the cold front in January of 1999, and storm Michelle in October of 2001.
- In regards to the climatological infrastructure implemented in the high areas of the Cuero River's geographical unit, a pluviometrical station called San Marcos was installed two years ago. It is located dozens of meters from the Flood Warning Station with the same name. It is not used for emergency support in substitution of this station. There is apparently a lack of knowledge on the use that it could have in the future, but it could be used as a reference for updates to the hydrological study.
- There is limited technical capacity at the EWS decision-making level in regards to the nature, analysis and application of meteorological forecasts that lead to intense rains. In addition, the system is not connected with various synoptic meteorological warning stations for hurricanes and tropical storms, among others, that are located in La Ceiba, Tela, Roatán and Guanaja. These last two are located in inland territory.
- It is important to mention that as a product of the impact of meteorological phenomena that causes intense precipitation, the responsible staff in CODEM and the EWS are not in the habit of placing permanent marks or historic milestones at the field level which indicate "normal" levels and the level of flood waters reached.
- The group in charge of the implementation has been successful in assimilating the technical-social functioning of the Project. This is due to their capabilityt of improving the system's organization and of making it more effective. Similarly, they have detected the necessity of expanding the EWS network for the Cuero River and San Juan Pueblo. A town also located in the La Masica municipality but in another basin. These actions can serve to provide more precise flood warnings.
- The EWS functioning is evaluated by calling on the radio operators on a periodic basis. However, there is no written record of the evaluations post-impact after recurring meteorological events that trigger a flood warnings on behalf of CODEM.

Community technology transfer

- The success of the project has been proven in timely warnings for floods, owed to excellent training provided. This situation has allowed for responsible project staff to provide their consultancy services for the EWS implementation in other municipalities in Honduras. Likewise, the OEA and FEMID/GTZ have included it in future regional projects.
- The EWS - La Masica functions as a model project that has been visited by representatives from Central and South American countries as well as from

Mozambique. The main attraction for visitors is its technical and social functioning in the face of impacts from meteorological phenomena of great importance, as well as its self-sufficiency.

The project's implementation has generated independence with respect to COPECO, for the execution of preparedness activities and flood response at the municipal authority and community levels.

Lessons learned

Social organization, educational, political and self-sustainability

- The creation of a leader group and a society committed to the EWS's functioning, in addition to risk management training, has achieved the permanent introduction of education. This has highlighted the functioning and importance of the EWS in the Undergraduate on Social Promotion Program offered in the city of La Masica.
- The successful implementation of the EWS has created a change in social behavior in the way emergencies caused by intense rains are faced. This occurs through an opportune warning that provides time for saving lives and property. Besides this, part of the project's success is owed to the accompaniment that the German Technical Cooperation (GTZ) has provided EWS since 1997 and to the present time.
- To the degree that the EWS´s are designed and implemented with multi-warning goals, there will be facilitated empowerment for the municipal authorities and civil society in general. The self-sufficiency of the project in the short term will also be ensured since the benefits is more tangible.
- In the implementation of future EWS´s in the respective areas of influence of private company investments, the participation in the self-sufficiency of the EWS´s should be promoted. This can be achieved with the vision that investing in the system will protect company property, generat economic benefits for the company.

Technical

- According to the location of the Project and the population's necessities as a result of the threat and impact of natural phenomena and of those produced by man, multiple warning systems should be designed and implemented. Additionally, the possibility that the EWS´s be interconnected with existing resources outside the basin to support the functions for which they were designed and implemented, should be contemplated.
- It will be of vital importance to identify and adequately promote national staff with the capacity to support the EWS implementation in other municipalities and therefore create permanent technical capacity at national level.
- All the natural and man caused threats that could affect the normal functioning of the system should be contemplated in the design. Corresponding prevention measures should also be implemented with the goal of ensuring the functioning of the system. This will prevent the people from loosing trust which could affect the future self-sustainability of the program as a result of a flaw that could have been prevented in the design.
- It will be important to design, validate and implement a printed tool which indicates the way in which the EWS should function during emergencies. This should also be followed by the preparation, printing and distribution of the strengths and weaknesses

detected so that they can serve as lessons learned in order to improve the functioning and implementation of future EWS´s. This information should be publicly available on the internet by means of a website.

- It will be important, to define and standardize physical, social and economic criteria for the prioritized selection of small valleys for future EWS implementations.
- The effective functioning of the EWS generates meteorological information demand on behalf of the rural population for applications in daily life.

International organizations

- The EWS´s with proven functioning from the social and technical point of view, and with a defined method for their sustainability, should be used as Model Projects for international organizations.
- It is considered convenient to support follow-up activity after the conclusion of the community EWS´s.

Integrated Water Resources Management

A properly organized population via the CODEM, and through the implementation of a Community EWS, can be the social base to support the implementation of Integrated Water Resources Management (IWRM). This will also contribute to the sustainable use of water as well as protecting the population from the impacts generated by extreme phenomena of hydric origins.

References and persons interviewed

Modelo I. Análisis de la Vulnerabilidad e identificación de Medidas de Mitigación; Modulo II Análisis Hidrológicos, Diseño de sistemas de alerta y Medición Hidrológica; Modelo III. Preparación Comunitaria. Organización de Estados Americanos (OEA). 1998.

Experiencias y contribuciones para la preparación ante los desastres naturales en la América Central. Reforzamiento de estructura Locales y Sistemas de Alerta Tempana. (RELSAT) ECHO/CEPREDENAC/Cooperación Técnica Alemana.

Gestión Local de Riesgos en América Central. Lecciones Aprendidas del Proyecto FEMID/GTZ.2000. Impreso por Magna Terra Editores.

Experiencia Centroamericana en Sistemas Comunitaria de Alerta Temprana. CEPREDENAC/ ASDI. 2000.

Manual para el Diseño e Implementación de un Sistema de Alerta Temprana en Cuencas Menores. OEA/ Gobierno de Irlanda. 2001.

Curso sobre Alerta de Inundaciones Valle de Sula. COPECO. Dimas Alonzo. 1998.

Consultoría Estudio de Ubicación de Radios y Sirenas en poblados vulnerable a Inundaciones en el Valle de Sula. GTZ. Dimas Alonzo. 2000.

Interviews

Mr. César Moradel
EWS Collaborator- La Masica
Tel (504) 436-1250
e-mail:moradelii@yahoo.com

Ms. Gina Ciliezar
Ex-Mayor, La Masica Municipality
Tel (504) 436-1015

Mr. Oscar Alcántara
President, La Masica Municipal Emergency Committee
Tel (504) 436-1288 / 436-1146

Mr. Mario Ayala
Vice-Mayor
Tel. (504) 436-1072 / 436-1146

Mr. Aroldo Dubon
Certified Plantations Project
Tel. (504) 441-0379