

Analisis Ketersediaan Air Menggunakan Model ARIMA Untuk Perencanaan  
Pola Tanam Dan Tata Tanam Di Daerah Irigasi (DI) Loning, Magelang

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INTISARI

Penelitian ini bertujuan untuk memprediksi ketersediaan air irigasi di DI Loning menggunakan model ARIMA. Hasil prediksi ketersediaan air irigasi kemudian digunakan untuk menentukan rencana pola tanam dan jadwal tanam terbaik untuk diterapkan di DI Loning berdasarkan indeks penanaman maksimum.

Prediksi debit sungai Loning digunakan untuk menentukan debit tersedia hasil prediksi dan prediksi curah hujan digunakan untuk menentukan curah hujan wilayah prediksi. Curah hujan wilayah kemudian digunakan untuk menghitung curah hujan efektif yang digunakan untuk menentukan kebutuhan air irigasi. Optimasi program linier dengan fungsi tujuan memaksimalkan indeks penanaman digunakan untuk menentukan pola tanam dan jadwal tanam terbaik.

Model ARIMA terbaik untuk simulasi data debit sungai Loning adalah model ARIMA musiman  $([1,2,6],1,[1,3]) (0,1,1)^{24}$  dengan 33 outlier. Nilai parameter  $\phi_1 = 0.413$ ,  $\phi_2 = 0.187$ ,  $\phi_6 = 0.098$ ,  $\theta_1 = 0.547$ ,  $\theta_3 = 0.381$ , dan  $\Theta_1 = 0.723$ .

Hasil prediksi ketersediaan air irigasi di DI Loning pada musim tanam 2013/2014 menunjukkan bahwa ketersediaan air irigasi maksimum terjadi pada periode Februari II dan minimum pada periode September II. Indeks penanaman maksimum diperoleh 300 % pada alternatif-2 dengan rencana jadwal tanam pada MT I periode pengolahan tanah untuk golongan 1 pada tanggal 16 Oktober 2013, golongan 2 tanggal 1 November 2013 dan golongan 3 tanggal 16 November 2013.

Kata kunci: Model ARIMA, ketersediaan air, pola tanam, tata tanam, DI Loning

Analysis of Water Availability Using ARIMA Model for Planning  
Cropping Pattern and Planting Schedule in Loning Irrigation Scheme, Magelang

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ABSTRACT

The objective of the research was to predict water availability for irrigation of Loning Irrigation Scheme using ARIMA model. The prediction was applied to manage cropping pattern and planting schedule based on optimal cropping index.

The predicted run off was used as water available, meanwhile the predicted rainfall was used to find out the rainfall area. The predicted rainfall area was used to find out the effective rainfall and then it was used to calculate the irrigation requirement. The linear programming optimization model was developed to find out the best cropping pattern and planting schedule for maximizing the cropping index.

The best ARIMA model for simulation Loning run off was seasonal ARIMA  $([1,2,6],1,[1,3]) (0,1,1)^{24}$  with 33 outlier. The parameter of the seasonal ARIMA were  $\phi_1 = 0.413$ ,  $\phi_2 = 0.187$ ,  $\phi_6 = 0.098$ ,  $\theta_1 = 0.547$ ,  $\theta_3 = 0.381$ , dan  $\Theta_1 = 0.723$ .

The prediction of water availability for irrigation of Loning irrigation scheme during the planting period of 2013/2014 indicated that maximum available water will occur on the period of February II and the minimum will occur on the period of September II. The optimal cropping index was 300 % for planting schedule alternative-2 with the first planting period the land cultivation started at 16 October 2013, 1 November 2013 and 16 November 2013 for the first group, second group and third group, respectively.

Key words: ARIMA model, water availability, irrigation water requirement, cropping pattern, planting schedule, Loning Irrigation Scheme