PRODUCTION AND FINANCIAL ANALYSES OF INTEGRATED RICE-FISH FARMING IN A SMALLHOLDERS' COMMUNITY IN TELUK INTAN, PERAK, MALAYSIA

By

BAMBANG SURYA ADJI SYAHPUTRA

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, In Fulfilment of the Requirement for the Degree of Master of Science

November 2006

DEDICATION

This thesis is dedicated to

My children,

Zahra Tsurayya Winarty

Qairunnissa Dwi Febriany

And

Muhammad Alfisyahrin

Your sacrifice and support during the period of my

Academic mission is appreciated

My mother,

Hjh. Siti Nur Jannah binti Djono

Your *do'a* for my success is very much acknowledged

My elder brother, Toni Suhartono

My elder sister, Dra. Sri Linda Rahmawati. SPd.

My younger brothers, Hendra Kumala

And

Hendri Kusuma

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Master of Science

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Chairman : Professor Jambari Hj. Ali, PhD.

Faculty : Science

The study was initiated to investigate production and financial analyses of integrated rice-fish farming system on smallholders' in Teluk Intan, Perak, Malaysia. Specifically, the objectives of the study were to determine farmers' income and financial analyses of integrated rice-fish farming system on the distribution of household income in the sample area. Questionnaires were distributed to smallholders around Sungai Manik and Labu Kubong in Teluk Intan. Three types of farmers were included in this study, namely those practiced rice farming system, integrated rice-fish farming system and fish farming within the rice field system. The study was conducted in three consecutive growing seasons from 2002 – 2004 which fish *Barbodes gonionotus* were introduced in densities, namely 2000, 4000, 6000, 8000 and 12000 fingerlings per hectare. Fish were not given supplementary food, except in the third season of were commercial feed were also given. The result had shown that the Rate of Return on Operational Cost (RROC) for integrated rice-fish farming (75.18%) was higher than rice farming only (41.32%) and also higher than the fish farming only (59.2%) only. Net income per hectare per season from rice-fish farming

(RM 1,706.68) was also higher than that rice farming only (RM 1,046.64). Apart from that, rice farming system also incurred high fertilizer (32.26%) and pesticides (25.38%) costs. Rice-fish farming system, on the other hand, incurred high fertilizer (31.4%) and fingerlings (20.09%) costs. The present study, utilizes the Cobb-Douglas production function to estimate the production functions for different farming systems. Results of the regression analyses showed that a 10% increase in the amount of fertilizer rate would increase rice output by 21.25% in the rice-fish farming. In the rice only, the same increase in amount of fertilizer rate would increase rice output by only 0.06%. The result showed that Specific Growth Rate (SGR) of the fish tends to decrease throughout the experimental seasons. The fish also tends to get smaller throughout the harvesting season. The growth of fish was best at 42 days after release, which was 1.92% of bodyweight/day. The fish differed significantly in term of length and body weights when treated with different types of feed. The RROC of integrated rice-fish farming system at lower stocking densities, namely 2000 and 4000/ha were 39.83% and 27.81%, respectively, and this were higher than that of rice farming system (25.47%). Similarly, net ricefield income of rice-fish farming system of RM 890.64 and RM 671.68 at lower stocking densities of 2000 and 4000/ha respectively, were also higher than that of rice farming system (RM 631.40). However, at higher stocking densities, the cost of purchasing fingerlings would be higher than the costs of pesticides, which would result in lower RROC for the integrated rice-fish farming system as compared to rice only. Essentially, the integrated rice-fish farming system is not a system that requires additional input capital, but merely a system that substitutes the cost of purchasing pesticides with the cost of purchasing fingerling.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia
sebagai memenuhi keperluan untuk ijazah Master Sains

ANALISA PENDAPATAN DAN PENGELUARAN SERTA PRODUKSI PADA PENYEPADUAN PADI-IKAN TERHADAP KOMUNITI PETANI KECIL DAN SEDERHANA DI TELUK INTAN, PERAK, MALAYSIA

Oleh

BAMBANG SURYA ADJI SYAHPUTRA

November 2006

Pengerusi : Profesor Jambari Hj. Ali, PhD.

Fakulti : Sains

Suatu kajian telah dilaksanakan untuk menganalisa pendapatan dan pengeluaran serta produksi sistem penyepaduan padi-ikan terhadap petani kecil dan sederhana di Teluk Intan, Perak. Tujuan kajian ini untuk mengetahui pendapatan dan pengeluaran petani serta kesan sosioekonomi paduan padi-ikan terhadap keseluruhan pendapatan petani pada lokasi kajian. Kajian ini dengan menggunakan borang kaji selidik. Tiga kelompok petani yang dikaji iaitu; petani yang hanya menanam padi sahaja, petani yang menanam padi berserta memelihara ikan di sawh dan petani yang hanya memelihara ikan di kolam di sekitar sawah padi. Kajian paduan padi-ikan dijalankan selama tiga musim tanam dengan jenis ikan lampam (*Barbodes gonionotus*)dengan pelbagai densiti iaitu; 2000, 4000, 6000, 8000 dan 12000 ikan/ha. Pada kajian yang ke tiga, kaedah pemberian makanan tambahan sebanyak 5% dari berat badan ikan tersebut diperaktikkan. Tinjauan menggunakan borang kaji selidik menunjukkan bahawa hasil RROC paduan padi-ikan (75.18%) adalah lebih tinggi apabila dibandingkan dengan hasil penanaman padi sahaja (41.32%) dan pemeliharaan ikan sahaja (59.2%). Pendapatan bersih untuk satu musim di setiap hektar sawah yang di

tanam penyepaduan padi-ikan (RM 1,706.68) juga adalah lebih tinggi jika dibandingkan dengan sawah yang ditanam padi sahaja (RM 1,046.64). Sawah yang ditanam padi sahaja memerlukan kos yang tinggi untuk penggunaan baja (32.26%) dan diikuti oleh pemakaian racun makhluk perosak (25.38%). Manakala bagi sawah penyepaduan padi-ikan, kos yang diperlukan adalah tinggi iaitu; baja (31.4%) dan diikuti oleh pembelian anak ikan (20.09%). Dalam kajian ini kaedah pengiraan Cobb-Douglas digunakan untuk menganggar tahap keuntungan maksimum daripada penyepaduan padi-ikan. Hasil anggaran tersebut menunjukkan bahawa terdapat kemungkinan setiap penambahan 10% jumlah baja yang diberikan akan meningkatkan hasil sebanyak 21.25% pada paduan padi-ikan. Sedangkan pada sawah yang ditanam padi sahaja, setiap penambahan 10% jumlah baja yang diberikan dianggar akan meningkatkan hasil sebanyak 0.06% sahaja. Hasil kajian sawah padi menunjukkan kecenderungan SGR semakin menurun dari musim pertama ke musim-musim seterusnya. Saiz ikan yang dibela didapati semakin kecil pada setiap kali sampel diambil. Pertumbuhan ikan yang baik adalah pada 42 hari setelah dilepaskan ke sawah dengan pertambahan peratusan sebanyak 1.92% daripada berat ikan/hari. Hasil dari kaedah pemberian makanan tambahan, menunjukkan bahawa terdapat perbezaan yang signifikan dari segi panjang dan berat ikan jika dibandingkan dengan ikan yang hanya mendapat makanan semula jadi sahaja. RROC paduan padi-ikan pada densiti 2000 dan 4000/ha ialah; 39.83% dan 27.81% dimana peratusannya adalah lebih tinggi apabila dibandingkan dengan RROC penanaman padi sahaja (25.47%). Pendapatan bersih paduan padi-ikan pada densiti 2000 dan 4000/ha iaitu; RM 890.64 dan RM 671.81, juga adalah lebih tinggi berbanding dengan pendapatan bersih daripada penanaman padi sahaja (RM 631.40). Walau bagaimanapun, pada densiti yang lebih padat (6000, 8000 dan 12000/ha) kos pembelian anak ikan adalah

lebih besar jika dibandingkan dengan kos pembelian racun makhluk perosak untuk keluasan sawah yang sama, dengan hasil RROC yang lebih rendah di kawasan paduan padi-ikan jika dibandingkan dengan kawasan yang hanya ditanam padi sahaja. Secara amnya, paduan padi-ikan merupakan satu sistem baru yang tidak menambahkan modal dalam penyelenggaraan sawah, dimana kos untuk membeli racun dapat digunakan untuk membeli anak ikan. Ia juga merupakan suatu kaedah untuk mengurangkan penggunaan racun makhluk perosak dan menambah pendapatan petani dengan memelihara ikan di dalam sawah.

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I certify that an examination committee met on 1st November 2006 to conduct the final examination of Bambang Surya Adji Syahputra on her Master of Science thesis entitled " Production and Financial Analyses of Integrated Rice-Fish Farming in A Smallholders' Community in Teluk Intan, Perak, Malaysia" in accordance with the Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulations 1981. The committee recommends that candidate be awarded the relevant degree. Members of the Examination Committee are as follow :

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This thesis submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Science. The members of the Supervisory Committee as follows :

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Date : 8 March 2007

DECLARATION

I hereby declare that the thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UPM or other institutions.

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BAMBANG SURYA ADJI SYAHPUTRA

Date : 2 February 2007

TABLES OF CONTENS