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DEVELOPMENT, CONSTRUCTION AND TESTING  
OF A HYDRAULIC RAM PUMP

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**DEVELOPMENT, CONSTRUCTION AND TESTING OF A  
HYDRAULIC RAM PUMP**

**Undergraduate Thesis  
Submitted to the Faculty of the  
Don Severino Agricultural College  
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**In Partial Fulfillment  
of the Requirements for the Degree of  
Bachelor of Science in Agricultural Engineering  
Major in Soil and Water Management**



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## ABSTRACT

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The study "Development, Construction and Testing of Hydraulic Ram Pump" was conducted at the Don Severino Agricultural College, Indang, Cavite from December 1991 to March 1992 . It specifically aimed to develop and construct a low cost hydaulic ram pump which will suit the rural conditions.

The hydraulic ram pump has three components namely the impulse valve, the check valve , and the air chamber. The impulse valve and the check valves are the two moving parts which control the operation. The air chamber provides the pressure necessary to lift water to higher elevation.

The hydraulic ram operates at a minimum fall of 30.49 cm.(1 foot) and tested up to maximum fall of 152.44 cm.(5feet). The maximum delivery was obtained at 152.44 cm.(5feet) fall with 58.33 liters per minute at lift of 152.44 cm.(5 feet). On the other hand the lowest delivery of 2.15 liters per minute was observed whrn its fall was 30.49 cm.( 1 foot) with a lift of 91.46 cm. ( 3 feet). The highest and lowest efficiencies were observed

at 152.44 cm.(5 feet) fall with 152.44 cm. ( 5 feet) lift and 30.49 cm.( 1 foot) fall with 91.46 cm.( 3 feet) lift, with values of 64.81% and 2.4% respectively.

The efficiency decreases as the lift increases; and increases as the fall increases. It was also observed that the lift increases as the fall increases. The number of pumping action of the impulse valve determines the amount of water delivered. The developed hydraulic ram was more adaptable in operating at lower fall but has a lower overall efficiency than the commercial hydraulic ram.

The total cost of the developed hydraulic ram was P1,329.00. It was constructed from readily available materials. Low cost of the developed hydraulic ram implies that it is more economical as compared to commercial hydraulic ram, and centrifugal pumps. Also it is easier to maintain, operate and replace parts because parts are readily available with least cost. Thus we can say that the developed hydraulic ram was adaptable to rural areas where there is sufficient source of flowing water.

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# DEVELOPMENT, CONSTRUCTION AND TESTING OF HYDRAULIC RAM PUMP<sup>1/</sup>

by

MARLON C. BABAAN

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## INTRODUCTION

A pump is a machine that draws fluid into itself through an entrance port and forces the fluid out through an exhaust port of higher elevation. A hydraulic ram pump is a simple mechanical device, automatic, in operation, for raising water by water power (Parker, 1984).

The hydraulic ram pump is suitable for applying water for stock watering purposes and to meet other water needs on the farm. It can pump water to irrigate a family garden and for domestic use.

A hydraulic ram is very much appropriate to communities that can neither be reached by water systems nor afford the high cost of pumps and fuels. It needs no external power