### Case Study

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<thead>
<tr>
<th>Country:</th>
<th>City:</th>
<th>Key Sectors:</th>
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<tr>
<td>PHILIPPINES</td>
<td>NAGA CITY, PROVINCE OF CAMARINES SUR</td>
<td>land use management, housing, wastewater treatment</td>
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<tr>
<th>Local Partner Organization</th>
<th>Geography and Population</th>
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<tr>
<td>- Naga City Planning and Development Office</td>
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<td>- Naga City Housing and Settlements Development Office</td>
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<td>- Metro Naga Water District</td>
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Naga City serves as the regional center of the Bicol Region as well as the capital of the Province of Camarines Sur, located in Southern Luzon. As of 2010, population is estimated to be at 174,931.

### Contact Information

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### Summary

Naga is a secondary city in the Philippines not spared from a common trend besieging emerging cities – that is, developing rapidly to meet the demands of economic activities which can eventually lead to disruption of other systems within the city. Fortunately, the city government has recognized this problem and is now taking the necessary steps to put in place safeguards to manage resources in an integrated manner.

The housing project in Barangay (village) Del Rosario is a demonstration of how this can be done. The project employs a multi-level approach involving various actors coming from the local, national, and meso levels. This in itself is already an application of the nexus approach.

A number of departments including the engineering, planning, and environment, to name a few share their respective insights on how best to elaborate the project. Naga City has also tapped the national level, through HDMF, in terms of financing the project.

At the meso level, it has collaborated with BISCAST to help broaden and disseminate knowledge and
skills provided by GIZ technical experts. Finally, the housing project employed community participation by requiring 400 hours of sweat equity. This refers to the hours of work that homeowners devote in building their houses and those of their neighbors.

In broader terms, the housing project proposes to include a wastewater treatment system which will allow the conversion of wastewater into other uses including biogas and fertilizer production. The use of this technology clearly illustrates the link within the spheres of water, food, and energy – which simply put, refers to the nexus. It is a closed loop system that is not only environment-friendly but it is practical, efficient, and can even become economical when applied to a larger scale.

**Rationale**

Naga City serves as the regional center of Bicol Region, located in the eastern part of the Philippines facing the Pacific Ocean. The city’s population is estimated to be more than 170,000 and is expected to increase in the coming years. Naga’s demographics show that it has a fairly young population, with 55.39 percent of the whole population being comprised by residents 24 years old and below.

A bustling center for various socioeconomic activities in its region, Naga City’s inevitable development meanwhile threatens its environment and natural resources. The changing climate also adds stress as impacts manifest through flooding, low agricultural yield, and energy shortage. Frequency of extreme weather events also hampers the livelihood and social security of the Naguenos.

With the continuous increase in its population while cognizant of the fact that land area remains constant, the task of meeting the increasing demand for residential areas becomes more challenging for the city government. This has prompted a re-examination and study of innovative ways to design and construct future housing projects.

The low-cost housing project in Barangay Del Rosario is a response to this scenario. Planning and implementation of cost-efficient housing schemes require a cross-sectoral approach. It encompasses roads, energy, water, wastewater, storm water drainage, and solid waste to name a few. With low-income employees from the city government as main beneficiaries, the proposed housing project explores integration of existing systems and resources in order to become efficient and economical.

One proposed intervention is the installation of a wastewater treatment system which will cover not only the housing estate but will also include neighboring facilities such as slaughterhouse and city penitentiary. At the moment, septic tanks and a constructed wetland are used to treat the slaughterhouse’s effluent. However, this causes a putrid smell which affects the people’s health. On the other hand, the penitentiary’s effluent runs off directly into a nearby creek thereby polluting the environment. No sewer facility network exists in the city.

As a “maogmang lugar” (happy place), Naga City will strive to keep its vision of being a recognized model of good governance and development centered on quality and accessible services to its citizenry. Cross-sectoral planning is one of the many strategies being undertaken by the city government toward the realization of this vision.

**Project Description**

Building a residential community near a prison and slaughterhouse seems like a strange idea but Naga
City in the Philippines has ventured into this prospect. The housing project in Barangay Del Rosario, Naga City will be constructed at a 5,200 square meters (m²) procured by the city government. The lot is located next to a slaughterhouse and adjacent to the city penitentiary.

A total of 48 housing units will be built with partial financing from the HDMF. Housing units have a size of 21 m² amounting to PhP150,000 each. Additionally, 400 hours of future home owners have to be contributed (known as sweat equity) adding another PhP104,000 to the housing unit cost. The Del Rosario housing development site has now completed three quadruple housing units (12 units). Additional nine quadruple housing units (36 units) are targeted to be completed by the end of 2014.

To incorporate nexus, a pilot wastewater treatment system is considered in a later stage. Wastewater coming from the nearby slaughterhouse, district jail, housing estate, and a planned high school would purified here. Biogas produced after treatment could then be used within the compound. Treated wastewater can also be reused for agricultural purposes.

Stakeholders / Target groups

Stakeholders:
- Naga City Planning and Development Office
- Naga City Environment and Natural Resources Office
- Naga City Engineer’s Office
- Naga City Housing and Settlements Development Office
- Naga City Solid Waste Management Office
- Metro Naga Water District (MNWD)
- Home Development Mutual Fund (HDMF)
- Bicol State College of Applied Sciences and Technology (BISCAST)
- Habitat for Humanity

Target groups:
- Low-income employees of the local government of Naga

Costs / Financing

The Del Rosario low-cost housing project with 48 housing units costs 26.2 million pesos. To finance the housing project, the local government entered into an agreement with one of the national government agencies mandated to assist in the provision of affordable housing facilities, the HDMF. To start construction, the HDMF granted Naga City a loan of 12 million pesos with a 4.5 percent interest rate per annum.

On the other hand, the Habitat for Humanity initially took the role of constructing the housing units. Over time, the parties involved agreed that only 12 units will be completed by the Habitat for Humanity. The construction of remaining units will be overseen by a private contractor.

Studies / Reports / Training

Report on Nexus activities in Naga City/Philippines on affordable housing and waste water management
Results (Impact)

Prior to its selection as one of the Nexus project sites, the City Government of Naga has entered into a tripartite agreement with the Habitat for Humanity and the Home Development Mutual Fund (HDMF) for a low-cost housing project located in Barangay Del Rosario.

Technical assistance was provided by GIZ Urban Nexus in two ways namely 1) introducing possible amendments in terms of structure and design, and 2) ensuring compliance with national building standards issued by the Housing and Land Use Regulatory Board (HLURB).

In terms of the design, one central septic tank was designed instead of 48 single septic tanks resulting to economic savings. Detailed cost calculations on the “quarto complex” housing units have also been elaborated and presented to the city government.

In terms of structural modifications, some changes introduced include making the foundations more earthquake-resistant, reducing unnecessary structural elements (columns), and adding reinforcements to protect the roof against uplifting especially during typhoon season. Considering that Naga City is located in the Bicol region frequently visited by typhoons, these structural changes are expected to make the houses more resilient.

To ensure that such innovations can be replicated in the future, an on-the-job-training for teachers and students of the Bicol State College of Applied Sciences and Technology (BISCAST) was conducted. The training covered practical engineering skills including construction site management, detailed cost estimation and cost calculation for better monitoring and evaluation, modular construction system and improved hollow block production, improved roofing, cross ventilation and climatically-adjusted design and construction. The training was conducted at BISCAST as well as on the construction site. The changes in housing designs have been drawn by students and teachers. These were later approved by the city government.

Advisory service to BISCAST has been resumed since November 2014 in the areas of Waste water management, solid waste management, resilient, cost-efficient and climatically adjusted housing, resilient, cost-efficient and climatically adjusted construction methods, energy efficiency and application of renewable energies and elaboration of respective training manuals and on-job-training.

Working at the meso-level has allowed the project to create a new pool of skilled individuals who will be
able to undertake similar work in the future. The training skills mentioned above have become part of the training courses implemented by BISCAST in their courses for architects. Such concrete action is a testament to BISCAST’s commitment to become the leading training center on innovative resilient low-cost housing technology and other nexus approaches not only within the Bicol Region but in the entire Philippines.

A proposal to establish a wastewater treatment system based on a septage project developed prior to GIZ intervention by the Metro Naga Water District was also put forward. The envisaged septage collection could be used for energy production if not only 40,000 septic tanks would be emptied but if additional organic waste would be added. However, due to the mandate of the Metro Naga Water District further considerations on energy use were put aside for the moment.