UNIVERSITI PUTRA MALAYSIA

VALUATION OF WATER SERVICE FEE FOR TIDAL LOWLAND AGRICULTURE IN SOUTH SUMATRA

MUHAMMAD YAZID

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VALUATION OF WATER SERVICE FEE FOR TIDAL LOWLAND AGRICULTURE IN SOUTH SUMATRA

By

MUHAMMAD YAZID

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Doctor of Philosophy

December 2010

DEDICATIONS

To
my wife *Nura Malahayati*,
my daughters *Keyshia Nur Yazid* and *Kania Meutia Yazid*.
and my son *Rizq Khairi Yazid*

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of
Doctor of Philosophy

VALUATION OF WATER SERVICE FEE FOR TIDAL LOWLAND AGRICULTURE IN SOUTH SUMATRA

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December 2010

Chair: Professor Mad Nasir Shamsudin, PhD

Faculty: Faculty of Environmental Studies

Water management is a key factor in tidal lowland agriculture with three-fold objectives of improving water allocation, recovering costs, and achieving efficient water distribution. In order to achieve these objectives, water management infrastructures must be properly operated and maintained. Therefore, besides the established guidelines for operation and maintenance (OM), the availability of fund is required to carry out proper OM and ensure the achievement of water management objectives (WMO). OM is financed by both government and water users through water service fee (WSF). However, neither government budget nor WSF is sufficient to finance OM at its respective level of water management. WSF is insufficient to finance OM at tertiary level since there is no reliable measures of WSF for which farmers are responsible to contribute.

The valuation of WSF for tidal lowland agriculture is aimed at: (i) the estimation of WSF; (ii) the estimation of willingness to pay (WTP) for WSF and its affecting factors; and (iii) the evaluation of the achievement of WMO. The results of this study are expected to contribute to the growth of knowledge in water resource management and to the formulation of policy in accordance to the achievement of sustainable water management in tidal lowland agriculture.

This study employs the following methods: (i) participatory field observation and focus group discussion for WSF estimation based on the costs of water delivery; (ii) production function estimation for WSF estimation based on the value of water service in crop production; (iii) contingent valuation method (CVM) for the estimation of WTP for WSF; (iv) hedonic pricing (HP) for the estimation of WTP for WSF to complement CVM. Data are collected through field survey at the tidal lowland area of Telang I, South Sumatra, Indonesia. Respondents are selected using stratified random sampling.

The results of this study include three WSF estimates based on the cost of water distribution. WSF_1 is amounted Rp 315,000 per hectare to indicate the supply cost, WSF_2 is amounted Rp 346,500 per hectare to account for economic cost, and WSF_3 is amounted Rp 391,500 per hectare to reflect the full cost. In comparison, the benefit of water service in crop production is Rp 455,700 per hectare, which is higher than any types of cost of water distribution. Water service is proved to be a significant determinant of crop production.

The mean WTP for WSF is Rp 204,680 per hectare, whereas total WTP per water management unit (256 hectares) is Rp 52,398,080. WTP for WSF is significantly affected by the bidding price, water service, frequency of fee payment, and income. Actual WTP for WSF is Rp 102,530 per hectare and is significantly affected only by income. Both estimated WTP for WSF and actual WTP for WSF indicate that the achievement of water management objective is limited to the improvement of water distribution.

This study concludes that water service should be employed in crop production in tidal lowlands. In addition, WSF should be collected to ensure proper OM of tidal irrigation. Efforts to increase farm income should also be directed through optimum use of labor, chemicals, and fertilizers in order to realize farmers' WTP for WSF as well as to increase current WSF payment.

This study recommends that WSF as one of farmer's responsibility mandated in Water Resource Law be implemented based on the objective valuation using either the cost of water delivery or the value of water service in crop production. The amount of WSF should be adjusted to the water management objective to be achieved. Water users association (WUA) should be given authority to manage the collected WSF.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

PENILAIAN YURAN PERKHIDMATAN AIR PADA PERTANIAN TANAH RENDAH BERPASANG SURUT DI SUMATERA SELATAN

Oleh

MUHAMMAD YAZID

Disember 2010

Pengerusi: Profesor Mad Nasir Shamsudin, PhD

Fakulti: Fakulti Pengajian Alam Sekitar

Pengurusan air adalah faktor utama pada pertanian tanah rendah berpasang surut yang memiliki tiga tahap objektif, iaitu meningkatkan pembekalan air, memulihkan kos dan mencapai pembekalan air yang cekap. Untuk mencapai tujuan tersebut infrastruktur pengurusan air harus diuruskan dan disenggara dengan baik. Bajet sedia ada yang diperlukan untuk membiayai operasi dan pemeliharaan (OP) yang tepat dan memastikan pencapaian tujuan pengurusan air (TPA) perlu diperhatikan di samping penetapan panduan OP. OP dibiayai oleh kerajaan dan pengguna perkhidmatan air melalui yuran perkhidmatan air (YPA) yang diiktiraf. Namun, dianggarkan pembiayaan kerajaan dan YPA tidak cukup untuk membiayai OP pada setiap tingkatan pengurusan air masing-masing. YPA tidak cukup untuk membiayai OP pada peringkat tertier kerana tidak ada penaksiran YPA yang pasti untuk dipenuhi dengan bertanggungjawab oleh pengusaha ladang.

Penilaian mengenai penaksiran YPA pada pertanian tanah rendah berpasang surut adalah diutamakan kepada: (i) penaksiran YPA; (ii) anggaran kesanggupan untuk membayar (KUM) YPA dan faktor pendorongnya; dan (iii) menilai pencapaian TPA. Hasil penilaian ini diharapkan dapat menyumbang pengetahuan dalam pengurusan sumber air dan perumusan kebijakan untuk mencapai pengurusan air yang berterusan.

Kaedah yang digunakan dalam kajian ini adalah: (i) pemerhatian lapangan dan perbincangan kumpulan terpilih yang bertujuan untuk menaksir YPA yang berasaskan kos pembahagian air; (ii) penaksiran fungsi pengeluaran untuk penaksiran YPA berasaskan nilai perkhidmatan air dalam pengeluaran pertanian; (iii) kaedah penilaian kontinjensi (KPK) untuk penaksiran KUM YPA; (iv) kaedah kos hedonik untuk penaksiran KUM YPA untuk melengkapkan KPK. Data diperolehi melalui survey di Telang I, Sumatera Selatan, Indonesia. Responden dipilih secara rawak berlapis.

Kajian ini menghasilkan 3 anggaran YPA yang bersesuaian dengan kos pembahagian air. YPA_1 dianggarkan Rp 315,000 setiap hektar bagi menunjukkan kos pembekalan, YPA_2 dianggarkan Rp 346,500 setiap hektar bagi menunjukkan kos ekonomi, dan YPA_3 dianggarkan Rp 391,500 setiap hektar bagi menunjukkan kos keseluruhan. Sebagai perbandingan, faedah daripada perkhidmatan air terhadap pengeluaran ladang adalah Rp 455,700 setiap hektar, iaitu lebih tinggi daripada sebarang jenis kos pembahagian air. Perkhidmatan air telah dibuktikan sebagai penentu yang signifikan bagi pengeluaran ladang.

Purata KUM YPA adalah Rp 204,680 bagi setiap hektar dan jumlah KUM bagi setiap unit pengurusan air (256 hektar) adalah Rp 52,398,080. KUM YPA dipengaruhi oleh harga penawaran, perkhidmatan air, kekerapan pembayaran yuran dan pendapatan. KUM YPA aktual adalah Rp 102,530 setiap hektar dan dipengaruhi oleh faktor pendapatan sahaja. Kedua-dua KUM YPA ditaksir dan KUM YPA aktual menunjukkan pencapaian objektif pengurusan air adalah terhad kepada penambahbaikan ke atas pembahagian air.

Sebagai kesimpulan, kajian ini mendapati bahawa perkhidmatan air harus digunakan dalam pengeluaran ladang. YPA juga harus dipenuhi untuk memastikan OP yang sesuai pada pengairan pasang surut. Usaha-usaha bagi meningkatkan pendapatan ladang juga harus diterjemahkan melalui penggunaan buruh yang lebih banyak dan penggunaan bahan kimia dan baja yang lebih bijak dengan tujuan untuk mewujudkan keinginan petani untuk membayar YPA dan meningkatkan pembayaran YPA semasa.

Kajian ini mengesyorkan YPA sebagai salah satu tanggung jawab petani sebagaimana termaktub di dalam Undang-undang Sumber Air agar dilaksanakan berdasarkan penilaian yang objektif sama ada menggunakan kos penghantaran air atau faedah perkhidmatan air dalam pengeluaran tanaman. Nilai YPA hendaknya disesuaikan dengan tujuan pengurusan air yang ingin dicapai. Badan pengguna air sepatutnya dipertanggungjawabkan untuk mengurus YPA yang terkumpul.

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I certify that a Thesis Examination Committee has met on **16th December 2010** to conduct the final examination of **Muhammad Yazid** on his thesis entitled "**Valuation of Water Service Fee for Tidal Lowland Agriculture in South Sumatra**" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Doctor of Philosophy.

Members of the Thesis Examination Committee were as follows:

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

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DECLARATION

I declare that the thesis is my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously, and is not concurrently, submitted for any other degree at Universiti Putra Malaysia or at any other institution.

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MUHAMMAD YAZID

Date: 16 December 2010

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