# A COMPARATIVE STUDY OF TEMPERATURE AND MOISTURE DRAINAGE IN TRANSPLANTED AND DIREC-SEEDED RICE FIELDS

AUTHOR : MS. SARUDA WANNATONG MS. PIRADA IMRUTTANAKUL MS. IRIN KONGNARONG MS. NATCHALIDATORN MATSA-AD
ADVISOR : MR. CHUMPON CHAREESAEN

## ABSTRACT

Thailand is an agricultural country where rice cultivation plays a crucial role in the economy and livelihoods of its people. The two primary rice cultivation methods, transplanted rice fields and direct-seeded rice fields, differ in terms of water management and soil structure. This study aims to compare soil drainage and temperature between these two cultivation methods through field experiments measuring soil moisture and temperatureover four weeks.The results indicate that transplanted rice fields exhibit superior water retention compared to direct-seeded rice fields in the long term. In the first week, soil moisture in transplanted rice fields reached 18.37%, whereas in direct-seeded fields, it was 8.98%. However, moisture levels in transplanted rice fields declined rapidly in the second week before stabilizing in the third and fourth weeks, remaining significantly higher than in direct-seeded fields. This finding suggests that transplanted rice fields are more effective at retaining soil moisture over time.Regarding soil temperature, direct-seeded rice fields consistently exhibited higher temperatures than transplanted fields throughout the study period. In the first week, soil temperature in transplanted rice fields was 23.67°C, while in direct-seeded fields, it was 25°C. The temperature increased progressively, reaching 24.33°C in transplanted rice fields and 27.33°C in direct-seeded fields by the fourth week. The key factors influencing these differences were soil moisture levels and water retention, with the presence of standing water in transplanted fields helping to lower soil temperature during early growth stages.This study highlights the advantages of transplanted rice fields in maintaining soil moisture and regulating soil temperature compared to direct-seeded fields. These findings provide valuable insights into selecting appropriate cultivation methods based on environmental conditions and water management strategies. Effective water management can enhance rice yield and promote sustainable agriculture in the long term.

## INTRODUCTION

Transplanted rice field

Direc-seeded rice field

Drainage in rice fields

## OBJECTIVE

- **To study moisture drainage in black soil and broadcast rice fields**
- **To compare the moisture drainage rates in black soil and broadcast rice fields**

## RESEARCH QUESTION

**Which method of moisture drainage in black soil and broadcast rice fields is more effective ?**

## METHODOLOG

**PART 1** A Comparative Study of Soil Moisture Drainage Properties Drainage in Transplanted and Direct-Seeded Rice Fields

**Measuring davice** 1) Digital scale 2) Soil sample holder

**Experimental method**

Determine study points and collect soil data at 3 points in in transplanted and 3 points in a broadcast rice field.

Soil sampling and weighing the soil

Baking the soil for 24 hours

weighing the soil after baking

5 Analyze data to find soil moisture in Transplanted and Direct-Seeded Rice Fields.

6 Compare the relationship of moisture drainage in Transplanted and Direct-Seeded Rice Fields.

**PART 2** A comparative study of temperatures in Transplanted and Direct-Seeded Rice Fields

**Measuring davice** Duro model needle soil thermometer

**Experimental method**

Determine study points and collect soil data at 3 points in in transplanted and 3 points in a broadcast rice field.

Soil temperature measurement

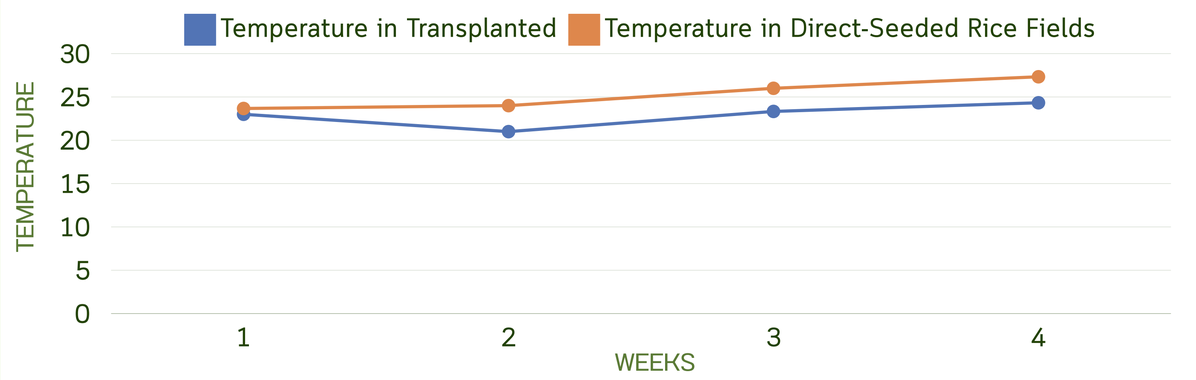
3 Analyze the data to find the relationship between the Transplanted and Direct- Seeded Rice Fields.

4 Compare the temperature data of the Transplanted and Direct-Seeded Rice Fields.

## RESULTS

### PART 1

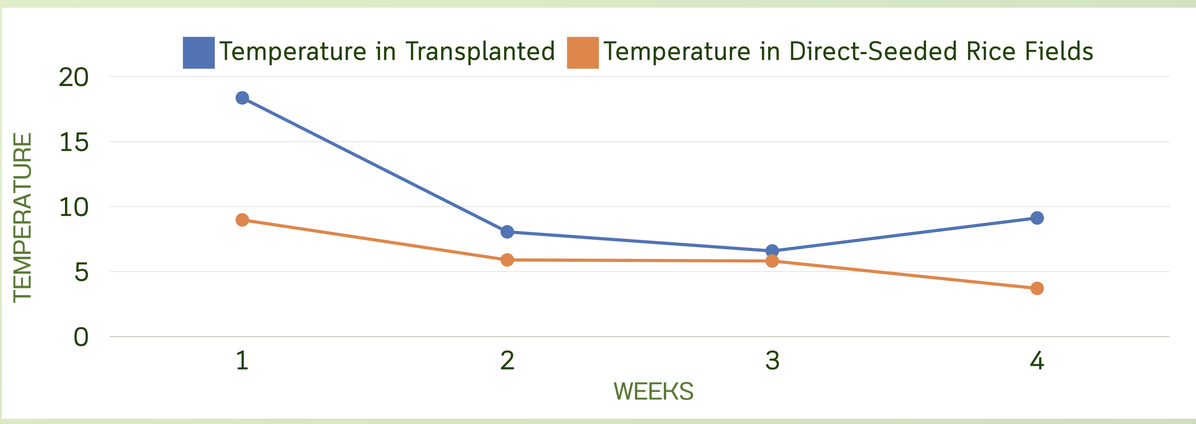
Determine study points and collect soil data at three points in both transplanted and broadcast rice fields. Randomly design and collect soil samples to compare the areas. Soil moisture data show variations between transplanted (paddy) and broadcast-seeded rice fields, leading to an analysis and comparison based on the graph below.




In the first week, moisture content peaked at 18.37% in transplanted rice fields, significantly higher than 8.98% in broadcast fields, indicating better water retention. By the second week, moisture dropped sharply to 8.06% and 5.9%, respectively, showing water loss in both systems. The decline continued in the third week, reaching 6.59% in transplanted and 5.82% in broadcast fields, with similar moisture levels. In the fourth week, transplanted fields saw an increase to 9.13%, while broadcast fields dropped to 3.71%, the lowest recorded value.

### PART 2

Identify study points and collect soil data from three locations in both transplanted and broadcast rice fields. Design and document data to compare the areas. Soil temperature measurements show variations between these field types, leading to an analysis and comparison based on the graph below.




In the first week, the transplanted rice field had a lower temperature (23.67°C) than the direct-seeded field (25°C). By the second week, the transplanted field cooled to 21°C, while the direct-seeded field rose to 24°C, likely due to higher soil moisture in the transplanted field. In the third week, the transplanted field warmed to 23.33°C, while the direct-seeded field remained higher at 26°C. By the fourth week, temperatures increased to 24.33°C and 27.33°C, respectively, with the direct-seeded field consistently warmer.

## CONCLUSION

This study compared soil water drainage and temperature in transplanted and direct-seeded rice fields to evaluate their effects on moisture retention and temperature regulation. Results showed that transplanted fields retained more moisture, with levels peaking at 18.37% in the first week and remaining higher than direct-seeded fields throughout the study. By the fourth week, moisture in transplanted fields increased to 9.13%, while direct-seeded fields dropped to 3.71%, indicating better long-term water retention in transplanted fields.

Regarding temperature, direct-seeded fields consistently recorded higher temperatures, starting at 25°C compared to 23.67°C in transplanted fields and rising to 27.33°C versus 24.33°C by the fourth week. This suggests that transplanted fields help regulate soil temperature due to higher moisture content, but this effect diminishes over time with water loss. Meanwhile, direct-seeded fields experienced a steady temperature increase due to lower moisture levels and higher heat absorption.

## DISCUSSION

The study suggests that transplanted rice cultivation offers better soil moisture retention and temperature regulation than direct-seeding. Higher moisture retention in transplanted fields may reduce drought risks and support plant growth, while lower soil temperatures in early stages promote root development. In contrast, higher temperatures in direct-seeded fields may increase evaporation and irrigation needs. These findings highlight the importance of water management in rice farming, helping farmers choose suitable cultivation methods. Efficient irrigation and soil conservation can improve yields and sustainability. Future research should explore long-term effects on soil quality, nutrient retention, and productivity to enhance sustainable rice farming in Thailand.

## REFERENCE

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