| | |
|---|---|
| **Title** | **Gaia Dam**<br>Gabion-Type Low Dam with Eco-Friendly Core Material |
| **Overview** | This low-cost and environment-friendly irrigation dam is highly beneficial to small farming communities, which need effective and sustainable systems to manage water supply and deliver sufficient water to their farmlands. It is also designed to help prevent extreme flooding due to heavy rains that are prevalent in tropical countries such as the Philippines, by minimizing and re-routing the flow of water. The dam utilizes gabion cages as its main structural frame, with recycled concrete cylinders or rocks as filler material. The sturdy cylinders inside the gabion cages provide stability against water forces pushing through the dam. |
| **Key Features** | The Gaia Dam has three major components: the geotextile fabrics, the gabion cages, and the core material. The geotextile fabrics that contain the core material are made from recycled plastic. The wire mesh baskets, called gabions, often contain rocks or recycled concrete cylinders. The gabions serve as the main structure of the dam and have a maximum life span of 15 years. Lastly, the dam's most unique feature is the core material, which could help improve farmers' productivity and yield because of its ability to produce humic and fulvic acids and chitinase when water passes through. Humic and fulvic acids help crops absorb the nutrients in the soil while chitinase, a hydrolytic enzyme, dissolves the exoskeleton of insects and fungi, thus acting as an organic fertilizer and pesticide. |
| **Applications** | Irrigation systems in agriculture industry, and green engineering in urban areas. |
| **User/Customer Edge** | The green engineering of Gaia Dam aims to help alleviate food and water supply shortages. It can also provide electricity to small communities by incorporating a mini hydroelectric turbine and generator. Farmers will benefit from this inexpensive yet effective irrigation system and impounding dam. |
| **Market Opportunities** | Globally, agriculture accounts for 3.1% of Gross Domestic Product. This rises to 25.6% of GDP in less developed nations (World Bank). Of the total potential agricultural land, only 18% is irrigated. The remaining 82% represents an opportunity for affordable irrigation methods, especially in developing economies. Rapid population growth in these developing countries also creates a need for better food production, which can be attained through cheaper and easier-to-build irrigation methods such as small-scale dams. This is particularly important as majority of agricultural players are small-scale farmers who do not have the resources to invest in big irrigation projects. |
| **Inventors** | Rhey Joseph S. Daway; Kent Renier M. Carandang; Ralph John P. Barte; Leonardo Q. Liongson, PhD; Mark Albert H. Zarco, PhD<br>Institute of Civil Engineering |