Efficiency Improvement of an Integrated Giant Freshwater-White Prawn Farming in Thailand Using a Wireless Sensor Network



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outline

- INTRODUCTION
- SMART PRAWN FARMING DESIGN
- EXPERIMENT SETUP AND RESULTS
- CONCLUSIONS



INTRODUCTION



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- integrated giant freshwaterwhite prawn farmings
- geographically lie in Nakhon Pathom province and its nearby vicinities.
- prawn farmers using a traditional approach in culturing their prawns







Sensors :

pH and DO sensors: each comes with its own processing unit are from Atlas Scienctific Biology Technology which can measure pH and DO within the ranges of 0-14 and 1-20 ppm, respectively.

temperature sensors : used in this

project is DS18b20 which can measure the temperature within a range of -55 to 125 °C with the accuracy of 12 bits or 0.0625 °C. Besides its wide available reading temperature range, DS18b20 is also inexpensive and has a plastic cover which makes it suitable for our application.





Processing unit :

- X86 processor with the model number of
 VSX-6154-V2/VSX-6154-V2-PLUS
- its potentials in computational speed
- stability
- low power consumption
- as well as various available I/O ports
- MS-DOS V6.22
- C Programming Language





Communication Subsystem :

- Short-ranged communication (range<= 250 m)
- Send data between a sensor node and gateway
- Server location central farm
- X-bee Pro 802.15.4 module
- Gateway through SIM300CZ using modules GSM



frequency : 2.4 GHz Outdoor line-of-sight: > 750 m Fig. 2. Sensor network for prawn farming.





(a) Layout of the entire farm showing the dimension of both the test and the control ponds.



(b) Two paddle wheel aerators and two automatic feeders are installed in both the test and the control ponds

Fig. 5. Experiment Setup











Fig. 6. Predefined criterion for decision making in activating the paddle wheel aerators and the SMS sending module.







RESULTS of the test and control ponds:

TABLE I

DATA ON TOTAL COST, PRODUCTIVITY AND TOTAL INCOME OBTAINED FROM TEST AND CONTROL PONDS

Factors	Test Pond (A1)	Control Pond (A4)
Culture Period (days)	89	74
Total Cost (\$)	3,968	3,137
Macrobrachium Rosenbergii (Kg)	283	260
Production		
White prawn Production (Kg)	990	620
Total Income (\$)	9,871	5,491



CONCLUSIONS



Experimental results show that significant efficiency gain can be achieved from the ability to extend the culture period significantly by 20.3%, leading to larger-size prawns and more than 150% better in profit.



...Thank you...

