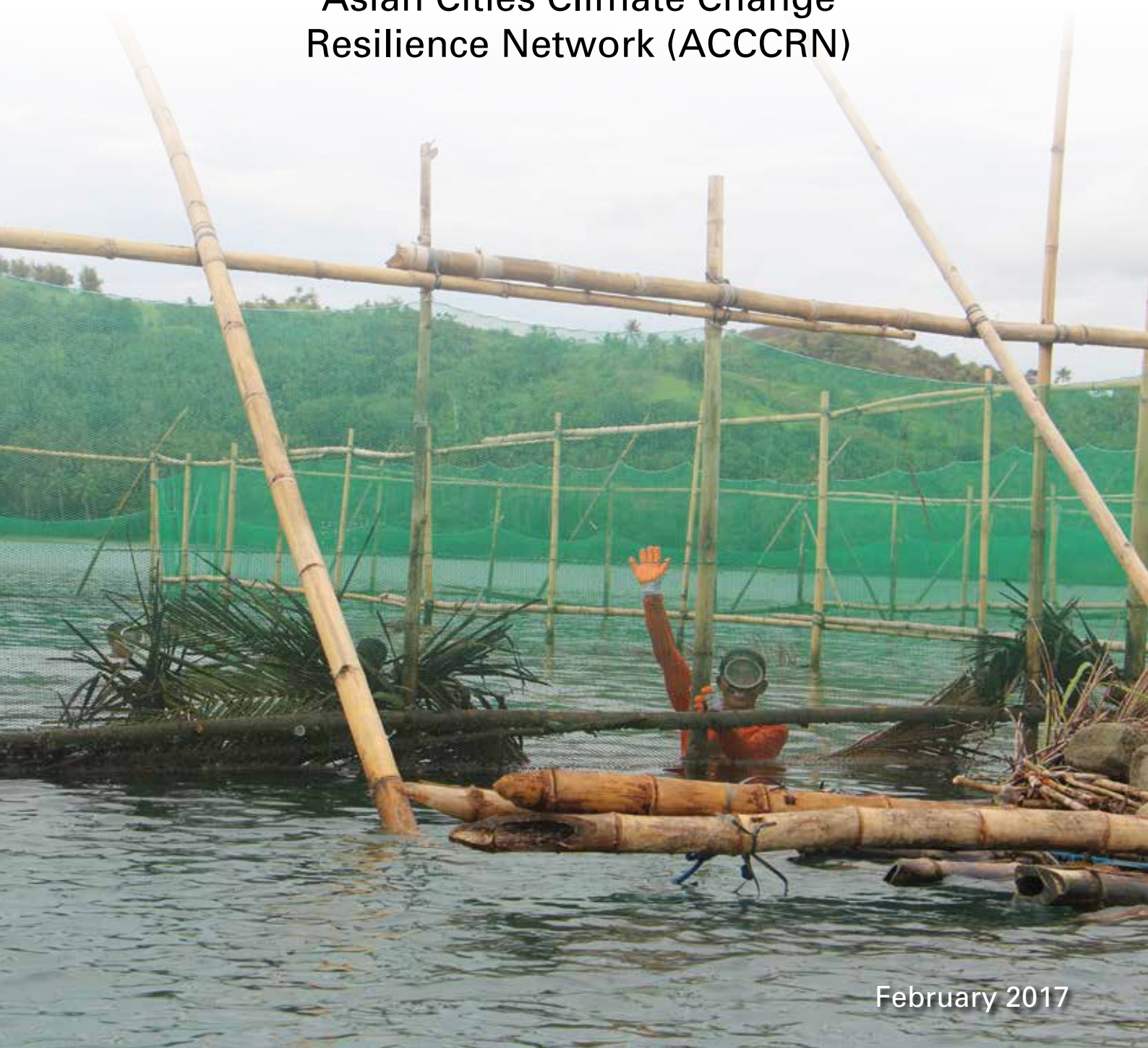


# ICLEI ACCCRN Engagement Building Projects

Asian Cities Climate Change  
Resilience Network (ACCCRN)



February 2017







## Acknowledgements

Thanks to the ICLEI offices in Delhi, Jakarta and Manila for their dedication in supporting many cities to work through the ICLEI ACCCRN process and to formulate these grant proposals. In particular we acknowledge the work of Bedoshruti Sadhukhan, ICLEI South Asia, Irvan Pulungan, ICLEI Indonesia and Ranell Dedicatoria, ICLEI Southeast Asia.

Thanks also to Sue Oliver for collating and editing the grant snapshots and coordinating the production of this booklet.

And finally we acknowledge the dedication and hard work of the climate core teams in all the ICLEI ACCCRN cities and particularly of the Nodal Officers who were responsible for driving the process within their city and maintaining close communications with their ICLEI offices.

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## Foreword

As the momentum to build urban resilience grows across the globe, the efforts of ICLEI across nearly 40 cities in Asia is a vital demonstration that tools and capacities can be rapidly scaled up. In 2012 ICLEI was engaged by the Foundation to undertake an ambitious upscaling phase of the ACCCRN program. The challenge was for ICLEI to take the early learnings and experiences of the first ten ACCCRN cities and develop a less intensive version of the climate resilience planning process which could be applied by many cities, with different capacity levels and in different geographies.

The target was for ICLEI to have applied this process in up to 40 cities in India, Bangladesh, Indonesia and the Philippines. I am very pleased to note that this has resulted in 35 new cities having Resilience Strategies by the end of 2016, with a number of other cities still working through the process. Since the ACCCRN program commenced in 2008, the field of urban climate resilience has grown and matured. Groups such as ICLEI have played a key role in helping to translate the theory of urban resilience building into practical guides and tools suitable for local authorities and communities throughout the developing world. The success of such work, of course, depends on local communities and actors becoming central players and drivers to achieve sustainable resilience tailored to their own contexts.

This Engagement Building small grants program is an important step in ensuring strong local ownership of City Resilience Strategies. While developing and implementing a city resilience plan can be a long-term effort, stakeholders want to test ideas and pilot practical actions along the way. Not only is this helpful in terms of maintaining their engagement, the experimentation reveals valuable insights about the sectors and issues that are most critical in a given context. And of course, if they prove successful, then they have the potential to be rapidly scaled up as the first generation of resilience-building actions that the city is consciously taking. These projects also provide a much-needed evidence base of practical resilience actions that can be measured so that, over time, we can build a more robust model for predicting the economic benefits of resilience – or the resilience dividend – and thereby incentivize more investment in this direction.

I offer my congratulations to the cities and ICLEI for this outstanding achievement.

*Ashvin Dayal*

Associate Vice President and Managing Director  
The Rockefeller Foundation



## About ACCCRN

ACCCRN was launched in 2008, funded by the Rockefeller Foundation, as a US\$59 million 9-year initiative aimed at building climate change resilience of cities in Asia. The first stage involved working with 10 cities in India, Indonesia, Thailand and Vietnam. From 2011 several grants were awarded to ICLEI to extend this program. The ICLEI brief was "to scale up demand and capacity of new cities in Bangladesh, India, Indonesia and the Philippines to plan, finance and execute measures across a range of critical Urban Climate Change Resilience (UCCR) actions, using streamlined tools and methods that enable cities to rapidly adopt UCCR building practice".

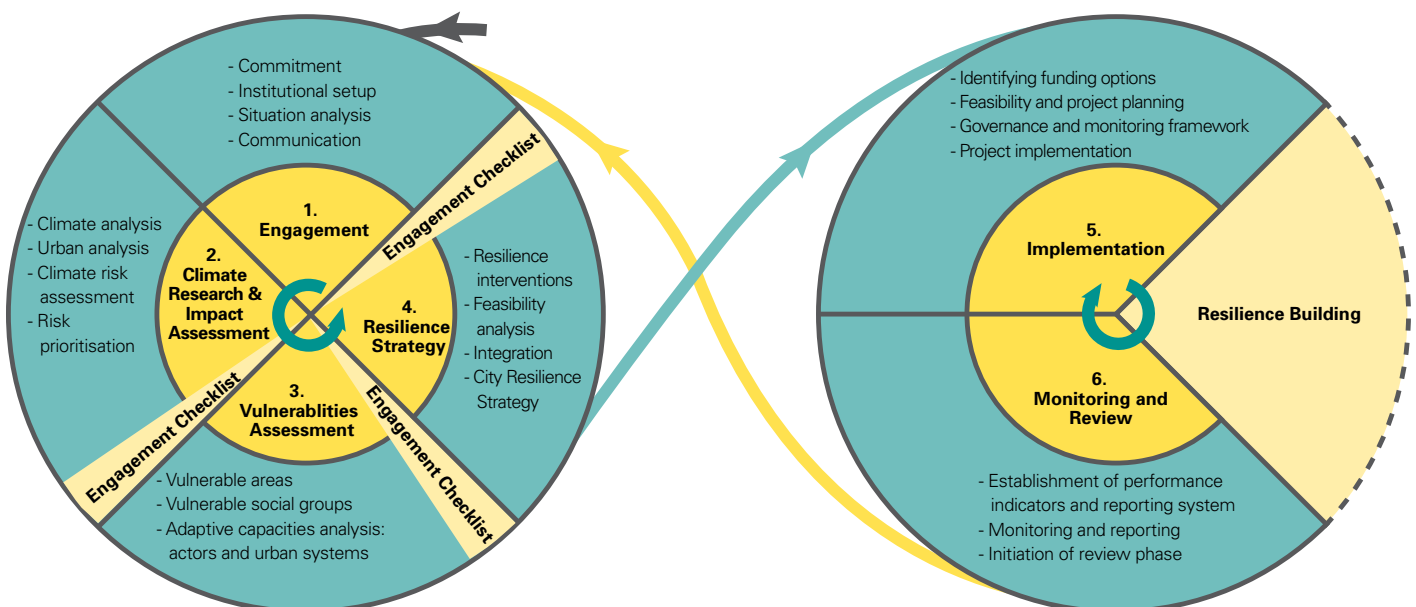
## The ICLEI process

To respond to this challenge, the ICLEI ACCCRN Process (IAP) was developed drawing from the experiences of the early ACCCRN partners and cities, along with other ICLEI toolkits and resources. The process enables local governments to assess their climate risks in the context of urbanization, poverty and vulnerability and formulate corresponding resilience strategies. The IAP comprises four phases:

- Engagement
- Climate Research and Impacts Assessment
- Vulnerabilities Assessment
- City Resilience Strategy

## Engagement Building Grants

Part of the ICLEI brief was to establish a grant-making fund available to the "ICLEI-ACCCRN" cities to deepen engagement and partnerships between various city stakeholders during the early stages of the resilience planning and project identification process. 16 grants were subsequently awarded. This booklet provides a snapshot of each grant project.



## UCCR Action Areas

10 major urban climate change resilience action areas have emerged from ACCCRN city projects. Each snapshot identifies the action areas most prominent in the project.



Land use and planning



Housing and Transport



Drainage, flood and solid waste management



Water demand and conservation systems



Emergency response and EWS



Ecosystems services



Health systems



Livelihoods



Education and capacity building of citizens



Institutional coordination and capacity support

## Contribution to Resilience-building

An assessment is also provided of the extent to which the project contributes to building resilience in the city and community, using the following criteria:

*Redundancy:* A resilient system can function and achieve results through multiple paths or nodes when one fails, when performance is critical. In contrast, a “single best solution,” is not resilient because if this single option fails, the system collapses. Back-up systems, or decentralized nodes for service delivery in a linked network, are preferable.

*Flexibility and diversity:* Essential systems should be able to work under a variety of conditions; they should not be rigid or designed only for one specific situation. Any system will fail if overloaded beyond its capacity, but it should be designed to fail under stress in a safe and predictable way, rather than suddenly and catastrophically.

*Re-organization and Responsiveness:* Under extreme conditions, systems should be able to respond and change to meet unexpected shocks. This requires flexible organizations and access to different kinds of resources (information, skills, equipment, knowledge and experience). It also means a high level of coordination and flexible organizational structures capable of adjusting to new conditions.

*Access to Information:* Resilient systems have mechanisms to learn from and build on experience, so that past mistakes are not repeated and lessons from other cities can be integrated into planning. This requires procedures for monitoring and evaluating performance under stress, and requires multiple sources of knowledge and documentation (strengthening “corporate memory”).





## Some reflections on the projects

### Predominant action areas

While the 16 projects in this catalogue cover all ten action areas, the most prominent are:

- Drainage, floods & solid waste management
- Water demand & conservation systems
- Responsive health systems
- Education & capacity building of citizens

This is probably not surprising as water – too much or not enough – flooding, waste and sanitation underpins the vulnerability of so many communities in developing countries, and are closely tied to the vagaries of climate and weather. And important to note that most of the projects coupled sectoral projects with strong education, communication and capacity-building strategies.

### Co-benefits

Many of the projects deliver multiple benefits and address greenhouse gas emissions as well as reducing climate vulnerabilities. Traditionally the professional field has differentiated between mitigation and adaptation actions, but experience on-the-ground shows that climate vulnerabilities are highly inter-linked and resilience is best built through holistic, cross-cutting action.

### Engagement building and ownership

The ultimate success of programs such as ACCCRN lies in the degree to which the ultimate “victims” or “beneficiaries” take ownership of actions, gain greater understanding of the challenges facing their communities, and have enhanced capacity to manage their future. The purpose of this small grants program was therefore aimed to foster full engagement of the central actors, moreso than to trigger large-scale infrastructure projects.

### Positioning of local governments

While not obvious from these project snapshots, it is important to understand the key role which can be played by local government, but also the limitations of local government. Leadership from Mayors and city administrations is often critical for aggregating and focusing the needs of their communities to develop strategies and programs. But the sustainability of these outcomes depends on the degree to which they are owned by and driven by the community. Mayors may come and go but the community is here for the long haul!

*Steve Gawler*

Regional Director ICLEI Oceania

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## Cities and projects

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|           |                   |   |
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| <b>06</b> | <b>Baguio</b>     | Engaging Communities and the City Government in Addressing Water Security, Sanitation, and Urban Resilience Challenges in Baguio City, Philippines                |
| <b>08</b> | <b>Bogor</b>      | Road Paving Project adapted to Climate Change, Bogor, Indonesia   |
| <b>10</b> | <b>Catbalogan</b> | A resilient and resilience enhancing danggit farming in Catbalogan City, Philippines  |
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| <b>16</b> | <b>Gangtok</b>    | Climate resilient solid waste management infrastructure for Gangtok, India  |
| <b>18</b> | <b>Kurseong</b>   | Revitalizing the existing water catchment areas to improve water quality and quantity downstream and Rehabilitation of Sherpa Busty Jhora, Kurseong, India        |
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| <b>22</b> | <b>Marikina</b>   | Young, Empowered and Service-oriented Filipinos towards Climate Leadership, Disaster Resilience and Responsible Citizen Participation, Marikina City, Philippines |
| <b>24</b> | <b>Mongla</b>     | Improvement of urban drainage system to manage flood risk by incorporating climate change adaptation measures, Mongla, Bangladesh                                 |
| <b>26</b> | <b>Naga</b>       | Space-based Decision Support System (DSS) for Urban Resilience in Naga City, Philippines  |
| <b>28</b> | <b>Nainital</b>   | Mainstreaming the role of ecosystem services in Water Supply of Nainital, India   |
| <b>30</b> | <b>Santa Rosa</b> | Building Capacity for Urban Agriculture in Santa Rosa City, Philippines   |
| <b>32</b> | <b>Shimla</b>     | Rejuvenating traditional water sources to augment water security in Shimla, India   |
| <b>34</b> | <b>Tuguegarao</b> | Hybrid Solar Power System with Integrated Water Harvesting Facility at the People's Gymnasium, Tuguegarao City, Philippines                                       |

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# Baguio

## Project details

**Title of proposed project**

Engaging Communities and the City Government in Addressing Water Security, Sanitation, and Urban Resilience Challenges in Baguio City, Philippines

**Name of organization**

University of the Philippines Baguio (UP Baguio)

**Time Period**

9 months

**Grant Requested**

USD 30,000



## Rationale

With its population expected to expand further in the coming years, Baguio City needs to find innovative and effective ways of ensuring, among other things, water access, water security, and sanitation for its residents and visitors.

UP Baguio's recently completed IIED/ACCCRN-funded study entitled "*Towards Establishing Water Security and Urban Resilience in the City of Baguio*" offers baseline information on the basis of which relevant policy recommendations and possible community-based initiatives have been advanced.

From a research perspective, the UP Baguio study is significant for it offers the most updated and rich information on water insecurity as experienced in the city. From a policy and action perspective, however, the study fails to draw the attention of policymakers, policy implementers, and stakeholders.

It is our hope that this study will pave the way for the implementation, by the Baguio City local government, of sound and informed water security, sanitation-related city policies and the adoption of sustainable, community-based urban resilience building initiatives.

Specifically, the project aims to:

- Bring together various Baguio-based stakeholders, particularly local government officials and community leaders and residents, to assess and validate the findings of our IIED/ACCCRN-funded study; and
- Provide the venue and occasion for stakeholders to consider, explore, identify, formulate, and push for sound and informed community-based solutions and policy recommendations aimed at improving water security and sanitation in Baguio City.



## Project Overview and Outcomes

We expect the following outcomes and achievements after 9 months:

- A publication documenting the conduct of the data presentation and validation activity, including comments and questions of participants and responses of researchers;
- A list of policy recommendations submitted to Baguio City Council and/or to the appropriate Baguio officials or offices; and
- Printed information, education, and communication (IEC) materials on rainwater harvesting, water filtration, and safeguarding water quality.
- Promotion of trust and the creation, if not the strengthening, of actual linkages between Baguio City officials and community leaders and residents.
- Adoption of resilience building initiatives by selected barangays in Baguio City.



## Climate Change Action Areas

As designed, the proposed study directly falls under the category of water demand and conservation systems. It can also contribute significantly to education and capacity building of citizens considering its emphasis on community deliberation and its information, education, and communication (IEC) component. The study contributes to each of the following climate change action areas:



Water demand and conservation systems



Education and capacity building of citizens



Institutional coordination and capacity support

## Contribution to Resilience-building

### Resilience Criteria

*Redundancy:* Considering that the various stakeholders will be expected to participate and each of them will assume key roles in particular initiatives, the proposed study may be seen as consistent with a decentralized approach to building urban resilience. When local government fails to implement resilience building policies, local communities and household residents can still exercise self-reliance and engage in resilient practices. Note, too, that the proposal has veered away from placing too much emphasis on the Baguio Water District's role in ensuring water security in the city.

*Flexibility and diversity:* The proposed study recognizes that there are instances when active government intervention and centralized planning and implementation are needed and there are situations when a more laissez faire-style, decentralized, or non-government-centered approach to a problem would be more beneficial. The proponents of the study are also wary of the unpredictability of climate change. Hence, the consultation dialogues will consider both the possibilities of more rain and less rain in the future.

*Re-organization and Responsiveness:* Since the study seeks greater citizen and local community participation in the planning and implementation of resilience-building initiatives, it also meets this criterion. Apart from sharing the stress of responsibilities among stakeholders, the study recognizes that each stakeholder has a unique set of skills, information, experience, and resources. Maximizing and coordinating the contribution of the stakeholders will be a guiding principle in the consultation dialogues.

*Access to Information:* The study highlights the role of information on rainwater harvesting and water purification, in addition to knowing water quality and safety standards, and other pertinent information. Consistent with the emphasis on access to information, the proposed project will conduct of a citywide survey on water consumption and sanitation at the height of the rainy season.

### “Ecologically Sustainable Development” principle

The proposed study is guided by the principle of ecologically sustainable development – i.e. the promotion of environmentally sustainable practices, and the imperative of promoting urban climate change resilience. It is in fact the conservation of Baguio's ecological system that we seek to promote.

### Do No Harm” principle

It is the welfare and empowerment of Baguio's poorest and most vulnerable households and residents that we seek to uphold in this study, alongside the protection of the ecological integrity of the city.



# Bogor

## Project details

**Title of proposed project:**

Road Paving Project adapted to Climate Change, Bogor, Indonesia

**Name of organization:**

*Forum Kota Sehat Bogor* (Bogor Healthy Citizen Forum)

**Time Period:**

August – November 2016

**Grant Requested:**

USD 1,400



## Rationale

The majority of roads in Bogor City are asphalt with only few roads being equipped with drainage to channel the water. During the rainy season, water run-off erodes the road surface causing flooding in the lower region before flowing into the city's river.

A drainage system analysis and survey conducted by the Kelurahan Sindangrasa's CRS working group found that when it rains, storm water runoff causes flooding in the street in front of the housing area, Sindangrasa Elementary School and the Sindangrasa Community Health Center. Consequently essential city services are affected due to school and health center closures.

Additionally, standing water left behind after flooding becomes breeding grounds for mosquito-borne diseases such as dengue fever.

The proposed project aims to reduce water run off and flooding during heavy rains by strengthening the drainage system with a sustainable paved road. A retention wall will be included and function as a rainwater harvesting facility providing an alternative water source for the citizens of Sindangrasa.

## Project Overview and Outcomes

We expect the following outcomes and achievements after 4 months:

- The construction of environmental-friendly paved road that allows storm water to filter through into a water reservoir.
- The construction of waterways positioned in the centre of the road. Thus, the waterways won't be disturbed by excavation or maintenance of power cables, PDAM (clean water) and gas pipelines. The waterways will be made of bios concrete (30 cm) and reinforced concrete.
- The construction of catchment basin (1,8 x 0,6 x 1 m with 13 units capacity).
- The construction of 'Biopori' absorption holes in the roadside. Biopori holes are adopted to minimize flooding, help channel rainwater runoff back into the ground thus maintaining ground water retention. The biopori is filled with organic waste that serves to trap the water that flows around it and feed it into underground water supplies and plants in the vicinity. This also helps with the weathering of organic waste into compost, which can be used as plant fertilizer.

## Climate Change Action Areas

The impact of climate change in Bogor is likely to trigger an increased risk of flood and a decrease of clean water available to its citizens. The project aims to reduce the risk and affects of floods and drought that frequently happen in this area as well as to decrease the risk of mosquito and water borne illnesses such as dengue and diarrhea.

Flooding in the area is usually severe and limits the mobility of residents to go anywhere including school and their place of work. Additionally, the storm water that seeps into the ground through this facility will increase ground water quality and quantity that can be used for urban farming, thus improving the livelihoods of the people.



Drainage, flood and solid waste management



Water demand and conservation systems



Health systems

## Contribution to Resilience-building

### Resilience Criteria

*Redundancy:* The water harvesting and catchment aspect of the project provides an alternative clean water source for the 50 households of the RW 09 Sindangrasa community, essentially decentralizing the current water management system and providing some redundancy.

*Flexibility and diversity:* While the aim of the project is to reduce flooding it also has the capacity to absorb water into the land and/or reservoir during heavy rains so as to alleviate the affects of droughts during the dry season. The project complements the existing sanitation activities and also contributes to the effort of strengthening the adaptive capacity of the community to the impact of climate change.

*Re-organization and Responsiveness:* A Management team will be responsible for the installation, maintenance and operation of the project and include members of Healthy City Forum (HCF) who reside at the project location. HCF is a non-governmental organization consisting of 50 people, with an aim to realize healthy and sustainable communities.

*Access to Information:* The project intends increase flood and storm water management awareness in the community and its success will serve as a pilot program that can be replicated in other villages.

The outcomes and 'lessons learnt' from the project will feed into the HCF for future decision making.

### "Ecologically Sustainable Development" principle

This installation is built on the existing community road and takes into account the carrying capacity of the environment and does not disturb the ecosystem. It supports educational, health and economic activities of the local people and as well as enhancing its water resources. The technology used in this project is environmentally friendly and developed by the local community. Materials comply with the National Standards (SNI). Raw materials for construction are locally produced so the community doesn't rely on resources from outside the City of Bogor.

### "Do No Harm" principle

The project aims to improve the health of the community, the ecosystem and the environment. It will improve the condition of the soil as well as contribute to the livelihoods of its citizens without any negative consequences.



# Catbalogan

## Project details

|                                   |  |
|-----------------------------------|--|
| <b>Title of proposed project:</b> | A resilient and resilience enhancing danggit farming in Catbalogan City, Philippines |
| <b>Name of organization:</b>      | Eastern Visayas Network of NGOs and POs (EVnet)                                      |
| <b>Time Period:</b>               | 9 months   |
| <b>Grant Requested:</b>           | USD 26,503   |



## Rationale

Catbalogan City has a sizable fisherfolks population<sup>1</sup> and there is a tendency to intensify fishing efforts to compensate for declining catch, thus aggravating over fishing and the degradation of the environment and biodiversity.

The community has traditionally shied away from promoting aquaculture, particularly fish farming, because of two issues: aquaculture's track record of causing pollution and its big capital requirements. Also, the introduction of new livelihood projects have often had feasibility and sustainability issues due to their high dropout rates, and low pay-back rates.

This project aims to develop a campaign to allow the fisherfolks to access a type of aquaculture called "Developmental Aquaculture" (DevAqua) to produce Danggit fish, which addresses the above issues:

- Reduce pollution - *DevAqua* adapts to local conditions the tested *Integrated Multi-trophic Aquaculture* (IMTA) practice developed in Canada, of growing marine flora and fauna around the fish farms to eat up the pollution-causing fish manure, rotting food wastes and other organic/inorganic debris generated by fish farms.
- Cut costs - it grows only native herbivore fishes, which can be fed with the algae that they eat in the wilds<sup>2</sup> and can spawn in captivity, to lower the expense of feed and seedlings.
- Feasibility and sustainability - the scheme is to train the fisherfolks through an apprenticeship for one production cycle, then provide them with fish pens initially on a "usufruct" basis i.e. they use these and get the earnings, then ownership of the fish pen is transferred to them only when they have fully paid for it. The deboning of the *danggit*, to produce "boneless *danggit*" would produce additional revenue.

## Project Overview and Outcomes

We expect the following achievements and outcomes after 9 months:

- Two fish pens are set up and divided into ten compartments. The first pen operated by the Project (POF) is the training/apprenticeship venue, and the second pen is loaned on a "usufruct" basis to the first batch of participants.
- Two batches of fisherfolks, with ten members per batch, go through the apprenticeship.
- The initial product is dried "boneless *danggit*" and the raw material fish is harvestable in four months. Thus the POF has two harvests.
- The POF's earnings from the 2 harvests are enough to set up the fish pen for the second batch after the 9-month project duration. Thereafter, POF earnings and payments of previous batches can finance the training and fish pens of succeeding batches.

<sup>1</sup> Catbalogan City's 2,882 fisherfolks constitute at least 40% of the populations of its barangays outside the city proper and its suburbs.

<sup>2</sup> In mainstream aquaculture, the cost of feeds usually constitutes about 70% of their operating capital

## Climate Change Action Areas

Climate change is expected to cause more frequent, extreme weather. While having adverse impacts on land based agricultural and livestock productions in poor communities, *DevAqua* is more impervious to frequent occurrences of floods and droughts making communities more adaptable to climate change.



Emergency response and EWS

*DevAqua* can create adoptable livelihoods that have the lowest greenhouse gas (GHG) emissions of all alternatives for producing protein for human consumption. The other sources of protein are soya, poultry, and livestock. Soya production requires fertilizers and pesticides and producing and transporting these inputs, has significant GHG emissions. Also, the larger number of fisherfolks engaging in this livelihood, the less the fishing efforts will be, thus allowing fish populations to regenerate.



Ecosystems services



Livelihoods

- The apprenticeship curriculum, the fish-farming manual to guide the beneficiaries, and the usufruct-lending policies are refined based on the experiences from two production cycles.
- The Research and Development efforts of the project will provide initial findings on the comparative profitability of various stocking densities of *danggit* and on assessing whether two other native herbivore species that can also be similarly processed.

## Contribution to Resilience-building

### Resilience Criteria

**Redundancy:** Initially, the project will grow the *danggit* species only, closely followed by two more robust commercial species. In addition, some species of marketable sea cucumbers and seashells will also be grown to “eat up” the pollutants generated by the fish farm. This makes available to the fishfolk several marketable products in the case that one fails.

The fish farms will also ensure the survival of the species by maintaining the breeders. Unlike their wild counterparts, the breeders in captivity are safe from predators and over fishing.

**Flexibility and Diversity:** The main products are flexible as commodities, as they can be harvested at any point from the time they are juveniles (for boneless *danggit*) to their maturity (as fresh fish) with feeding costs a non-issue. The fish farmers are thus better off as they can harvest only when the market conditions are favorable.

**Reorganization and Responsiveness:** *DevAqua* fares better against typhoons compared to other food production systems because it can minimize its loses by harvesting at any time (from juveniles to mature fish stocks) and removing the nets from the sea when there is an impending typhoon. The nets that can be salvaged at full or near full value, before the typhoon. Also, any fish stocks that cannot be harvested are added to the wild population of their species.

### “Ecologically Sustainable Development” principle

Capture fisheries require fuelled fishing boats to travel increasing distances due to the declining fish populations of the coastal waters. By maintaining breeders and enhancing the fish population of the municipal waters we lower energy consumption for ourselves as well as capture fisheries in the area.

### “Do No Harm” principle

One of the major criticisms against mainstream aquaculture enterprises is that they cause pollution to the sea due to their feed wastes (uneaten feeds that eventually rot) and fish manures. In the case of the *DevAqua* project:

- Algae continues to grow until eaten hence they do not become pollutants
- Seaweeds/seagrasses and seashells will be grown around the fish pens to absorb floating pollutants that are inorganic and organic, respectively, and
- Sea cucumbers will be grown on the sea floor below to eat the pollutants that sink

Additionally, the project cultures only herbivores that are fed algae. It does not use lower-value fish species as feeds that would further deplete the overall fish population.

Also, only species that are native to the locality are grown, hence escapees will actually add to the wild population and will not predate on, compete with or infect diseases on the natives.

# Cikundul

## Project details

**Title of proposed project:**

The Installment of Simple Water Treatment Plants in Cikundul, Sukabumi, Indonesia

**Name of organisation:**

Cimandiri Heurang Community Group/Kelompok Swadaya Masyarakat Cimandiri Heurang

**Time Period:**

March-Sept 2016

**Grant Requested:**

USD 6,860



## Rationale

An ongoing challenge for the Local Government of Sukabumi is providing clean water for all its citizens. The Regional Water Supply Company (PDAM) has so far been unable to deliver clean water to a growing number of the population with the greatest impact being on disadvantaged and poor citizens who are unable to afford the rising cost of clean water. The issue is compounded with the high population growth rate and increasing urban activities.

The excessive use of groundwater by the private sector for industry has decreased the volume of ground water available. This together with the contamination of ground water, due to waste discharged from both domestic and industrial sources, results in an overall lack of quality clean water.

Cikundul urban village is one of the most underdeveloped areas in Sukabumi with studies identifying it as a region most vulnerable to climate change. Additionally, Cikundul village is the center of cassava chips industry; a small scale industry that relies heavily on clean water.

The government of Sukabumi's department of Spatial Planning, Housing and Settlement proposes a plan to improve the clean water service to the citizens of Cikundul through the installation of Simple Water Treatment Plants (IPAS). The main aim of the project is to improve the health of the citizens by providing reliable access to clean water.

## Project Overview and Outcomes

We expect the following achievements and outcomes after 7 months:

- Improved community health by providing access to clean water through the installation of IPAS in Cikundul. The plant will source and harness water from Cibeureum river using a pipeline installed and managed by KSM Cimandiri Heurang.
- Conservation of existing ground water. The use of surface water instead of groundwater enables the preservation of existing ground water. Also, any digging activity is difficult and hazardous due to the Cikundul hot springs being in close proximity; land drilling activity can cause a 'flow in' of hot water that contains sulfur and other dangerous elements not recommended for human consumption.
- Development of a water reservoir in the event of drought or fire.
- Improved livelihoods of the people of Cikundul.

## Climate Change Action Areas

The impact of climate change and environmental degradation in the city of Sukabumi could trigger the problem of water scarcity for residents. The IPAS program provides residents will have an alternative source of clean water so that they will be protected from diseases caused by consuming contaminated water.



Water demand and conservation systems



Health systems

The IPAS program will help to ensure 20 small and medium enterprises currently manufacturing cassava crackers to remain operational within the area. Clean water from the IPAS system will allow the producer to manufacture healthy and environmentally friendly cassava crackers, thus maintaining employment for the residents of Cikundul village and securing their livelihoods.



Livelihoods

## Contribution to Resilience-building

### Resilience Criteria

*Redundancy:* The IPAS program will provide an alternative source of quality water for the people of Cikundul. While meeting the needs of clean drinking water for around 80 families and 20 small businesses, the IPAS project will also serve as a pilot program that can be expanded and replicated in other villages. By providing several IPAS's, linked in a network, throughout the District of Sukabumi, we hope to decentralize access to clean water and ensure robustness of the system.

*Flexibility and diversity:* As well as providing an alternative source of clean water, the IPAS will serve as a reservoir in the case of fire and drought.

*Re-organization and Responsiveness:* A management team will be established to oversee maintenance, finance and monitoring of the IPAS facility ensuring the program flourishes and is sustainable.

### "Ecologically Sustainable Development" principle

The project contributes to urban climate change resilience without negatively straining or degrading ecological systems or resulting in environmentally unsustainable practices. The activity supports the agriculture and aquaculture activities of local people as well as water conservation efforts.

The Simple Water Treatment program provides an alternative source of clean water and moves people away from using ground or pond water. It also encourages SME to produce cassava crackers that are healthy, clean and sustainable.

The IPAS will be installed on land with enough distance from the hills and river to allow continued operation during extreme weather and climatic events such as droughts, earthquakes, landslides and floods. The raw material for water purification will also be locally sourced and not dependent on resources outside of the area City of Sukabumi.

### "Do No Harm" principle

The construction and activities of IPAS program complements the existing water system and does not cause any negative impacts on the ecosystem or the community.



# Citimiang

## Project details

|                                   |  |
|-----------------------------------|--|
| <b>Title of proposed project:</b> | Mosque-based Rain Water Harvesting, Citimiang, Sukabumi, Indonesia |
| <b>Name of organisation:</b>      | The Board of Jami Al-Muhajirin Mosque                              |
| <b>Time Period:</b>               | March – June 2016  |
| <b>Grant Requested:</b>           | USD 9,000  |



## Rationale

The Local Clean Water Company (PDAM) is the provider of clean water in Citimiang sub-district. There is, however, a proportion of the community who is not served by PDAM and is using water from the river, the pond and/or ground water. Much of the ground water contains E.coli bacteria and is contaminated by high levels of iron and sulfur. Additionally, many people are not able to distinguish between adequate and inadequate drinking water and this has led to public health issues.

The Board of Jami Al-Muhajirin Mosque has proposed the installation of rain water harvesting and simple water treatment plants (IPAS) close to the Mosque. The harvested rainwater would be an alternative source of clean water for the community and could serve as a water reservoir in the case of drought and fire.

The city government's local planning and public works agencies will assist in the implementation and monitoring of the project. The mosque's involvement is beneficial in helping to educate Muslim worshippers of climate change. Also, utilizing wakaf (an endowment intended for Muslim religious or charitable purposes) land could save a significant amount of money.

The project aims to:

- Create an alternative source of clean drinking water
- Improve the local economy
- Harness the natural resources including rain water
- Increase the health and wellbeing of the community through dissemination of information regarding safe drinking water

## Project Overview and Outcomes

The IPAS will use Reverse Osmosis (RO) technology and filter through cotton. The system will be enhanced with rainwater harvesting equipment and will be installed close to the mosque in Citimiang village using wakaf land.

Management, operation and maintenance of the system will be the responsibility of the Board of Jami Al-Muhajirin Mosque in cooperation with the local government.

We expect the following achievements and outcomes after 4 months:

- Installation of rainwater harvesting
- Installation of simple water treatment plants, IPAS, using harvested rainwater close to the Jami Al-Muhajirin Mosque.
- Increased community awareness of safe drinking water practices and clean water management.
- Increased community health and wellbeing.



## Climate Change Action Areas

The Mosque-based Rain Water Harvesting System will give the community broader access to alternative water sources.



Education and capacity building of citizens



Water demand and conservation systems



Health systems

## Contribution to Resilience-building

### Resilience Criteria

*Redundancy:* There is currently a leaking pipeline issue, which causes frequent disruption of water supply. This project provides an alternative source of clean water, and thus delivers some redundancy in the present water system.

*Flexibility and diversity:* The project provides an alternative source of clean water for drinking and irrigation as well as a water reservoir in the event of fire or drought.

*Re-organization and Responsiveness:* The technology used in this project is robust enough to absorb shocks caused by earthquake or landslide. Also the construction is located underground protecting it against heat and corrosion due to extreme climatic events.

Climate projections indicate a rise in rainfall in the Sukabumi area. As such, the water supply needed for rainwater harvesting will remain reliable and sustainable.

*Access to Information:* The project will be monitored and evaluated with the expectation that lessons learnt can be passed on to others wishing to adopt similar programs.

### “Ecologically Sustainable Development” principle

The Mosque-based Rain Water Harvesting System provides an alternative source for clean water. While contributing to the conservation of current ground water, it also encourages the community to avoid contaminated groundwater that adversely affects community health.

The construction is located underground and will not degrade current ecological systems. Quite conversely it will enhance the ecological systems by allowing urban farming on the land above and providing an alternative source of food.

### “Do No Harm” principle

The construction of rainwater harvesting will not cause any negative impacts to the ecosystem or the community. This project will rather improve access to clean water as well as conserving ground water resources.



# Gangtok

## Project details

|                                   |  |
|-----------------------------------|--|
| <b>Title of proposed project:</b> | Climate resilient solid waste management infrastructure for Gangtok, India |
| <b>Name of organisation:</b>      | Gangtok Municipal Corporation (GMC)  |
| <b>Time Period:</b>               | June – December, 2016  |
| <b>Grant Requested:</b>           | USD 50,000   |



## Rationale

The Gangtok Municipal Corporation (GMC) intends to establish a 'Bio Composting Plant' at Kanchenjunga Shopping Complex (Vegetable Market) to treat all vegetable waste at the source. The market generates daily around one tonne of vegetable waste and this is transported to a landfill site.

However, there is currently no proper mechanism or schedule for the waste collection, which results in the waste not being processed in a timely manner. Being left to rot, the waste spreads a foul smell and creates a breeding ground for flies and other insects that spread disease through the area. Additionally, the waste sometimes gets dumped into jhoras (small streams that act as storm water drains) leading to the clogging and an increased risk of landslides in the area. This results in financial loss and may have catastrophic impacts on infrastructure and human life.

## Project Overview and Outcomes

We expect the following outcomes and achievements after 9 months:

- The construction of a compost plant to treat segregated waste at the source and process into compost. This will also curtail the cost of transporting the waste and reduce the pressure on the existing landfill sites.
- Increased stakeholder and community awareness around the benefits of segregation and treatment of waste.
- Decreased waste dumping into streams and drains, reducing clogging of jhoras and occurrence of landslides.
- Improved hygiene, ambience and well being of the market place
- Increased employment opportunities to run and supervise the plant with the sale of compost generating ongoing revenue.

## Contribution to Resilience-building

*Redundancy:* The composting plant allows for redundancy by providing an alternative system for treating and disposing of organic waste generated from the shopping complex. The waste that was originally dumped in a landfill will be treated and processed on site, reducing transfer costs and increasing the life of landfill site.

*Flexibility and Diversity:* The composting plant will be set up in an area that will be protected from rain and erratic weather ensuring the plant remains operational throughout the year.

*Reorganization and Responsiveness:* The Corporation will involve stakeholders and community to ensure long-term sustainability of the project. It will also provide suitable training, manpower and management to run the project and operate the plant. Moving forward, we hope that other marketing centers and hotels will link

## Climate Change Action Areas



Drainage, flood and solid waste management



Education and capacity building of citizens



Health systems



Livelihoods



Ecosystems services

into the composting plant and that the project will be replicated in similar wards throughout the municipality.

### “Ecologically Sustainable Development” principle

The main objective of the program is to evolve the urban environment of the market place by ensuring timely and efficient disposal of organic waste. This will improve living conditions and increase the health and well being of the community.

The Composting Plant will help decrease the cost of transporting waste as well as reducing pressure on the existing landfill site thus ensuring its longevity. Additionally, revenue generated from sale of compost and collection of user charges/fees will be used to run and sustain the plant.

### “Do No Harm” principle

The project aims to enhance the urban landscape of the area. Overall ownership of the project will lie in the hands of ward level committees and stakeholders. Designated committees will be responsible for planning, implementation and monitoring of the project. Extreme care will be taken not to create disturbances to the environment during infrastructure construction. Community programs will be undertaken to educate and inform people about waste and the plant.



# Kurseong

## Project details

**Title of proposed project:**

Revitalizing the existing water catchment areas to improve water quality and quantity downstream and Rehabilitation of Sherpa Busty Jhora, Kurseong, India

**Name of organisation:**

Kurseong Municipality

**Time Period:**

June 16 - February 2017

**Grant Requested:**

USD 50,000



## Rationale

Studies by the federal Ministry of Environment and Forest indicate that the region can expect increasingly erratic and extreme weather. While higher temperatures and less rainfall will combine to put additional stress on current water supply systems, torrential rain is likely to lead to flash flooding and landslides due to clogged jhoras (streams) that cannot efficiently drain excess water. The project is two pronged - catchment area revitalization and rehabilitation of Sherpa Busty Jhora.

Firstly, we intend to revitalize the existing water catchment areas to improve water availability and quality in Kurseong Municipal Hill Town of Darjeeling in West Bengal. While the natural water resources of the region are large, a poorly designed and maintained infrastructure has degraded over time and is unable to cope with the increasing population and the effects of climate change. Insufficient maintenance and poor management of the water catchment areas has led to 90% of the municipality's annual allocated budget being spent on mending leaks rather than investing in infrastructure and the future. Also, there is no jointly agreed definition or standards with regards to catchment area and water quality.

The revitalization project aims to:

- Create sufficient and sanitary water storage to cope with the dry season
- Harness water from key extraction points
- Implement water monitoring mechanisms including water quality testing
- Enrich water catchment through reforestation

Secondly, rehabilitation of Sherpa Busty Jhora (Sherpa Slum Stream) in Ward -7 in Kurseong Municipal Hill will ensure the proper drainage of the storm water during the heavy rainfall and thus reduce the incidence of landslides and increase the adaptive capacity of the system.

Currently, the mostly 'natural' drainage system covering the city is being clogged by waste making it ineffectual and creating pools of contaminated water. Not only is this causing a potential health hazard and playing havoc on sanitation facilities it is also making the area vulnerable to landslides.

The rehabilitation the Sherpa Busty Jhora will aim to address these issues and create a model of cleanliness and sustainability that other regions can follow.

The project aims to:

- Clean up and rehabilitate 1 km of the Sherpa Busty Jhora
- Construct retaining walls at locations most vulnerable to heavy rain and flooding.
- Construct solid waste bins at identified locations.



## Climate Change Action Areas



Drainage, flood and solid waste management



Housing and Transport



Health systems



Education and capacity building of citizens

## Contribution to Resilience-building

### Resilience Criteria

*Redundancy:* By revitalizing water catchment areas we hope to enhance the existing water supply by forming a more distributed and decentralized structure for delivering and storing clean water. Also, the process is not reliant on external resources as it depends on gravity to work and does not need power for pumping and boosting.

*Flexibility and Diversity:* The project will ensure that water supply and drainage is maintained as extreme weather events such as drought, torrential rain and flooding become more frequent.

*Access to information:* The workshop and training component of the project is intended to inform the community and residents of sustainable practices around water conservation in addition to the protection and rehabilitation of jhoras. Drawing on lessons learnt, it is hoped that the project will prove to be a model for other communities to adopt.

### “Ecologically Sustainable Development” principle

As well as ensuring clean and reliable access to water, the project will enhance and renew the eco system services of the catchment area. Water from various catchment sources will be collected through newly constructed tanks and sedimentation chambers thus minimizing the chance of pollutants entering the system. The process relies on gravitational forces to operate and does not need fuelled generators/boosters of any kind.

Project decisions will be made in consultation with the community, ward committees and stakeholders throughout the entire process of planning, implementation and monitoring. This collaboration will ensure minimal environmental damage as well as addressing any social concerns and issues.

### “Do No Harm” principle

The project intends to revitalize current water and drainage services so they function efficiently. This can only improve the health and wellbeing of the community and enhance the eco system services.



# Kushtia

## Project details

### Title of proposed project:

Construction of a reinforced concrete (RCC) drain & supporting road to improve life quality of the people at Gorai Ashroyan Phase-2, Kushtia, Bangladesh

### Name of organisation:

Kushtia Municipality (Paurashava)

### Time Period:

Sept 2016 – May 2017

### Grant Requested:

USD 31,277



## Rationale

This project is aimed at funding small innovative developments to test the feasibility of proposed resilience building actions in the city. One of the fragile urban systems in the city of Kushtia is storm water drainage. The resilience interventions identified during the shared learning dialogues have recognized the importance of improving drainage in urban low-lying areas.

In Kushtia, existing drains are mostly open and coverage is poor. Consequently, drains often get clogged with litter resulting in an overflow of water and flooding during heavy rains. An increased health risk to the community follows, particularly in children and the elderly of low-lying areas where majority of the urban poor reside.

This project hopes to create a drainage system in Millpara slum, located in Ward No. 10, to protect against excessive rainfall during monsoons. The project intends to construct a drain to prevent flooding and improve the health of the residents in the area. The construction of the drainage system will be complemented with a community awareness program aimed at educating citizens in the use, preservation and maintenance of the drain, including litter prevention.

There are about 4000 people living in this slum area. Constructing the drain will help to prevent the water logging due to excess rain, thereby allowing people to move smoothly without any trouble during monsoons. It will also ensure convenience in moving and transporting goods to and from their home during flood period.

## Project Overview and Outcomes

We expect the following outcomes and achievements after 9 months:

- Construction of 160 meter RCC drain.
- Construction of a vertical extension of 290 meter brick drain.
- Construction of 285 meter RCC road.
- Greater movability for slum people and their goods during monsoon and flooding.
- Increased daily transaction leading a greater economy in the area.

## Contribution to Resilience-building

### Resilience Criteria

*Flexibility and diversity:* The construction of a drain will help in the functionality of the current drainage system and ensure that the community continues to operate under extreme climatic events such as severe storms and heavy rains.

*Re-organization and Responsiveness:* The drainage system will be monitored, and modified if needed, to ensure that it is operating to its full capacity and can sustain unexpected shocks.

## Climate Change Action Areas



Drainage, flood and solid waste management



Education and capacity building of citizens



Housing and Transport



Health systems

*Access to Information:* Awareness activities around drainage systems and littering will be adopted and community feedback collected on the projects successes and/or failures. Information gained will be shared with other cities hoping to implement similar projects.

### “Ecologically Sustainable Development” principle

During the rainy season flooding occurs at the intended project site. The resulting water logging interferes with the normal growth patterns of the plants in the area. Introduction of a drainage system will streamline the water flow to the river from the drains and thus alleviate risk of flooding.

### “Do No Harm” principle

Implementation of the project can only help to improve the community health and well-being during heavy rains and extreme weather, both socially and economically. Construction of the drain will enhance the surrounding environment and ecosystems by ensuring floods don't wash away embankments, plants and nutrients.



# Marikina

## Project details

**Title of proposed project:**

Young, Empowered and Service-oriented Filipinos towards Climate Leadership, Disaster Resilience and Responsible Citizen Participation, Marikina City, Philippines

**Name of organisation:**

YesPinoy Foundation Inc.

**Time Period:**

9 months

**Grant Requested:**

USD 30,000



## Rationale

The Philippines is facing the “new normal”. Extreme weather events are causing serious impact on the country’s development, the welfare of its vulnerable communities and sectors such as children and youth. Hence, the urgency of building resilience and converging efforts to address climate change and disaster risks cannot be overemphasized.

In response to this, the National Youth Commission (NYC) and the Climate Change Commission (CCC) launched the #NowPH or Not on Our Watch Philippines movement to urge global leaders at the COP21 in Paris to act on climate change and prevent global warming from reaching two degrees Celsius. With the support of its institutional partners and celebrity advocates, the youth-led movement gathered 3.6 million pledges and generated 221 million social media interactions through offline and online campaigns.

Beyond gathering signatures, #NowPH also empowers the Filipino youth by raising their understanding on the science of climate change, and ways to lead a climate-resilient and climate-smart lifestyle and ensuring youth representation in all disaster risk reduction and management (DRRM) bodies and activities in the government through its partnership with the Office of Civil Defense and the Department of Interior and Local Government.

This 2016, the NYC and the YesPinoy Foundation Inc. – the planning and implementing arm for #NowPH – will be strengthening its campaign to turn Filipino youth’s voices into concrete actions, and sustaining the involvement of Filipino youth, who signed up in 2015 through climate and disaster resilience leadership development, and responsible citizenship formation.

Aim of the proposed project:

- To support specific stakeholder engagement activities and initiatives towards the development of young movers for climate change and disaster resilience
- To fund small innovative projects to test the feasibility of proposed resilience-building actions through education and capacity building programs for the youth in highly vulnerable communities in order to enhance their knowledge and skills on climate change adaptation and mitigation, and disaster risk reduction and management.

## Project Overview and Outcomes

We expect the following outcomes and achievements after 9 months:

- Whole-day summit to develop Young, Empowered and Service-Oriented citizens of this country, who will champion climate action, disaster risk reduction and management, and responsible citizenship.
- Information, education and communication materials on climate change adaptation and mitigation, disaster risk reduction and management, leadership development and responsible citizen participation





## Climate Change Action Areas

As designed, the proposed study directly falls under the category of water demand and conservation systems. It can also contribute significantly to education and capacity building of citizens considering its emphasis on community deliberation and its information, education, and communication (IEC) component. The study contributes to each of the following climate change action areas:



Education and capacity building of citizens



Institutional coordination and capacity support

- Climate Leadership Handbook for Young Leaders and series of capacity building events in selected local government units, schools and communities
- Memorandum of Understanding or other partnership instrument with local government units, schools, youth organizations and institutions to support the capacity development of children and youth
- Mobile and computer application and online system to monitor and report climate leadership, disaster resilience and responsible citizenship participation
- Policies that ensure meaningful youth participation in climate leadership, disaster resilience and responsible citizenship participation
- Programs that foster stakeholder resilience, especially in terms of building the sector's adaptive capacity to climate change and disasters through education and capacity development
- Youth-led climate change adaptation and mitigation, and disaster risk reduction and management (i.e. communication products, advocacy events and constituency building efforts)

## Contribution to Resilience-building

### Resilience Criteria

*Redundancy:* The project will involve youth-led and youth-serving organization coming from various local government units, schools and communities to ensure project's realization and sustainability. Likewise, the beneficiaries will be provided with multiple options for participation in climate leadership, disaster resilience and responsible citizenship development.

*Flexibility and Diversity:* The varying needs of the beneficiaries will be considered in designing and implementing education and capacity building programs. For instance, there will be more emphasis on activities and training modules related to adaptation in flooding for youth who are residing in communities that are low-lying or flood-prone.

*Reorganization and Responsiveness:* The activities will be carried out through multi-stakeholder participation. Relevant local government unit, school and/or community-based organizations will be tapped to ensure their support and ownership in implementing and sustaining the efforts towards empowering the children and youth sector.

*Access to Information:* The information, education and communication materials along with the Climate Leadership Handbook will be shared with the beneficiaries. The distribution of the said communication products will also be coupled by appropriate workshops and trainings.

### "Ecologically Sustainable Development" principle

The project will not only ensure that it adheres to environmentally sustainable practices as it conduct its initiatives, but will also position itself at the forefront of promoting this advocacy by providing a breeding ground for young people who are climate leaders, disaster resilience advocates and responsible citizens.

### "Do No Harm" principle

The project will cater to localities, schools and communities that are highly vulnerable to climate and disaster risks, and impart knowledge and skills that will can be utilized to contribute not only in building urban climate change resilience but also improving quality of life through leadership development and responsible citizenship formation.

# Mongla

## Project details

**Title of proposed project:**

Improvement of urban drainage system to manage flood risk by incorporating climate change adaptation measures, Mongla, Bangladesh

**Name of organisation:**

Mongla Port Municipality, Bagerhat, Bangladesh

**Time Period:**

9 months

**Grant Requested:**

USD 50,000



## Rationale

Mongla is a port city with very basic infrastructure throughout the municipality area. As such, the city lacks a proper drainage system. Solid waste is often dumped in open gutters creating drainage issues compounded by the absence of secondary outlets for escaping water. As a result, the internal roads often flood during heavy rain.

Additionally, there are no proper toilets or treatment facilities throughout the majority of the municipality. Toilets either open into drains/canals or are pit latrines with no outlets. This causes severe water pollution and impacts the health of its citizens due to the increased risk of water borne diseases such as cholera, diarrhea, and dysentery.

The proposed project intends to provide covered drains to one particular slum area in the city; ward number 2 – Hazi Bahauddin Road. The planned drainage system will alleviate flooding and the associated health impacts during heavy rains. Residents will also be given information regarding the harmful effects of throwing garbage into the drains, so that clogging of drains and water pooling can be avoided.

## Project Overview and Outcomes

We expect the following outcomes and achievements after 9 months:

- Implementation of structural and nonstructural measures to improve the overall capacity and function of existing drainage system.
- Increased flow capacity during heavy rainfall by linking up with the existing drainage network.
- Decreased risk of flooding due to implementation of an efficient drainage system.
- Decreased morbidity and mortality rates from infectious diseases associated with existing poor drainage and sanitation conditions.
- Reduced risk of ground water contamination during heavy rains.
- Increased community awareness around waste disposal and drainage systems.

## Contribution to Resilience-building

### Resilience Criteria

*Redundancy:* The proposed project enhances the existing drainage system by enabling greater flow capacity and providing an additional means for water to drain from roads during heavy rain-fall.

*Reorganization and responsiveness:* The drainage system will be monitored, and adapted accordingly, if the structure fails to function properly during or after an extreme climatic event. For example, severe storms may change the natural water flow and thus the drainage system will need to have the capacity to adapt.

*Access to Information:* A management committee will be formed to construct, maintain and monitor the drainage system and ensure lessons learnt are fed into future projects.

## Climate Change Action Areas



Drainage, flood and solid waste management



Education and capacity building of citizens



Housing and Transport



Health systems

### “Ecologically Sustainable Development” principle

The proposed drains will be a long lasting RCC type construction that takes into account the salinity of the water and soil.

Community health and wellbeing will improve with decreased flooding on the streets and less exposure to water and vector borne diseases. Also, the citizens will be engaged in the project through information sharing around waste disposal and storm water management.

### “Do No Harm” principle

Mongla City has been identified as a coastal region most vulnerable to the impacts of climate change. Its drainage system is virtually non-existent due to the dumping of waste, and it is unable to cope with heavy rains and storm water. Pooled contaminated water poses serious health risks to the community and the environment. This project will improve the living standards of its citizens through education and the implementation of an effective drainage system. The livelihoods of Mongla citizens and the surrounding environment and ecosystems will not be negatively affected by the project. In fact, they can only benefit.



# Naga

## Project details

**Title of proposed project:**

Space-based Decision Support System (DSS) for Urban Resilience in Naga City, Philippines

**Name of organisation:**

Manila Observatory

**Time Period:**

6 months

**Grant Requested:**

USD 50,000



## Rationale

Environmental problems, including haphazard and uncontrolled urbanization, climate change and disaster risk are critical issues and concerns that threaten the socio-economic and ecological sustainability of Naga City.

An innovative and proactive local government and a strong stakeholder base are reasons for selecting Naga City as the study area.

The project aims to:

- Fund climate-associated risk assessments: climate-associated impact assessment, vulnerability assessment and City Resilience Strategy (CRS)
- Support stakeholder engagement activities and initiatives towards the formulation of land use/cover-based strategic CCA-DRRM options
- Fund a small innovative project to test the feasibility of proposed resilience-building actions including:
  - Prioritization of co-beneficial CCA-DRRM among stakeholders and communities
  - Building and enhancing knowledge, understanding and awareness of climate change and disaster risks, so as to further empower stakeholders and communities towards action, especially in terms of risk governance.



## Project Overview and Outcomes

We expect the following outcomes and achievements after 6 months:

- Integrated hydro-meteorological risk map overlays, assessment and analysis, where risk is the compounding effect of hazards, exposure to these and vulnerabilities:
  - Desk review of available historical and projected climate scenarios (e.g. temperature and rainfall).
  - Maps of prioritized hydro-meteorological hazards (e.g. historical tropical cyclone tracks, flooding, rainfall-induced landslides, as available).
  - Exposure maps will include land use and cover population density available from the Naga City Local Government Unit (LGU) and Low Elevation Coastal Zones (LEZs). Land use cover would be derived from open-source optical satellite products.
  - Vulnerability maps will include latest available poverty indicators (e.g. sourced from the Naga City Community-based Monitoring System (CBMS, 2011-2013) as well as the Barangay census.
- Stakeholder and community strategic CCA-DRRM options based on land use and cover sectors as well as their mainstreaming pathways.
- Policies to address risk towards co-beneficial CCA-DRRM



## Climate Change Action Areas



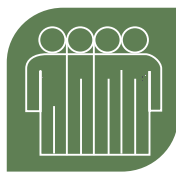
Land use and planning



Ecosystems services



Drainage, flood and solid waste management



Institutional coordination and capacity support

- Programs fostering stakeholder resilience, especially in terms of livelihood and other strategic aspects that reduce climate-associated risk (e.g. hazard mitigation, decrease exposure and reduce vulnerability)
- Evidence-based CCA-DRRM towards more effective and empowered risk governance (e.g. risk assessments, risk-sensitive development instruments – Comprehensive Land Use Plans (CLUPs), communication products, and other management tools)

As designed, the proposed study directly falls under the category of water demand and conservation systems. It can also contribute significantly to education and capacity building of citizens considering its emphasis on community deliberation and its information, education, and communication (IEC) component. The study contributes to each of the following climate change action areas:

## Contribution to Resilience-building

### Resilience Criteria

*Redundancy:* Multiple options for strategic CCA-DRRM may be explored and later evaluated by stakeholders and communities in terms of cost and benefit.

*Flexibility and diversity:* The dynamics, complexity and spatial variability of urban systems are to be studied and analyzed, especially through influence diagrams, impact chains and maps of climate-associated hazards, exposure, vulnerabilities and risk. Integrated risk mapping will help systematize information and knowledge that may be explored among stakeholders and communities.

*Access to Information:* The integrated hydro-meteorological hazard impact maps in the form of a risk atlas will be periodically updated and shared with communities and stakeholders. Furthermore, successes, shortcomings and risks will be documented, assessed, monitored and evaluated by the Naga City local government and fed into future initiatives.

### “Ecologically Sustainable Development” principle

Historical and projected hydro-meteorological risk assessments and analysis for Naga City are essential for building urban stakeholders and community resilience that are transformative in the longer term. The approach is to institutionally support the generation of more risk-sensitive CLUPs through the participative formulation of strategic CCA-DRRM options that are land use and cover-based and so sectorial.

### “Do No Harm” principle

The study of climate-associated risk would feed into the formulation of CLUPs, based upon which strategic CCA-DRRM options may be explored and then after evaluated in terms of costs and benefits. Because land use-based risk assessments and optional CCA-DRRM strategies are sectorial, urban stakeholder and community resilience would be fostered accordingly.

As a prerequisite to climate-associated risk assessments, influence diagrams and impact chains would enable a better understanding of socio-environmental dynamics and complexities. As such, negative impacts of climate variability and extremes as well as associated hydro-meteorological hazards may then be addressed more effectively and ensure resolution of climate-associated impacts not only on ecosystem services but on the most vulnerable and poor populations as well.

# Nainital

## Project details

**Title of proposed project:**

Mainstreaming the role of ecosystem services in Water Supply of Nainital, India

**Name of organisation:**

Centre for Ecology Development and Research

**Time Period:**

Sept 2016 – May 2017

**Grant Requested:**

USD 35,000



## Rationale

Nainital is a major tourist town of Uttarakhand in the Kumaon Himalayas and is renowned for its kidney shaped lake, which is surrounded by buildings and a densely forested catchment area. Historically, the decision-makers in Nainital have taken several steps to conserve the catchment – this includes identifying forest areas, controlling construction, forming a ‘hillside’ committee, and building a network of drains for efficient movement of water. However, in the last 20 years, changes in rainfall and climatic conditions and unplanned urbanization have impacted adversely on the lake and Nainital.

The lake provides several ecosystem services, caters to 90% of the water demand of the city and is a most important tourist attraction of which a large proportion of the city depends on for economic benefits. The reasons attributed to the rapid decline in lake level include (1) monsoon receding early in 2015 (2) winter rainfall deficit (79% Jan – Feb 2016) (3) Encroachment and degradation of recharge zones (4) Construction in the hill slopes reducing infiltration and enhancing siltation. While erratic rainfall patterns are a given, adaptive measures can be adopted to mitigate their impact. Key among them is to identify and protect the critical water zones in the catchment that facilitate sub-surface flow of water to the Naini Lake during the lean season.

The Centre of Ecology Development and Research proposes to undertake a holistic process to capture ecosystem service issues related to the sustainability of the lake and the supply of water. It will consider recharge zones and the catchment area and hopes to highlight management and institutional issues, which may require modification to cope with changing climatic conditions.



## Project Overview and Outcomes

We expect the following outcomes and achievements after 9 months:

- Sensitization of key stakeholders to the role of watershed ecosystem services in maintaining water supply and the lake in Nainital.
- Initiation of catchment and recharge friendly outreach activities
- Initiation of steps to address the gaps in protection of critical zones in the catchment
- Ecologically sustainable water management for the city of Nainital
- Improvement of present urban water system in the city of Nainital
- Information and maps generated on catchment, forested areas, watershed ecosystem services and Critical water zones and their present condition in view of their catchments.
- Review of Current levels of protection in forest laws and urban zoning plans, and identification of gaps in protection
- Ecological sustainability plan for Nainital focusing on water supply systems underling the importance of catchments and sub catchments in sustaining the water supply and lake
- Cleaning of 10 drains to improve water supply system



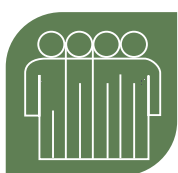
## Climate Change Action Areas



Drainage, flood and solid waste management



Water demand and conservation systems



Institutional coordination and capacity support



Ecosystems services

## Contribution to Resilience-building

### Resilience Criteria

*Flexibility and Diversity:* The proposed project is designed in such a way that each component complements the other. The process is adaptive and flexible and consults key stakeholders at the beginning, middle and end of the process to incorporate feedback. The process will also seek to develop diverse options that can be robust and relevant under different situations, e.g. in a high rainfall year, or a low rainfall year, or high tourist season, or low tourist season.

*Reorganization and Responsiveness:* One of the aims of the proposal is to develop cohesive relationships between local government agencies, students and the community to help in the decision-making process. We intend to bring in specialized partnership facilitators to develop an effective partnership and shared leadership/responsibilities amongst different stakeholders.

*Access to Information:* The proposed study will provide comprehensive knowledge base of the watershed ecosystem services and the critical water zones of the lake. This information will be disseminated widely amongst multiple stakeholders, local authorities, catchment water supply authorities and the local community. Decision-making and management of the lake will be based on feedback channeled from all parties to ensure its economic, environment and social sustainability of the lake.

This information would be made available to relevant local government agencies to incorporate in their formal decision making processes and share, via their website, with schools, sport and hotel associations.

### “Ecologically Sustainable Development” principle

The overall objective of this project is to incorporate ecological information in decision-making to enhance sustainability of the lake. The project will collect and collate information about the ecosystem services related to the catchment forest and juxtapose it with current levels of protection to identify gaps for action.

Several other factors such as dumping of debris in drains and sewage line overflow in monsoons has severe consequences on the lake health, this requires a collective action from government and general public for the longevity of the system which will be proposed.

### “Do No Harm” principle

The study intends to develop awareness, understanding and action towards ensuring the long-term sustainability of the lake given the changing climatic conditions. It will ensure all social, environmental and economic impacts are explored before making decisions about future of the lake.



# Santa Rosa

## Project details

**Title of proposed project:**

Building Capacity for Urban Agriculture in Santa Rosa City, Philippines

**Name of organisation:**

School of Environmental Science and Management, University of the Philippines Los Baños (SESAM UPLB)

**Time Period:**

6 months

**Grant Requested:**

USD 29,934



## Rationale

Urban areas, cities in particular, face challenges that are being exacerbated by climate change. Some of these challenges include the rapid increase of population, poverty, land use planning, and urban decay. Similarly, in Santa Rosa City there are pressures associated with urbanization and industrialization, particularly around the availability and distribution of food within urban areas.

Climate change scenarios indicate that Santa Rosa City will experience a decrease in water availability while being subjected to an increased risk of flooding to downstream communities, which could have dire consequences for food systems; production and availability.

By utilizing idle spaces for urban agriculture activities we hope to help manage issues of food security, climate change vulnerability, and poverty.

Overall, the project aims to explore how best to integrate urban agriculture into local plans, programs, and policies in Santa Rosa City, Laguna in the Philippines.

Specifically, the project aims to:

- Identify areas, and possible pilot sites, which are vulnerable to climate change, yet possess a high potential for various types of urban agriculture.
- Assess and integrate into at least three Santa Rosa City policies urban agriculture activities that can best alleviate both food security and climate change challenges.
- Recommend guidelines on how urban agriculture, as a climate change adaptation strategy, can be hardwired into local government plans, programs, and policies.



## Project Overview and Outcomes

We expect the following outcomes and achievements after 6 months:

- Pilot site identified and assessed: site selection will be based on local knowledge of the area and farming techniques while drawing on related literature around climate adaptable urban agriculture.
- Integration of urban agriculture that addresses food security and climate change adaptation into at least three city policies of Santa Rosa: the policies may include but not limited to the local climate change adaptation plan, land use plan, zoning ordinance, environmental code, development plan, or the city's permitting and incentive system.
- Policy guidebook for mainstreaming urban agriculture as a climate change adaptation strategy in local government plans: the guidebook will detail the scope, principles, and approaches on how local government could incorporate urban agriculture into their climate change adaptation strategy.
- Reduced vulnerability of at risk urban groups and the strengthening community-based adaptive management





## Climate Change Action Areas

Develop and implement urban agriculture activities and hardwire these into land-use planning policies to increase ecosystem services and improve local food security across Santa Rosa City.



Land use and planning



Ecosystems services

Improve livelihoods and wellbeing of its citizens by generating new jobs and educational opportunities in addition to creating healthy recreational spaces.



Health systems



Livelihoods



Education and capacity building of citizens

- Enhanced vegetation coverage across the city through green open spaces, thus reducing the urban heat island effect.
- Safe reuse of wastewater and composting of organic waste
- Reduced energy use and greenhouse gas emissions resulting from producing fresh food close to the city and consumers.

## Contribution to Resilience-building

### Resilience Criteria

*Redundancy:* Urban agriculture increases the security and redundancy of the local food system. Rather than the production of a crop by a handful of producers in a centralized location, crops are produced by potentially more people in various plots around the city. The failure of one crop would not collapse the local food system, as other plots would backfill the gap.

*Flexibility and diversity:* The adaptable nature of agriculture allows for flexible and diverse use in the urban context. Recommended forms of urban agriculture would be based on science and it's proven success elsewhere and be dependent on the specific vacant sites and 'spaces' to be utilized. Identifying these sites and implementing urban agriculture activities would be made in collaboration with community, concerned stakeholders and agriculture experts.

*Re-organization and Responsiveness:* As part of the process, the pilot site will provide an ongoing educational opportunity for inhabitants and nearby farmers to come together in a co-learning environment to share information. Lessons learnt will be beneficial to all and allow both parties to adjust and enhance farming techniques as necessary to deal with the changing climate and its impacts.

*Access to Information:* The proposed project would involve capacity building activities and knowledge-sharing events that would be complemented by a strict documentation process. Additionally, a monitoring and evaluation system will also be implemented to gage the success of the project and ensure relevant information is captured and processed. Such information including 'lessons learnt' would then be made available to interested parties.

### "Ecologically Sustainable Development" principle

Utilizing otherwise abandoned lots for agriculture would reduce the urban heat island effect through the greening of the city. Also, producing fresh food close to the city and consumer reduces food miles and results in a reduction of energy use and greenhouse gas emissions.

### "Do No Harm" principle

While the project aims to increase food security and manage climate change vulnerability it has the added bonus of beautifying the city and nurturing the wellbeing of its people. By utilizing vacant land that would otherwise remain empty wasteland, the project will create clean green spaces for its inhabitants.

# Shimla

## Project details

|                                   |   |
|-----------------------------------|---|
| <b>Title of proposed project:</b> | Rejuvenating traditional water sources to augment water security in Shimla, India |
| <b>Name of organisation:</b>      | Municipal Corporation of Shimla   |
| <b>Time Period:</b>               | June 2015 – Feb 2016  |
| <b>Grant Requested:</b>           | USD 342,580   |



## Rationale

The proposed initiative aims to rejuvenate and revive the ecosystem functionality of traditional water sources and thus enhance water security in the City of Shimla. This project will develop the resilience-building capacities of the city's ecosystem and expects to mobilize community-based actions for climate resilience planning and implementation. This small pilot initiative will test the feasibility of ecosystem-based approaches to city resilience planning.

The ICLEI ACCCRN Process (IAP) identified water resource management as a major issue in Shimla given the future climatic risks of increase temperature.

The project consists of an assessment of the traditional water sources in Shimla, construction of spring water collection tanks (SCTs) at selected sites to collect and store water, and maintenance and management of the tanks through a community led institutional mechanism at the ward level. This will help to revive traditional water resources, protect natural springs from contamination and degradation and conserve the water source for the city.

## Project Overview and Outcomes

We expect the following outcomes and achievements after 9 months:

- The Water Supply and Sewerage Department to enhance the current water system to meet community demand during lean seasons.
- Greater public awareness of water conservation and the potential of traditional water sources to meet the water needs of growing cities.
- Construction of 14 SCTs, (one pair of SCTs at each source). The SCTs intend to help meet the water demand during lean seasons and/or in emergencies when the water treatment plant is damaged and fails to operate at full capacity.
- Creation of ward level committees for management
- Increased community involvement in managing and maintaining the water resources.
- Implementation of capacity building programs for undertaking maintenance and water quality assessments

## Contribution to Resilience-building

### Resilience Criteria

*Redundancy:* The proposed action around rejuvenation of traditional sources of water is complementary to the existing water supply system in the city. It is a decentralized system which is owned and managed by ward level committees and doesn't require external input including electricity for pumping water.

## Climate Change Action Areas



Water demand and conservation systems



Education and capacity building of citizens



Health systems



Ecosystems services

*Flexibility and diversity:* The water resources enhanced by the springs will provide water in the eventuality of water scarcity due to climatic impacts of higher temperatures, lending flexibility to the water system.

*Re-organization and Responsiveness:* SCTs will be designed and constructed very close to the spring sources in order to ensure the collected and stored water is easily accessible under extreme conditions such as prolonged dry periods or heavy snowfall.

*Access to Information:* Awareness generation and capacity building programs involving community to manage the resources will improve their access to information.

### “Ecologically Sustainable Development” principle

The project is an ecosystem-based approach and aims to further revive the ecosystems services of traditional water sources to meet the climate change adaptation needs of the city.

Water from traditional sources will be collected and stored through the SCTs and managed by the communities at ward level. Water usage monitoring by these committees will ensure sustainable use of the resources and supply and guarantee equity.

Mutual respect and reciprocity among social economic and environmental considerations in the entire process of planning implementation and monitoring will be ensured. Additionally, no pollution will be generated through the construction or maintenance of SCTs and the associated system.

### “Do No Harm” principle

The project is ecosystem based and the overall ownership is with the ward level committees. As such, the entire design, implementation and monitoring will be through designated committees. Care will be taken not to harm or disturb the surrounding environment while constructing the SCTs. Additionally community awareness programs will be undertaken.

Decisions regarding the design and location of SCTs will be guided by careful evaluation to avoid and minimize serious or irreversible damage to the environment.



# Tuguegarao

## Project details

### Title of proposed project:

Hybrid Solar Power System with Integrated Water Harvesting Facility at the People's Gymnasium, Tuguegarao City, Philippines

### Name of organisation:

Cagayan State University

### Time Period:

9 months

### Grant Requested:

USD 30,000



## Rationale

One of the perennial problems being experienced by Tuguegarao City is flooding from the Cagayan River as a result of torrential rains from typhoons and other atmospheric disturbances. When this occurs, residents from the low-lying areas are being relocated to an evacuation center, which is usually at the city gymnasium. To compound the problem, these events are often coupled with power interruptions and water contaminations.

While evacuating residents to safe ground, we need to ensure normal daily activities carry on uninterrupted. This includes addressing basic needs like food, water, shelter and clothing. When power lines are down, solar energy stored in batteries provides a reliable alternative for energy source. The solar panels and other components of a hybrid photovoltaic (PV) energy system can be installed on the rooftop of the gymnasium to provide lighting and other energy requirements.

When the system is not being used in an emergency situation, the Tuguegarao City Science High School, the Tuguegarao City Police Station (TCPS) and the Bureau of Fire Protection (BFP) can utilize it as their offices share the same compound as the gymnasium.

Sanitation and hygiene of the evacuees is also of primary concern. Water harvested from the rooftop of the gymnasium can be passed through a safe and low-cost purifying system and be used as an alternative and reliable source of water. Like the hybrid solar system, other consumers within the vicinity can utilize harvested water during periods when the facility is not in use. For example, the BFP can derive water for its fire trucks directly from the system as the need arises.

## Project Overview and Outcomes

We expect the following outcomes and achievements after 9 months:

- Installation and integration of a crystalline silicon PV system into the existing Peoples' Gymnasium
- Installation and integration of a water harvesting system into the existing infrastructure including a reservoir, a purification system, a pump and the piping system layout.
- Creation of an emergency temporary refuge for evacuees in the event of torrential rains or catastrophic event.
- Creation of a function area for social and public use.
- Creation of a back up system for other service offices such as the BFP, TCPS and the High School.

## Contribution to Resilience-building

### Resilience Criteria

*Redundancy:* The proposed system provides redundancy under extreme conditions for the current water and energy systems by providing reliable back-up supplies.

## Climate Change Action Areas



Land use and planning



Emergency response and EWS



Drainage, flood and solid waste management



Water demand and conservation systems

During an extreme climatic event when evacuation of residents is deemed necessary it often follows that there is total power failure and water contamination. This decentralized system provides alternative back-up power that can also be used to support communication lines. Similarly, water from the rooftop can be used to provide food and sanitation requirements during the period.

During non-emergency conditions, the energy and water collected by the system can be used by nearby government services as an alternative energy and water source.

*Flexibility and diversity:* The gymnasium is a multi-purpose facility. While its primary use is for sporting competitions, it can also provide a venue for a range of events involving large numbers of individuals. In emergency situations it becomes a safe refuge for displaced people. Under all of these circumstances, the provision of an integrated PV power system and dependable water supply will be greatly beneficial.

The system can also be adapted to provide the needs of the Tuguegarao City Science High School, Tuguegarao City Police Station and the Bureau of Fire Protection under normal conditions.

*Re-organization and Responsiveness:* The proposed system will be located at the People's gymnasium and is considered the least likely to be flooded during torrential rains. The design of the gymnasium with elevated bleachers provides immediate adjustments to higher points within the building as the need arises. Also, the nearby school can accommodate for additional number of people if needed. The proximity of the TCPS and BFP provides able personnel and staff to deliver security and first aid concerns.

*Access to Information:* The gymnasium is maintained and operated by the Tuguegarao City local government. Monitoring and evaluation of the system can easily be achieved with proper inter-departmental networking ensuring any issues and concerns may be immediately addressed. Linkage with proper authorities like Philippine Atmospheric, Geophysical, and Astronomical Services Administration (PAGASA), Mines and Geosciences Bureau (MGB), and Office of Civil Defense (OCD) would greatly improve pre-emptive measures and could save lives and properties.

Appropriate materials will be distributed informing stakeholders of the existence and benefits of such a facility.

### “Ecologically Sustainable Development” principle

Energy coming from the sun is safe to use and is readily available in stored form using batteries. In isolated regions, it has been proven to be sustainable even under the worst conditions.

Like solar energy, rainwater, is one of the safest water resources, especially under rural setting where the air is relatively pollution-free. Efficient rainwater collection mechanisms and water quality controls will ensure rainwater harvesting is an excellent alternative method for providing our water needs. Appropriate procedures will comply with water standards based on intended use.

### “Do No Harm” principle

A solar power system does not create any pollution in the process of generating electricity. Solar energy is clean, renewable (unlike gas, oil and coal) and sustainable. There is no on-going cost for the power it generates – as solar radiation is free everywhere. Once installed, there are no recurring expenses. This system coupled with the water harvesting system will enhance the Gym and provides an environmentally friendly and sustainable solution.

Extra care should, however, be observed in the disposal of malfunctioning batteries as these contain solutions that could contaminate the environment.







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