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Experience with the Implementation of a Biogas-Program in Thailand

Erfahrungen bei der Durchführung eines Biogas-Programmes in Thailand

By R. Kraft*

1. Introduction

The increasing costs of energy, coupled with the needs to conserve forest areas, are the main reasons why biogas technology has recently attracted broad attention in Thailand. Different government and private aid agencies made it possible of introducing the technology to Thailand's estimated 4 000 000 small scale farmers. Small scale farming means a family of about seven persons with a small-holding between 6 to 25 rei (1 to 4 ha). Subsisetence crop is mainly rice with peanuts, maize, tobacco, garlic etc. as cash crop, depending on region and altitude. One to three waterbuffaloes are the usual animal stock.

2. Government Campaign

Of all institutions, the Department of Agricultural Extension is probably the best equipped for the straight introduction of biogas technology to interested farmers. This Department, which has recently been reorganized with World Bank aids and foreign personnel, can reach large numbers of farmers through its field level extension-system. The training and visit system is based on fortnightly visits by the extension-workers to a limited number of contact farmers. The contact farmers pass the recommendations, which are made to them, on to the other farmers (1).
The proposed extension worker to farm-family-ratio is 1 : 1000, within 30 km range. This ratio has already been reached in about 30 of Thailand's 74 provinces. The important line of technical support and administration controls is given through the district and province offices.

* Rainer Kraft, Dipl.-Ing. agr. Von 1980 bis 1982 als Landwirtschaftsberater tätig für das Department of Agricultural Extension in Bangkok, Tailand.
Anschrift: Hinterm Bachberg 2, 6000 Frankfurt/M 50

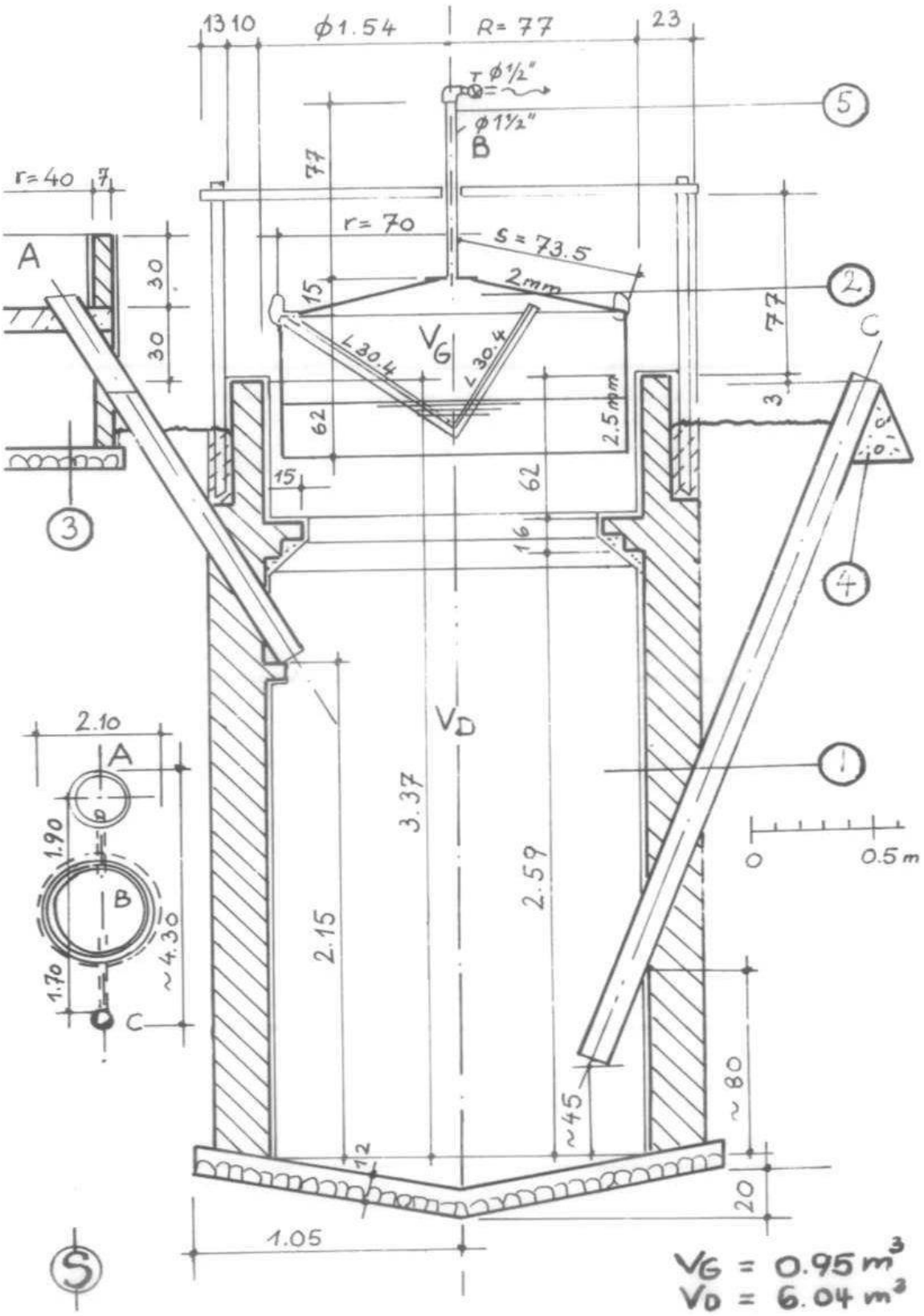

Fig. 1: Gabar biogas plant (5, 94)
1. Digester pit (Biogas is generated through anaerobic condition).
2. Steel gas holder 3. Inlet 4. Outhlet 5. Gas outlet tube.

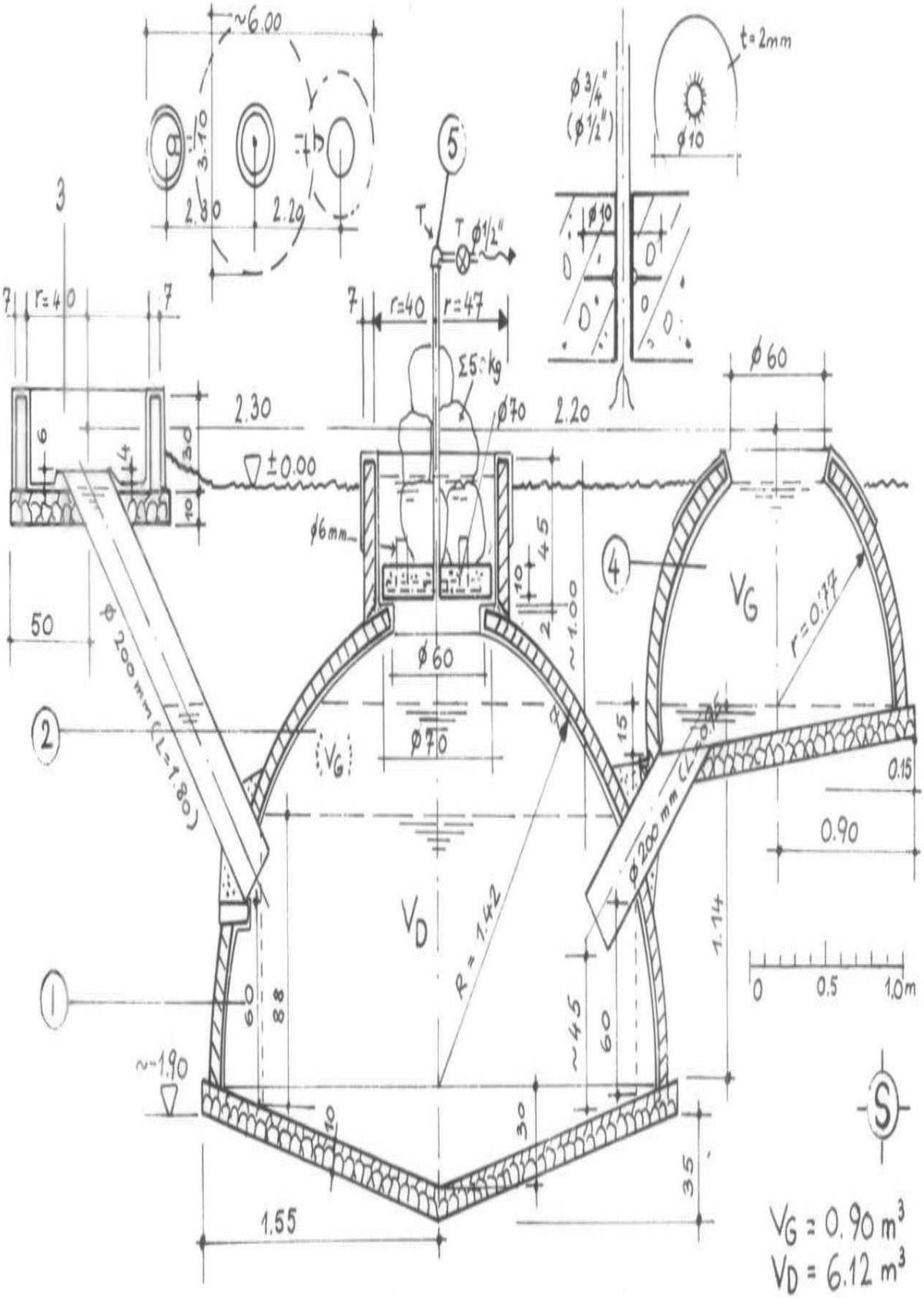

Fig. 2: Dome biogas plant (5, 93) _1. Digester pit 2. Gas holder 3. Inlet tank 4. Outlet tank 5.Gas outlet tube.

According to Thai sources, 1000 plants are in countrywide operation. Three kinds of biogas plants are known for small scale farmers:

- Dome type (2, 3, 4, 5)
- Gobar type (3, 4, 5)
- Ferrocement type (7).

The dome type is the most popular and widespred one, because it is the cheapest (about half the price of a comparable gobar or two third of a ferrocement type). The main advantage of the dome type is that farmers in a village can build a plant by themselves, provided that the construction is supervised by a biogas technican. The farmers are able to carry out the mason and pflastering work involved in the building of the dome-type, but not, however, capable to do the welding of the iron parts connected with the gobar-type.

Dom plants are often not gas tight because of bad pflastering and cracks at the rim (between dom and digester) caused by tensions. BORDA designed and tested new gas plants without rim (Fig. 2; 5, 6) which are not yet known in Thailand.

In the period from 1979 to 1982 a budget was given to each province to construct between 5 and 18 dome-biogas plants. Each plant, all of which are dome types, is subsidized with an amount of 2500 Bath[+], enough to cover about 80% of the costs for building materials of a standard 6 to 8 m^3 plant. From 1983 onwards a limited number of plants will be subsidized with 1.000 Bath each throughout the country.

3. Difficulties

The experience connected with the implementation of the biogas program have varied from region to region. In the north-east and north of Thailand, areas with a high percentage of subsistence farmers, the technology was only useful to a limited extent:

- Few farmers have the financial means to construct a plant on their own (the 6 m^3 unit costs approx. 2.800 Bath without labour costs and yet the average annual gross income ranges between 3.000 to 7.000 Bath per family)
- Not enough manure available to run a biogas plant (most of the farmers own no more than two waterbuffaloes or cows whereas four at least would be necessary)
- Wood and charcoal (produced in the work-free dry season) are still, to a limited extent, quite easily available.

Observations indicate, however, clearly that if the biogas technican from the provincial office superwises the construction and assists in the maintenance of demonstrations plants, more farmers will be willing to set up their own plants. The relatively prosperous farmers, with an adequate animal stock, are often responding quickly to follow this technology. We can estimate that about 5% of all farmers belong to this group.

In central Thailand, within dairy cooperatives and urban areas, the situation is different. There is a more effective propagation possible because of:

- Higher farm-income (annual gross income ranges between 15.000 and 40.000 Bath per family and year)

[+] 1 DM equals approx. 9 Bath

— Enough manure to run a biogas plant (dairy cattle with stallfeeding, pig farms)
— The use of cooking with cylinders is already widespread (in about 18 months a 6 m^3 plant will be amortized) and wood or charcoal must be bought.

The dairy cooperatives of Chaing Mai and Nong Po (Ratchaburi) are examples of these facts. Within three years 50 and 20 plants were constructed and in operation and hence more farmers were willing to follow the technology.

4. Conclusion

The success of a biogas program depends on:
— Ecological and economical framework of the particular region
— The technical support of the provincial and district agricultural offices and the level of understanding of its field staff.

Often a poor training of the provincial biogas technicians disrupts programs substantially. Plants in operation are the best publicity for a biogas program. Farmers do not have confidence in unknown technology and are therefore reluctant to invest. Without a certain numer of demonstration plants a biogas program can never be started (3).

Summary

With the constant rising costs of energy and the need to conserve forest areas, the use of biogas attracted broad attention in Thailand. The Department of Agricultural Extension started a campaign aimed at instruction the country's small-scale-farmers in the biogas technology. Observation indicated the limitations involved in running a biogas program. Only the relatively prosperous farmers, with an adequate animal stock were willing an able to replace wood, charcoal or cylindric gas with biogas as cooking energy. Sound technical support in connection with dependable field extension systems are essential for the success of a biogas program.

Zusammenfassung

Aufgrund ständig steigender Energiepreise und zum Schutz der abnehmenden Waldbestände gewinnt die Biogas-Technologie in Thailand zunehmend an Bedeutung. Das Department of Agricultural Extension unternahm daher den Versuch, Biogas-Anlagen auf Kleinbauernebene zu verbreiten. Die Erfahrungen verdeutlichten die Faktoren, die die Implementierung eines Biogas-Programmes begrenzen. Nur relativ wohlhabende, viehreiche Farmbetriebe sind bereit und in der Lage, die Kochenergieträger Holz, Holzkohle oder Flaschengas durch Biogas zu ersetzen. Das Gelingen eines Biogas-Programmes ist dabei wesentlich abhängig von der technischen Unterstützung und Zuverlässigkeit des Beratungssystems.

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