



# Best Practices in the Proposal of a Sanitation Solution in La Fortuna de San Carlos, Costa Rica



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# Models for the Development of Innovative Sanitation Solutions in Rural Communities

## A history of learning in La Fortuna de San Carlos, Costa Rica

*An innovative participatory approach for a sanitation proposal in La Fortuna de San Carlos, Costa Rica*

### Background

La Fortuna is the seventh district of the community of San Carlos and covers an area of 225 km<sup>2</sup>. This district has grown rapidly in recent decades. In the period of 1984-2011 there was a population growth rate of over 200 %, which was above the national average of 78 %. It also has a high touristic relevance in the country. Of the total number of international tourists visiting Costa Rica, between 21 % and 27.6 % visit the attractions of this district (Hidrogeotecnia, 2022a).

However, according to the *La Fortuna District Strategic Development Plan 2014-2024*, one of the community's problems is the management of its wastewater. More than 90 % of the houses in La Fortuna use septic tanks for wastewater treatment and less than 20 % provide adequate operation and maintenance of the systems. Similarly, the majority of the stakeholders in the commercial sector in the district uses a septic tank. Only 33 % of these stakeholders report annual maintenance. Therefore, bad odors, soapy water, sewage overflow and an increase in vectors harmful to health are perceived within the district. In addition, there are several negative effects on the environment (Hidrogeotecnia, 2022a).

Considering the population growth mentioned above, a greater demand for all services in La Fortuna can be inferred, which increases the pressure on the existing wastewater management systems. There is little concern about this in the region, which is why at the beginning of the 21<sup>st</sup> century the Integral Development Association of La Fortuna (ADIFORT) acquired an 11 ha and 1696 m<sup>2</sup> plot of land for the installation of an integrated wastewater treatment plant (Vega, ADIFORT, 2022).

In recent years, motivated by the National Wastewater Policy 2016-2045 and in accordance with the Regulations of the Administrative Associations of Communal Aqueduct and Sewerage Systems, the Costa Rican Institute of Aqueducts and Sewers (AyA) has supported the Rural Aqueduct Administrative Association (ASADA La Fortuna) with the development of a sanitation solution for La Fortuna de San Carlos.

Therefore, this territory was selected for the development of a feasibility study and preliminary designs for a sanitation solution for La Fortuna de San Carlos within the framework of the GEF CReW+ project "Implementing integrated water and wastewater management solutions for a clean and healthy Caribbean Sea".

### The challenge

According to data from the National Institute of Statistics and Census (INEC), 4,832,227 inhabitants lived in Costa Rica in 2015. AyA estimates that the daily wastewater generation per person is 0.2 m<sup>3</sup>/day. Based on this assumption, Costa Rica generates 966,455 m<sup>3</sup>/day of ordinary wastewater, of which only 14.43 % undergoes treatment (AyA, MINAE and MS, 2016, p. 30).

According to data from 2015, the bigger part of the wastewater in the country (about 70 %) is disposed of through septic tanks. It should be noted that this treatment is not a guarantee that there will be no impact on the environment or health, since the construction, operation, and maintenance of these systems in the country are not controlled (AyA, MINAE and MS, 2016, p. 15).

In the particular case of the district of La Fortuna, this situation is more generalized since, according to data compiled by INEC, 98.74 % of the population reported in 2011 that they dispose their wastewater through septic tanks. The sewage system proposed in the GEF CReW+ project would be the first project with a wastewater treatment plant to be developed in conjunction with the ASADA

La Fortuna. There are no other services of a similar nature within the project's area of influence, but rather isolated treatment plants exclusively in tourist developments (Hidrogeotecnia, 2022a).

Low sanitary sewer coverage and poor wastewater management pose a threat to the sustainability of water resources and the conservation of the many water bodies in the country. The major problems resulting from the lack of adequate sanitation and wastewater treatment systems have implications for public health and environmental pollution, resulting in potential risks to the country's productivity and competitiveness (AyA, MINAE and MS, 2016, p.40).

According to the National Wastewater Sanitation Policy 2016-2045 (AyA, MINAE and MS, 2016, p.54), there are severe limitations for integrated wastewater management, highlighting the following:

- Inadequate use of existing tools and lack of financial, technological, human, regulatory, and information resources
- Insufficient citizen participation in water resources protection measures due to limited awareness in this regard
- Low coverage both of national sewers (21.4 % in 2015) and ordinary wastewater treatment plants (14.3 %)
- Investments in sewerage and wastewater treatment systems have a significant backlog, as they are focused on drinking water supply only

Considering the above, and in addition to the relevance of the locality in terms of tourism and the projected population growth with its consequent pressure on public services, the feasibility analysis and preliminary designs of a centralized sanitation solution take on special relevance, aiming at the collection, treatment, and disposal of wastewater in a receiving body (Hidrogeotecnia, 2022a). This is important, considering the challenges experienced by communal aqueducts in terms of funding for pre-investment studies and experiences that ASADA La Fortuna can subsequently share with other communal organizations. This in turn is key in terms of financing the subsequent stages. In addition, this experience has the potential to promote cultural change towards awareness and citizen involvement, as evidenced by the relevance given to the issue by both community and institutional representatives in a rural area.

One of the main challenges of the project was its formulation and execution during the COVID-19 pandemic. The pandemic limited communication among stakeholders and supervision of field work. Thus, participation in the project is a major challenge in the implementation of sanitation solutions, as well as the establishment of a relationship of trust among stakeholders.

## **CReW+ Model and Strategy**

The Global Environment Facility (GEF) has provided \$22 million in grants and financial resources and mobilized nearly \$120 billion to co-finance more than 5,200 projects and programmes. The GEF is the largest trust fund focused on enabling developing countries to invest in nature and it supports the implementation of international conventions on biodiversity, climate change, chemicals, and desertification. It unites 184 governments, as well as civil society, international organizations, the private sector, and other partners.

The GEF CReW+ project is a partnership project funded by the Global Environment Facility (GEF) and co-implemented by the Inter-American Development Bank (IDB) and the United Nations Environment Programme (UNEP) in 18 countries of the Wider Caribbean Region (WCR). This innovative project builds on the successful previous phase called "The Caribbean Regional Fund for Wastewater Management (CReW)" (2011-2017).

CReW+ is being executed by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, the Organization of American States (OAS) and the Cartagena Convention Secretariat (UNEP-CAR/RCU) on behalf of the IDB and UNEP respectively. In the case of Costa Rica and in response to the objective "application of innovative small-scale solutions for integrated water and wastewater management in urban, peri-urban, and rural areas", the development of a feasibility study and preliminary designs for the integrated wastewater management of La Fortuna was defined as the scope of the project, which has been executed under the responsibility of GIZ.

For this purpose, the company Hidrogeotecnia Ltd. was hired, which carried out a consultancy from March 2021 to August 2022. It includes the following deliverables: 1) A baseline study of the wastewater situation in La Fortuna. 2) A pre-feasibility study of

alternatives regarding the construction work through a multi-criteria evaluation. 3) A feasibility study of the selected construction alternative. To achieve the expected results, an inter-institutional work team was formed, made up of counterparts from public institutions such as the Water Directorate of MINAE, the Wastewater Management Department of AyA, as well as cooperating partners, namely, IDB and GIZ. Very important has also been the community representation by the ASADA of La Fortuna.

This team advised and supported Hidrogeotecnia through regular sessions that promoted the involvement and knowledge of the parties in the process. Once the baseline collection of the district's wastewater situation was completed and a survey was conducted to obtain information on the willingness to pay for the sewerage service and wastewater treatment plant and users' perception of local sanitation, the company proposed a series of technological alternatives under the consideration of economic, environmental, technical, and social factors<sup>1</sup>.

The selection of the final alternative was the final product of a multi-criteria workshop, in which several stakeholders such as the ASADA of La Fortuna, ADIFORT, the Municipality of San Carlos, AyA, MINAE, IDB and GIZ were involved. During this workshop, discussion groups were held to agree on the relevance of each evaluation criterion according to the local context. After receiving feedback, the most appropriate technological option was agreed upon and a feasibility analysis of the selected alternative was developed.



Figure 1: Contamination from wastewater discharge in La Fortuna de San Carlos. Foto: © GIZ/Joaquín Viquez

As a result of the selection process, a sanitary sewer was preferred, primarily gravity-driven, taking advantage of the differences in elevation in the study area. This alternative includes a pumping station to carry the water from the last collector to the wastewater treatment plant (WWTP). The WWTP design includes up-flow anaerobic reactors and trickling filters. It will treat an average daily flow of 136.2 l/s by 2050. The proposed WWTP design was complemented with pre-treatment, disinfection, sludge drying bed, and other components (Hidrogeotecnia, 2022c).

Once the activities defined in the framework of the feasibility study were completed, the final results were presented to different national and local stakeholders through a workshop in the community. This also promoted the identification of synergies and the search for financing to continue the next stages of the project.

It is necessary to highlight the interest and promotion of joint work (public institutions and validation of civil society organizations) for the selection of an alternative for integrated wastewater management in the town of La Fortuna de San Carlos. **Table 1** summarizes the main activities carried out, as well as the products resulting from this process:

**Table 1**

*Activities and products identified in the CReW+ project: a feasibility study and preliminary designs for La Fortuna's integrated wastewater management.*

Activities	Products
<ul style="list-style-type: none"> <li>Field visits to the community of La Fortuna by Hidrogeotecnia</li> <li>Meetings with project counterparts to follow up on the consultancy. These sessions were attended by GIZ, AyA, MINAE, ASADA of La Fortuna, ADIFORT, and IDB.</li> </ul>	<ul style="list-style-type: none"> <li>Assessment and diagnosis: initial situation of the project, identification of basic planning conditions.</li> <li>Market study: forecast of population growth and services and wastewater production (flow) generated by the division of the urban area and its expansion until 2050.</li> </ul>

<sup>1</sup> Three sewerage and three WWTP technological alternatives were proposed.

<ul style="list-style-type: none"> <li>• Survey*: Carried out to collect information on the willingness to pay for sewage and treatment plant services</li> <li>• Multi-criteria workshop**: The purpose of this workshop was to select the best wastewater collection and treatment alternative. Representatives of ASADA of La Fortuna, Municipality of San Carlos, ADIFORT, MINAE, IDB and GIZ participated in this workshop.</li> <li>• Sharing the results with the counterparts of the workshop "Towards a sustainable sanitation system in La Fortuna de San Carlos". There, the main findings of the project were presented and the development of synergies for the following stages of the project was promoted.</li> </ul>	<ul style="list-style-type: none"> <li>• Preliminary design and feasibility study (economic and financial).</li> </ul>
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\*The survey application was conducted between June 24 and 25, 2021, to a population of 71 households (subscribers) and 22 stakeholders linked to different commercial activities.

\*\* The criteria analysed included: economic, environmental, technical, and social criteria.

Source: Own elaboration, 2022.

## Expected result

The scope of the proposed solution involves the implementation of a sanitary sewer system and wastewater treatment plant, with a planning horizon of 2050, covering 23,077 people. The construction of a sanitary sewer system will benefit the inhabitants of the following areas: Zeta Trece, Barrio Pastoral, Palmas, El Centro, Barrio Olivos, Barrio Monolo, Barrio Pito, Barrio La Rivera, Barrio Dora, and Barrio Pilo. This implies a substantial improvement in the way wastewater is treated and, consequently, a positive effect on environmental and social factors in these areas.

In accordance with the facts mentioned above, some of the benefits that the people of La Fortuna perceive from the sewerage and treatment plant project are the following: protection of the rivers and the environment, reduction of diseases caused by wastewater, improvement in the quality of life in the area, increase in the value of the land, among others (Hidrogeotecnia, 2022a).

Although these are medium-term effects, there are other short-term effects that can be generated from the specific actions carried out in the GEF CReW+ project, i.e., the feasibility study and preliminary designs. In this regard, the synergies between public institutions and ASADA and ADIFORT stand out, as these local actors recognize that their engagement in water management can benefit from the technical support of institutions such as AyA.

In addition, the work experience presented in this document, with its respective good practices and lessons learned, can serve as a stimulus and guide to other local organizations that intend to coordinate efforts to address the problems related to wastewater management and treatment.

**Table 2**

*Summary of short- and medium-term results attributed to the GEF CReW+ project: a feasibility study and preliminary designs for the integrated wastewater management of La Fortuna.*

Short- and medium-term results
<p><b>Short-term results:</b></p> <ul style="list-style-type: none"> <li>- Construction of a treatment plant in La Fortuna de San Carlos.</li> <li>- Synergies between public institutions and local organizations engaged in water and wastewater management.</li> <li>- Encouragement in other rural and touristic communities to address their wastewater management needs.</li> </ul>

**Medium-term results:**

- Protection of rivers and the environment.
- Improved health conditions

Source: Own elaboration, 2022.

## What has worked?

- There are **contextual elements** at country level that are key to the development of actions related to water management and sanitation. Aspects such as the existence of a favourable environment in terms of institutions, legislation, public policies<sup>2</sup>, and regulations such as that of the ASADAS promote and encourage the participation of institutional and local actors, which allowed the synergies required for the execution of the "Feasibility study for the sanitation project in La Fortuna de San Carlos", which in turn involved the pre-investment methodologies of the Ministry of National Planning and Economic Policy (MIDEPLAN), with regard to its financing.

*"Hay un entorno muy favorable, prácticamente tenemos una política aprobada que domina la inversión en saneamiento, el país se está moviendo bastante en esto" (Antony Torres, GIZ).*

*"There is a very favourable environment, we practically have an approved policy that drives investment in sanitation, the country is making great progress in this area" (Antony Torres, GIZ).*

- **The community selected to carry out the project was the appropriate one.** It has civil society organizations that **meet important criteria such as trajectory, interest, and commitment**<sup>3</sup> to address the environmental, social, economic, and health issues involved in the non-treatment of wastewater, especially for a region in which one of its main economic activities is tourism.

*"La ASADA de la Fortuna, aparte de que es ejemplo en cuanto su administración, ya que es una ASADA medio grandecita, también tiene el problema de que la Fortuna se está haciendo como muy grande para que las soluciones vía tanque séptico sean lo óptimo (...) al ser una zona tan turística tienen mucho apoyo de la empresa privada y de la Asociación de Desarrollo" (Vivian González, MINAE).*

*"The ASADA of La Fortuna not only represents a suitable example for the administration, since it is a medium-sized ASADA, but also faces the problem that the municipality of La Fortuna is growing, so that the solutions concerning the septic tank are optimal (...), and since it is such a tourist area, the municipality gets a lot of support from private companies and the development corporation" (Vivian González, MINAE).*

- The cooperation and **synergy between the institutions and the community** were key, from the phase in which the relevance of the problem was established, through the subsequent request for allocation of non-reimbursable funds, to the final product, which required the technical and operational accompaniment of all stakeholders. A clear example of this is that, given the relevance by the municipality and a favourable institutional context, the stakeholders were aware of the problem before the project began and had even prepared Terms of Reference for the development of the commissioned pre-feasibility study. In addition, the **consultation of the municipality in the diagnosis of sanitation** in the area, as well as in the commercial and private sectors, allowed the identification of risks and opportunities for the sustainability of the project, which were taken into account in the preparation of the proposal for sanitation.

<sup>2</sup> In particular, the National Water and Sanitation Policy ([download the Spanish version here](#))

<sup>3</sup> ADIFORT has been engaged in the development of water treatment solutions since approximately the 1990s and more recently in partnership with ASADA La Fortuna. Both organizations have the common goal of building a treatment plant in the town of La Fortuna.

*“Resulta clave para el éxito la buena coordinación interinstitucional y con la ASADA desde las etapas previas de preparación, considerando por ejemplo que los términos de referencia ya estaban listos a partir del conocimiento de la temática y la coordinación entre las partes” (Laura Torres, AyA).*

*“Good inter-institutional coordination and coordination with ASADA from the previous stages of preparation was key to success, considering, for example, that the Terms of Reference were already based on knowledge of the subject matter and coordination between the stakeholders” (Laura Torres, AyA).*



*Figure 2: Presentation of the results of the workshop "Towards a sustainable sanitation system in La Fortuna de San Carlos".  
Foto: ©GIZ/Antony Torres*

- The implementation of **inter-institutional technical advisory** meetings to review the progress of the consultancy expedited the construction of an integrated sanitation solution and improved the quality of the project's products through the exchange of different experiences and knowledge. These follow-up meetings made it possible to identify errors, correct them, and change the direction of the project in a timely manner. In particular, through these meetings with specialists, the implications that the proposed technologies could have on the design were identified in detail. In this way, the evaluation of possible alternatives for implementation according to local conditions was agreed upon.

Besides, the exchange during these meetings allowed to get to know the needs and expectations regarding the design of representatives of organizations with experience in the sector in Costa Rica that would later support its implementation, such as AyA. Therefore, the development of a product that could have a higher probability of success for its implementation was promoted.

- The implementation of a **participatory multi-criteria workshop in the community** for the prioritization of sanitation technology systems gave different local and national stakeholders the opportunity to express their respective concerns and preferences, and thus be considered in the design process. In particular, the evaluation of the technology proposals by **local stakeholders** allowed the prioritization of those technology proposals most applicable to the reality of the community. In addition, the evaluation of the technology systems through different criteria facilitated the identification of priorities in a comprehensive manner, so that the technological proposals that generate the greatest benefit are prioritized. Also, the discussion of the results of the activity with stakeholders from the public and private sectors and NGOs through the **face-to-face workshop "Towards a sustainable sanitation system in La Fortuna de San Carlos"** favoured the exchange of ideas for the development of financing solutions that would provide continuity to the project. New synergies and collaboration opportunities were established that favour the implementation of the next stages of the project.

## Which ideas were dropped?

- In general, projects should have a **clear governance scheme** that specifies the stakeholders involved, their roles, responsibilities, expected interaction, means of approval and formal channels of communication. This is particularly important in a project that has a certain complexity due to its scope, as well as the multiplicity of stakeholders involved in decision making, with varying levels of authority.

*“Hubiese sido bueno detallar qué se esperaba de cada actor, estaba muy por encima. Yo especificaría más el rol de cada contraparte dentro del proyecto [...] Conviene dejar más claro procesos ambientales y legales, porque eso nos tomó como un mes, tener claro los procesos, por ejemplo, con el SETENA y el AyA” (Uver Villalobos, GIZ).*

*“It would have been good to specify what was expected of each actor, it was too much. I would specify more on the role of each counterpart within the project [...] It would have been better to make environmental and legal processes clearer, because it took us about a month to gain enough knowledge about the processes, for example, with SETENA and AyA” (Uver Villalobos, GIZ).*

- **Deepening the stakeholder analysis results** in the identification and prioritization of a greater number of stakeholders, as well as their prioritization according to power and interest, and to the definition of engagement strategies according to their profile. This promotes trust among stakeholders by deepening communication requirements according to their level of involvement. In cases where local stakeholders or organizations are the end users of a project, it is important to ensure that the flow of information is effective (i.e., communicate in appropriate formats and languages). In addition, when operating in a highly touristic environment, it is important to ensure the involvement of local businesses in this sector, to facilitate community awareness of sanitation and encourage community participation in it.
- Implementing the sanitation projects, it is important to carry out **awareness-raising activities in the community** in relation to environmental sanitation and hygiene. It is also important to seek **funding** for their implementation. Therefore, it is advisable to consider and include funding and dissemination components in the agreements between implementing agencies and national partners at the formulation stage to complement and accompany the technical solutions implementation activities. In this way, considering the financing component, it would facilitate the search for affordable sources according to the local context, which would allow an agile leveraging of resources to continue with the following stages of the project.

## Key Steps towards Sustainability

The following elements, according to the lessons learned, are essential to advance towards the subsequent stages, i.e., final designs and subsequent construction and implementing:

1. Maintaining the functioning synergy between the community and the institutional framework in terms of budget search and allocation: The involvement of the community base (ASADA and ADIFORT) is fundamental in the search for funding and must be supported by the institutions, with a focus on local stakeholders. To this end, proposals have been developed for the use of public funds such as the landfill tax, as well as for the involvement of other institutions such as the Institute for Rural Development (INDER) and private funds.

*“Clave principal del éxito, el interés de la comunidad, de la ASADA y la ADIFORT y de muchas instituciones que también apoyan, que conocen la línea que llevan la ADIFORT y la ASADA en cuanto a la protección de recursos, el MINAE y el AyA conocen el interés de llevar a cabo este proyecto y lo apoyan, sea como sea este proyecto se va a llevar a cabo” (Ronald Vega, ADIFORT).*

*“The most important key to success is the interest of the community, of ASADA and ADIFORT and many institutions that also support, that know the line of ADIFORT and ASADA in terms of resource protection, MINAE and AyA are aware of the high interest in the implementation of this project and support it in whatever way the project will be implemented” (Ronald Vega, ADIFORT).*

2. Community stakeholder engagement (particularly from ASADA-ADIFORT and other relevant stakeholders) must be sustained and concretized: both in work plans and through the hiring of technical staff to assist in the final design of the work and in future operations and maintenance, in addition to institutional partners.

*“La motivación, la ASADA es la que va a tener el proyecto, si la ASADA no está clara en lo que quiere o lo que sigue, si lo deja botado y se desmotiva el proyecto no va a ocurrir. Un tema muy importante es la motivación de los actores locales para que el proyecto suceda” (Jossette Quesada, Hidrogeotecnia).*

*“If ASADA is not clear about what it wants or what comes next, if it lets itself go and becomes unmotivated, the project will not work. A very important point to make the project happen is to motivate the local stakeholders” (Jossette Quesada, Hidrogeotecnia).*

- 3.** Promoting cultural change within the community together with neighbouring communities and the commercial sector: A cultural change is essential making community stakeholders understand that they must take responsibility not only for the water pumped, but also for the way they manage wastewater. If this is not successful, there might be a risk that private users will refuse to support the initiative. Therefore, locally adapted communication strategies need to be developed and designed for the awareness raising required in the next phases of the project. These should be supported by public institutions, local organizations, donors, and other partners that may be involved.

*“Tenemos que hacer entender a la gente que el agua que consumís, tenés que pagarlo al devolverlo. (...) una gran parte del éxito del proyecto va a depender de la sensibilización de la comunidad” (Nidia Vega, ADIFORT).*

*“We have to make people understand that when they give back the water they consumed, they have to pay for it (...) a big part of the success of the project will depend on raising awareness within the community” (Nidia Vega, ADIFORT).*

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