

A Study on Bamboo Tube well for Irrigation

(Published in September, 1978)

a) Researcher's Identity

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b) Objectives of the Study

Objectives of the study can be outlined as below:

- i. To study the technical feasibility of installing bamboo tube wells in the Barind Tract of Bogra district;
- ii. To utilize locally available raw materials and man-power for construction and installation of the bamboo tubewell;
- iii. To offer an easy technique of construction and installation of bamboo tubewell in the farmer's level;
- iv. To study the competency of using bamboo tubewell over shallow tubewell having 3 inches diameter G.I. pipe and brass strainer both being designed for 0.50 cu. sec. discharge capacity. Centrifugal pump coupled with diesel power unit, would be connected to it; and
- v. To study the economic feasibility of installing bamboo tubewell over the above mentioned shallow tubewell.

c) Executive summary

The study on bamboo tube well for irrigation was undertaken during April, 1975. The purpose was to offer the concept of bamboo tubewell in the field of local irrigation technology in a disciplined technical manner and to judge its economic feasibility over the same type of mechanized irrigation technology, in a typical portion of the Barind soil tract under Bogra district. This portion is more specifically known as the "Sherpur Failure Area" indicating non-availability of irrigation water in the formation maximum below 100 feet.

The salient features on construction, drilling, installation, development and cost of the bamboo tubewell can be outlined as below.

- 1) Properly matured and seasoned bamboo (*Bambusa tudula*) of the stronger quality (locally known as Borac or Pawyee) was used in making bamboo strips (length; 10 & 12 feet, width 0.50 inches, thickness 0.25 inches and slightly tapering inwardly at both edges). Then these were arranged around the iron rings (inner diameter 3 & 4 inner width 0.75 inches and thickness 0.25 inches) and tied up with thin G.I. wire (diameter 0.03 inches) to construct bamboo frame of the housing pipe (inner diameter 4 inches and length 12 feet), the blind pipe (inner diameter 3 inches and length 10 feet) and the bamboo strainer (inner diameter 3 inches length 10 feet and strip to strip gap 0.18 inches).
- 2) 8 number of V-shaped hooks, made of G.I. wire (diameter 0.10 inches) were arranged around each end of the bamboo frames and set on through 8 numbers of holes (diameter 0.25 inches and hole to hole distance 0.87 inches for 3 inches diameter and 1.5 inches for 4 inches diameter G.I. rings) drilled on the iron rings (inner diameter 3 & 4 inches width 1.5 inches, thickness 0.25 inches) at its ends. Such arrangements served the purpose of sockets.
- 3) Gunny was wrapped around the bamboo frame made for the housing pipe and the blind pipe in two layers by smearing coal-tar in order to avoid any leaking and for its longer life.
- 4) Coir i.e. coconut fibre string (diameter 0.125 inches) was wrapped in two layers to prevent the entrance of sand from the formation into the well. Tension on the string was kept high at the same time much care was taken to maintain uniform diameter of the bamboo strainer. It has been observed that single layer of 0.10 inches diameter coir winding would also meet up the purpose.
- 5) The design length and diameter of the bamboo pipe and the bamboo strainer has been considered to be maximum for the purpose. Further increase in length would develop its bending tendency at perpendicular position that might cause installation failure.
- 6) The total 85 feet fixture length of the bamboo tube well has been considered to be sufficient and the less would be better. Because, high down ward pressure was required at the top of the upper pipes during installation due to its floating tendency in water. Such trouble should be treated as high risk in installation. Therefore, it would be better to keep

its diameter within 4 inches to avoid more circumferential area in contact with the ground water.

- 7) Slow but steady installation operation would be advisable. It would be useful to mention here, that the first attempt for installation of the bamboo tube well resulted in failure only due to hasty approach.
- 8) Development of the bamboo tube well needs to be started just after installation in order to avoid any clogging of the strainer opening and to ensure the expected discharge throughout its life. It would be again important to mention here that delay of 5 days in starting the development process of the bamboo tubewell created a great trouble. Even it took nearly a month to develop the same up to 0.33 cu. sec. steady discharge.
- 9) Introduction of the upper 24 feet housing pipe has been considered to be useful for better life and efficiency of the bamboo tubewell. Because, the upper portion does not always remain under water, as such it would get disintegrated faster due to insect attack. The use of G.I. pipe (length 20 feet, inner diameter, 8 inches) suspended into the housing pipe would necessarily serve the purpose.
- 10) Care was taken to place the bamboo strainer in alluvial formation having medium to coarse sand and where the draw-down would be less, thus showing the availability of enough water at shallow depth.
- 11) Total cost of the bamboo tube well amounts to Tk. 2,912.77 only. Whereas the total cost of a shallow tube well, G.I. pipe and brass strainer) designed for the same 0.50 cu. sec. capacity has been considered to be Tk. 4,330.00 only. Thus the initial investment cost of the bamboo tube well would be 48.65% less than that of a shallow tube well. But the rate of annual depreciation in case of the bamboo tube well has been calculated to be Tk. 468.70 only. Whereas in case of a shallow tube well, it stand to Tk. 335.30 only, because, service life of the former has been estimated to be half (5 years) of the latter (10 years).

Therefore, if the initial investment cost and those factors that can not be justified in monetary terms are concerned, then a bamboo tube well might be considered for use. Otherwise it would not be advantageous to use a bamboo tube well in place of a shallow tube well, having the same capacity. But it has been assumed, that the cost incurred as labour charge for the construction, and the drilling and installation of the bamboo tube well that amounts to Tk. 436.00 and Tk. 950.00 respectively, were too much for the same. Also the

cost of other raw materials was quite high. It has happened only due to the unusual increase in the then market price that even seriously affected the national economy. This factor must be taken into consideration. It has been expected, that under normal condition with the decrease in cost of raw materials, labour and increase in efficiency of workmanship, the bamboo tube well would be found economical over shallow tube wells having the same capacity, in near future.