# 西スマトラ島ソロ郡におけるコメ生産に対する水利用可能量の評価
# Water Availability Assessment for Rice Production in Solok Regency, West Sumatra

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## 1. Introduction

Solok Regency is a primary rice-producing region. Its total area is 373,800 ha, with around 23,535 ha used as paddy fields (ICBS, 2015). Five sub-districts form the central rice production in Solok Regency: Gunung Talang, Bukit Sundi, Kubung, Lembang Jaya, and X Koto Singkarak. These sub-districts lie in the Sumani watershed, which has an area of around 57,089 ha. Around 30% of this area is rice fields, which depend on the existence of water resources in the watershed. In addition for the agriculture sector, water management and infrastructures such as irrigation system and water use efficiency are the crucial factors that influence water availability for cultivation in the study area. Therefore, a clear understanding of the basin hydrological processes, manageable water flows, the interaction with land use and opportunities to mitigate the negative effect and increase the benefit of water depletion on society is a prerequisite for water sustainability (Karimi, et al., 2012). The objectives of this study are to assess the current condition of water supply and water demand for sustainability rice production and to analyze the future water availability under water supply and water demand development scenarios.

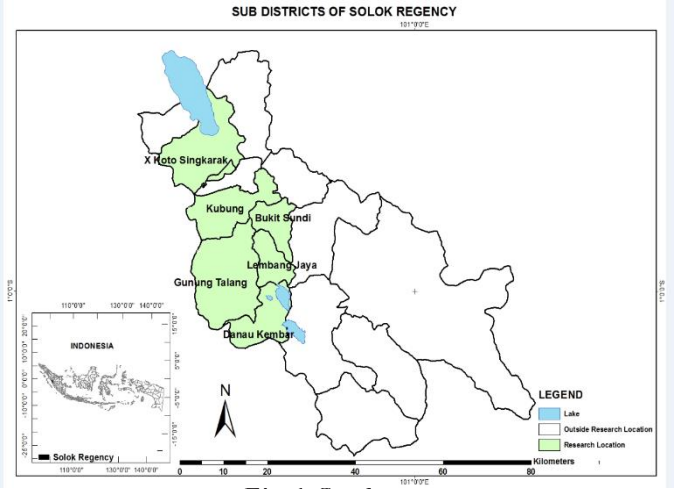

Fig.1 Study area

## 2. Methodology

Based on field survey and secondary data, agriculture and dry season crops (palawija) are the main agriculture water use in the study area. The water requirement will be estimated by considering several factors such as; rice field area, crop coefficient, evaporation, irrigation system efficiency, etc.

Climatological and hydrological condition is a substantial factor that influence water availability in the Sumani watershed. Water availability in the dry season is necessary for sustainable rice production. Dry season occurred on June, July, August and September. The compression to intensify rice production by the increase yield and cropping index will increase water demand for cultivation in the dry season. Hence, water availability in the study area is

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analyzed for wet season and dry season base on rainfall and discharge data.

## 3. Result and Discussion

Tentative result shows, water requirement for rice cultivation is approximately 2.9 mm/day for land preparation, 2.2 mm/day for growth period and 0.77 mm/day for harvesting period. Dry season crop (palawija) cultivation requires water approximately 0.85 mm/day.

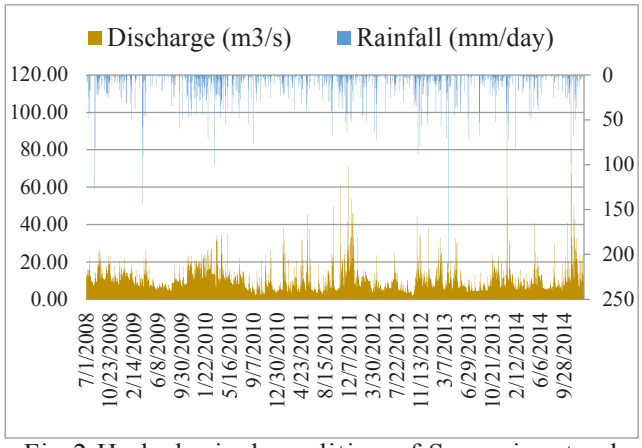

Fig.2 Hydrological condition of Sumani watershed

The average discharge of Sumani River is approximately 1.75 mm/day and the average rainfall is approximately 4.96 mm/day. This condition shows that surface water is only 29% of the rainfall in the watershed. However, in the dry season, average discharge in Sumani River decrease to 0.84 mm/day.

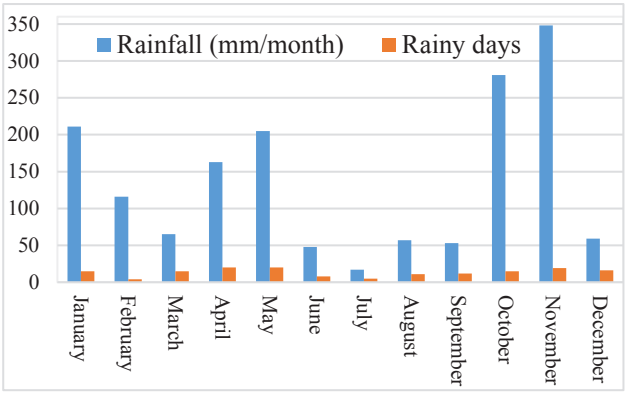

Fig.3 Wet season and dry season

Discharge fluctuation indicates the different amount water availability between the wet and dry season in the study area. Inadequate water resources infrastructure will increase the vulnerability rice cultivation and increase water competition in the dry season. Therefore, to expand rice cultivation in the dry season, mitigation approach such as reservoir and irrigation infrastructure development are necessary aspects for the government investment. In addition, adaptation approach such as water saving technology application is also required to increase water use efficiency for rice cultivation.

Hereafter, Water Evaluation and Planning (WEAP) model is expected to analyze water resources management in the study area. The integrated management of the water resources will be analyzed for the current condition of the watershed and the evaluation of the future scenario water availability for rice cultivation will be conducted base on irrigation management, infrastructures and social development in the study area.

## References

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