

Objectives

In accordance with the TOR of the Consultant, the objectives set for this study are directed towards collecting the accurate information on (a) the quantities of labour and materials needed for the construction of 4, 6, 8, 10, 15 and 20 m³ biogas plants, based on the plant drawing and the quality standards; (b) the actual amounts of labour and materials used for the construction of 4, 6, 8, 10, 15 and 20 m³ plants, according to the interviews with farmers and masons in the selected districts; and (c) the total contact sum, based on the BOQ and prices for labour and material, obtained from field research in Butwal and three areas of Baglung district viz. Bazar area, away from Bazar but accessible and inaccessible areas.

The purpose of this report is to provide accurate information to the AEPC, about the actual cost and estimated cost of biogas plants of varying sizes being constructed under the Biogas Support Programme (BSP) through the 39 recognised biogas construction companies.

Approach and Methodology

Biogas plants of the model GGC 2047 are being commissioned in varying sizes of 4, 6, 8, 10, 15 and 20 m³ under the BSP. As per the agreement with the BSP, the concerned companies are committed to build the plants in accordance with the SNV/BSP quality standards.

In order to obtain the required information, the activities carried out by the field research team consisted of farmers and masons' interview and collection of local market prices. The study team mainly concentrated to collect the quantity and cost of the construction materials and labours involved in the biogas construction with the farmers. The cost of the pipe fittings and accessories was collected with the respective construction company from their record.

Main Findings

Calculated Quantities of Materials and Labours for Biogas Plants Construction

Based on the GGC 2047 model biogas plant, detail calculation of the materials and labours has been done and presented in the report. A summary of the construction materials, pipe fittings, appliances and labours required for the different size of biogas plant both in stone and brick masonry are presented in **Table 1.2(a)** and **Table 1.2(b)** of the report.

A separate checklist was prepared to collect the actual quantity of the construction materials used in the construction of various sizes of biogas plant from the masons. The study team managed to collect the information from each 20 masons from Baglung and Butwal areas.

The study team collected the local prices for construction materials, pipe, fittings, accessories and the labour involved in the construction of biogas plants at local market of both the districts. The prices of local construction materials (bricks, stone, sand, gravel etc.) and labours were collected for the VDCs/Municipalities taken under survey, whereas the prices of imported materials (cement, pipe fittings and accessories) were collected in the local market of Butwal and Baglung districts.

Average Actual Quantities of Materials and Labours for Biogas Plants Construction

The average actual quantities of materials and labours for biogas plant of sizes 4, 6, 8, 10, 15 and 20 m³ capacity resulting from interviews with farmers and masons have presented in **Table 1.3(a)**, **1.3(b)**, **1.4(a)** and **1.4(b)** of the report both for stone and brick masonry, respectively.

Summary of Materials and Labours Costs for Biogas Plants Construction for Hill and Terai Area

The unit costs of construction materials, pipe fittings and appliances and labours for biogas plant construction collected during March/April 1999 have been presented for Hill and Terai area. The costs of local construction materials viz. stone, brick, sand and gravel labours are based on the average of Butwal and Baglung areas for Hill and Terai region respectively. The cost of pipes and fittings were collected through the three independent quotations at the local market of Butwal and

Baglung. The costs of appliances are based on the quotation provided by the construction company. It was observed that the cost of pipes and fittings provided by the construction company appeared higher than the local market prices.

Summary of Calculated Costs of Biogas Plants Construction for Hill and Terai Area

Based upon the local average rates of construction materials collected at Butwal and Baglung areas and the cost of pipe fittings and appliances quoted by the construction company, the costs of biogas plant have been calculated for different sizes of biogas plants following GGC 2047 model biogas plant. It was observed during the study that brick masonry is not used in the Hill area for the construction of biogas plant due to the high transportation cost involved. However, both stone as well as brick masonry are used in Terai for the biogas plants construction. So only the stone masonry plants are calculated for Hill and both brick and stone masonry plants are calculated for Terai.

Summary of Actual Minimum and Maximum Costs of Biogas Plants Construction for Hill and Terai Area

Amongst the 31 plants at Butwal and 36 plants at Baglung sampled for this study, the average costs of the biogas plants of size 4, 6, 8, 10, 15 and 20 m³ are drawn up as per the actual costs invested by the farmers and presented in **Table 1.7(a)** and **1.7(b)** for Terai and Hill, respectively. The details of the individual cost of all 67 plants studied are summarised in **Chapter – 3** of the report.