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# Mapping of Posphorus, Potassium, and C-organic Nutrient Status of Dry Land Using Dry Soil Testing Equipment (PUTK) in Pamulihan Dystrict Sumedang Regency

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**ABSTRACT**
*This study aims to determine the status of P, K, and C-Organic nutrients in the dry land soil of Pamulihan Dystrictt, Sumedang Regency. The study was conducted to map the status of P, K, and C-Organic nutrients in the dry land of Pamulihan Dystrictt according to the guidelines for using the Dry Land Soil Test Kit (PUTK). The research was carried out from July 2024 to August 2024 in Pamulihan Dystrictt. The research method involved collecting primary data through field surveys, determining the number and location of sample points using random sampling with the ArcGIS 10.8 application, collecting samples at the designated points, and analyzing the chemical properties of the dry land soil in Pamulihan Dystrictt according to the guidelines for using the Dry Land Soil Test Kit (PUTK). Geographic data were collected and analyzed using GIS technology to map the status of P, K, and C-Organic nutrients in the dry land of Pamulihan Dystrictt. The results of the nutrient status testing in the dry land of Pamulihan Dystrictt, particularly in the villages of Cigendel, Citali, Haurngombong, Pamulihan, and Sukawangi, showed low, medium, and high phosphorus (P) levels, predominantly low with an area of 216.29 ha (55%). Potassium (K) testing showed medium and high levels, predominantly medium with an area of 246.14 ha (62.61%). C-Organic testing showed low levels across an area of 393.13 ha (100%). Fertilization recommendations for crops were made based on the nutrient needs of each plant according to the fertilization recommendation guidelines in the Dry Land Soil Test Kit (PUTK). The conclusion of this study is that the nutrient status of dry land in Pamulihan Dystrictt shows low phosphorus (P), medium potassium (K), and low C-Organic levels. The mapping of P, K, and C-Organic nutrient status in the dry land of Pamulihan Dystrictt was done in a semi-detailed map with a scale of 1:50,000.*

*Keywords: GIS, PUTK, nutrients, dry land, soil, geographic, Pamulihan*

## Itroduction

Land is one of the important elements to support the sustainability of life, especially humans, most of whom use the land as a medium for planting in agricultural activities and also as a place to live to build settlements. In Indonesia, land is widely used for the agricultural sector, because it has fertile soil and is supported by weather that is not too extreme. Most of the Indonesian population depends on the agricultural sector for their livelihood. Especially the West Java region, which uses a lot of its land with the agricultural sector as well as a source of livelihood (Ardiyansyah, 2023).

The area of agricultural land in Indonesia based on agricultural statistics book data for 2019 is 36,617,086 ha with an area of 7,463,948 ha of rice fields, 12,393,092 ha of fields/gardens, 5,188,658 ha of fields/humas and 11,771,388 ha of temporary uncultivated land Ha. The area of agricultural land in West Java is 1,671,628 ha with an area of 928,218 ha of rice fields, 570,351 ha of fields/gardens, 159,329 ha of fields/humas and 13,730 ha of temporary uncultivated land. Data on the area of dry land in West Java based on the sum of dry land/gardens, fields/humas and temporary uncultivated land is 743,410 ha (Ministry of Agriculture, 2023). The area of dry land in Sumedang Dystrictt in 2023 is 9,730.43 ha and in the research location, namely Pamulihan subDystrictt, 1,399.42 ha (Attachment I to Sumedang Regent's Decree Number 542 of 2023 concerning Determining the Area of Sustainable Agricultural Land in Sumedang Regency).

The area of agricultural land in Indonesia based on agricultural statistics book data for 2019 is 36,617,086 ha with a rice field area of 7,463,948 ha, dry fields/gardens 12,393,092 ha, fields/huma 5,188,658 ha and temporary uncultivated land 11,771,388 ha. The area of agricultural land in West Java is 1,671,628 ha with a rice field area of 928,218 ha, dry fields/gardens 570,351 ha, fields/huma 159,329 ha and temporary uncultivated land 13,730 ha. Data on the area of dry land in West Java based on the addition of dry fields/gardens, fields/huma and temporary uncultivated land is 743,410 ha (Ministry of Agriculture, 2023). The area of dry land in Sumedang Regency in 2023 was 9,730.43 ha and the area in the research location, namely Pamulihan Dystrictt, was 1,399.42 ha (Attachment I of the Decree of the Regent of Sumedang Number 542 of 2023 concerning the Determination of the Area of Sustainable Agricultural Land in Sumedang Regency).

Agricultural land or plots of land used for agricultural businesses such as plantations, fisheries and animal husbandry. Land availability is a major factor in the development of the agricultural sector because it is related to the quantity and quality of the types of plants planted in an effort to gain profit. Agricultural land is divided into two, namely, wetland agriculture and dry land agriculture (Febriana Sulistya Pratiwi., 2022).

Agricultural land or land area used for agricultural purposes such as plantations, fisheries and livestock. Land availability is a major factor in the development of the agricultural sector because it is related to the quantity and quality of the types of crops planted as an effort to gain profit. Agricultural land is divided into two, namely, wetland agriculture and dry land agriculture (Febriana Sulistya Pratiwi, 2022). Then dryland agriculture is a type of agriculture carried out on land that lacks water. Dryland or drylands is land that has the characteristics of a lack of or minimal water, such as rivers, lakes or irrigation channels. This dry land is defined as land that is never flooded or inundated with water even once or all the time. This dryland agriculture can be exemplified by legume plants, fruit tree plantations, tuber plants, horticultural plants, ornamental plantations and others.

The potential for dry land for agricultural development in Indonesia is very large, estimated at 76 million hectares in low to highlands with wet and dry climates. Of the dry land area in Indonesia which reaches 144.47 million ha, around 99.65 million ha (68.98%) is potential land for agriculture, while the remaining 44.82 million ha has no potential for agriculture, most of which is in forest areas. (Heryani and Rejekiningrum, 2020).

Soil fertility is the ability of the soil to provide nutrients, at a certain level and balance to support the growth of a type of plant in an environment with other growth factors in favorable conditions. Fertile soil has sufficient nutrient availability for plants and does not have limiting factors in the soil that will affect plant growth. The nutrient content in the soil is not static but always changes, depending on the season, type of plant, and soil processing (Hermansyah et al., 2024).

Soil fertility status is the condition of soil fertility at a certain place and time which is assessed based on standard criteria for soil fertility parameters. There are five parameters used to assess soil fertility status, namely cation exchange capacity, base saturation, organic C, potential $P_2O_5$ levels, and potential $K_2O$. Based on the combination of data from these five characteristics, the soil fertility status can then be determined, including very low, low, medium and high according to the values in the Technical Instructions for Determining Soil Fertility Status (Hermansyah et al., 2024).

## RESEARCH METHODS

The research will be implemented in the month of July - August 2024. Starting from survey activities, soil sampling and sample preparation, analysis and parameters and made of nutrient status map. Desk study land use map the area of dry land in some sub-Dystricts of Pamulihan is Sukawangi Village, Pamulihan, Cigendel, Haurngombong, Citali and Ciptasari. Based on the results of field observation, the preparation of a map of the area and distribution of Sustainable Food Agriculture Land in 2023 after data processing with an area of 391.9 ha divided into 42 sampling location points. The determination of the distribution of sampling points was determined by initial determination using a random sample on ArcGIS 10.8 application, then a shift was made taking into consideration variations in land use, slope, rainfall and catchment area. Soil, climate, and topography data collection uses the following steps:

1. Field survey at the sampling point location for soil sampling.
2. Analysis of the soil chemical properties of the soil samples taken at the dry land sampling point in the Restoration Dystrictt in accordance with the nutrient Analysis Manual of Dry Soil Testing Devices (PUTK).
3. Dryland distribution map of soil sampling points in Restoration Dystrict, rainfall, topography and soil type map of Restoration Dystrict were processed using ArcGIS 10.8 software.
4. land use, slope, rainfall and catchment area.

How to take soil samples

1. Soil sampling point by taking soil samples at sample points that have been determined using the random sampling method using the ArcGIS 10.8 application taking into account that the expanse area representing one sample point is more than 5 ha, then shifting is carried out taking into account variations in land use, soil type, slope, rainfall and expanse area. Taking one sample point represents 5 – 12 ha of dry land.
2. Composite soil is taken before planting or before tillage.
3. Soil sampling is done by taking 2 - 3 single soil points and then combining them.
4. Grass, rocks or gravel, plant remains or fresh organic material/litter found on the surface of the soil are set aside.
5. Soil is taken in a moist condition, not to wet and not to dry.
6. Soil is taken with a soil drill and small crowbar to a depth of 0 to 20 cm.
7. Stir the soil evenly in plastic when taking several individual pieces of soil to be composited, if there are plant residues, roots or gravel, discard

Then approximately 1 kg of the soil sample mixture is taken and stored in clear plastic and given information about the location, coordinates, sample number and date of sampling.
The test soil samples are ready to be analyzed for Phosphorus P, Potassium K and C-Organic content with a quick test using the PUTK Dry Soil Test Kit, the test is carried out after the test soil samples are collected and carried out at the Technical Implementation Unit Office of the UPTD Department of Agriculture and Food Security in the Pamulihan Region and the researcher's house .

Processing research data with the following stages:

1. Process data from laboratory analysis test results into spatial data using the interpolation method using the ArcGIS 10.8 application.

2. The interpolation results are classified based on land value classes according to the instructions for using the Dry Soil Test Kit.
3. Class division using the ArcGIS 10.8 application. Classification of nutrient status according to the instructions for using the Dry Soil Test Device (PUTK).

Research on mapping the status of phosphorus P, Potassium K and C-Organic nutrients in Pamulihan Dystrict requires research data in Table 1.

Table 1. Research data

| Data Type | Main Data | Source |
|---|---|---|
| Primair Data | Dry Soil Test Device (PUTK) | To test the Soil Nutrient Status of Phosphorus P, Potassium K and C-organic |
| Secondary Data | Pamulihan Dystrict Administrative Map | https://tanahair.indonesia.go.id/unduh-rbi/#/ |
| | Pamulihan Dystrictt Rainfall Map | https://tanahair.indonesia.go.id/unduh-rbi/#/ |
| | Map of Soil Types in Pamulihan Dystrictt | https://tanahair.indonesia.go.id/unduh-rbi/#/ |
| | Pamulihan Dystrictt Land Contour Map | https://tanahair.indonesia.go.id/unduh-rbi/#/ |

Source: Integrated Geospatial Information, One Map Policy, BIG Year (2024)

This research was carried out in 4 stages, namely pre-survey, main survey, map making and determining fertilizer recommendations

RESULTS AND DISCUSSION

Soil phosphorus is an essential macro nutrient and naturally phosphorus in the soil is in the form of organic or inorganic compounds. Both forms are insoluble forms of phosphorus, so their availability in the soil is very limited. The availability of P in soil is greatly influenced by the pH value. Under neutral pH conditions, the P content is usually also within the high criteria.

Table 2. Extent of Dry Land Phosphorus P Nutrient Status in Pamulihan Dystrict

| No | Village | Phosporus (P) Nutrient Status (ha) | | | Sample Point Area |
|---|---|---|---|---|---|
| | | Low | Medium | High | Total (HA) |
| 1 | CIGENDEL | 36,50 | 61,40 | 6,70 | 104,60 |
| 2 | CITALI | 0,00 | 5,60 | 0,00 | 5,60 |
| 3 | HAURGOMBONG | 0,00 | 25,70 | 0,00 | 25,70 |
| 4 | PAMULIHAN | 75,40 | 20,20 | 12,00 | 107,60 |
| 5 | SUKAWARGI | 104,30 | 5,40 | 39,90 | 149,60 |
| Total | | 216,20 | 118,30 | 58,60 | 393,10 |
| Prosentage % | | 55,00 | 30,09 | 14,91 | 100,00 |

**Source: Data processing results of phosphorus P nutrient testing in Pamulihan Dystrictt**

The results of phosphorus P testing in Pamulihan Dystrict were dominated by low status at 55%, medium at 30.09% and high at 14.91% of the total dry land area. Pamulihan Dystrictt is dominated by low P phosphorus status with an area of 216.20 ha which covers 55% of the total area of dry land locations used for sampling, especially the villages of Cigendel, Citali, Haurngombong, Pamulihan and Sukawangi.

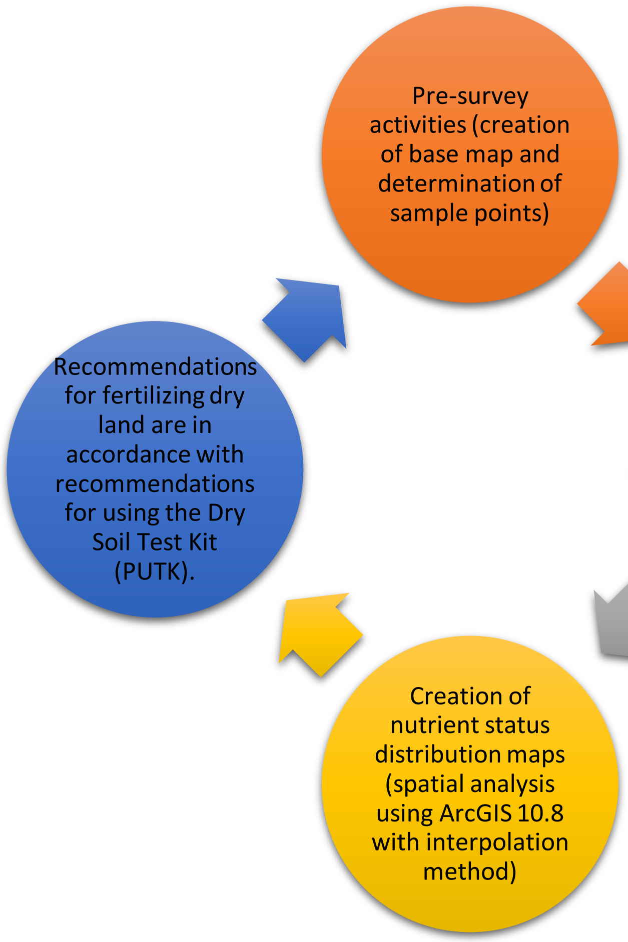



Figure 1. Implementation Research Stage

The availability of phosphorus P is influenced by fertilization factors as well as by the parent material that forms the soil and the soil management system at that location. Young soils with low rainfall usually contain quite high levels of P, when compared with soils that have experienced advanced weathering and developed in areas with high rainfall. The relatively high P is caused by land being used intensively for horticultural crops using artificial fertilizers. One way to increase the availability of phosphorus in the soil is by adding rice husk ash. The content of several macro elements in rice husks are: Nitrogen (N) 2%, Phosphorus ($P_2O_5$) O.65%, Potassium (K) 4% and magnesium (Mg) 0.5% (Diaz, 1993). Phosphorus that is absorbed by plants in the form of inorganic ions quickly turns into organic phosphorus compounds. Phosphorus easily moves between plant tissues (Trisnawati, 2022).

Soil potassium K comes from soil minerals and organic plant residues. Potassium K in soil is mobile (easy to move) so it is easily lost through the washing process or carried away by the movement of water.

Table 3. Extent of Potassium K Nutrient Status in Dry Land in Pamulihan Dystrictt

| No | Village | Potassium (K) Nutrient Status (ha) | | | Sample Point Area |
|---|---|---|---|---|---|
| | | Low | Medium | High | Total (HA) |
| 1 | CIGENDEL | 0,00 | 61,40 | 43,20 | 104,60 |
| 2 | CITALI | 0,00 | 5,60 | 0,00 | 5,60 |
| 3 | HAURGOMBONG | 0,00 | 25,70 | 0,00 | 25,70 |
| 4 | PAMULIHAN | 0,00 | 54,90 | 52,70 | 107,60 |
| 5 | SUKAWARGI | 0,00 | 98,70 | 50,90 | 149,60 |
| Total | | 0,00 | 246,30 | 146,80 | 393,10 |
| Prosentage % | | 0,00 | 62,66 | 37,34 | 100,00 |

Source: Data processing results of potassium K nutrient testing in Pamulihan Dystrict

The results of the Potassium K test in Pamulihan Dystrictt were dominated by medium status at 62.66% and high at 37.34% of the total dry land area. Pamulihan Dystrictt is dominated by medium K potassium status with an area of 246.30 ha which covers 62.66% of the total area of dry land locations used for sampling, especially the villages of Cigendel, Citali, Haurngombong, Pamulihan and Sukawangi.

The nutrient potassium is found in large quantities in the soil, but only a small portion is used by plants, namely that which is soluble in water or which can be exchanged (in soil colloids). Element K is absorbed by plants as $K^+$ ions. The concentration of soluble K in the soil solution and K in the soil sorption complex is the form available to plants and is influenced by cation exchange capacity (CEC), content of other cations, pH, aeration, and type of plants (Muliadi et al., 2023). Potassium supplies in the soil can decrease due to several reasons, namely transport of plants during harvesting, leaching or erosion. The loss of potassium due to transport by plants is greater, the loss of potassium transported by plants will be further magnified by the nature of potassium which can be absorbed by plants in excess beyond actual needs. This situation is called luxury consumption. This excessive absorption no longer increases plant production, resulting in wasted use of potassium (Widowati et al., 2021). The need for moderate potassium K nutrient status is the addition of potassium fertilizer and the addition of organic matter and pH adjustment. Adding potassium fertilizer to the soil can increase the potassium content and adding organic material rich in potassium can increase the K content. Organic material can also increase the base saturation of the soil. Organic material in the form of humus has a negative charge which can bind K+ so that the potential for potassium to be leached is lower. Efforts must be made to reduce losses and increase the availability and absorption of potassium K nutrients in the soil by increasing the soil organic matter content, as a source of potassium K and so that the soil binds or provides more water to facilitate the movement of potassium K to the root surface through mass flow processes and diffusion and planting living fences to reduce erosion or create terraces (Trisnawati, 2022).

Soil organic C- is the part of the soil that comes from plant or animal remains found in the soil which continually undergo changes in shape because they are influenced by biological, physical and chemical factors. Through decomposition, humification and mineralization processes.

Extensive Table of C-Organic Nutrient Status in Pamulihan Dystrict

Table 4. Extent of Dry Land C-Organic Nutrient Status in Pamulihan Dystrictt

| No | Village | Organic Nutrient Status (ha) | | | Sample Point Area |
|---|---|---|---|---|---|
| | | Low | Medium | High | Total (HA) |
| 1 | CIGENDEL | 104,50 | 0,00 | 0,00 | 104,50 |
| 2 | CITALI | 5,60 | 0,00 | 0,00 | 5,60 |
| 3 | HAURGOMBONG | 25,70 | 0,00 | 0,00 | 25,70 |
| 4 | PAMULIHAN | 107,60 | 0,00 | 0,00 | 107,60 |
| 5 | SUKAWARGI | 149,60 | 0,00 | 0,00 | 149,60 |
| Total | | 393,00 | 0,00 | 0,00 | 393,00 |
| Prosentage % | | 100,00 | 0,00 | 0,00 | 100,00 |

Source: Results of C-organic nutrient testing data processing in Pamulihan Dystrictt

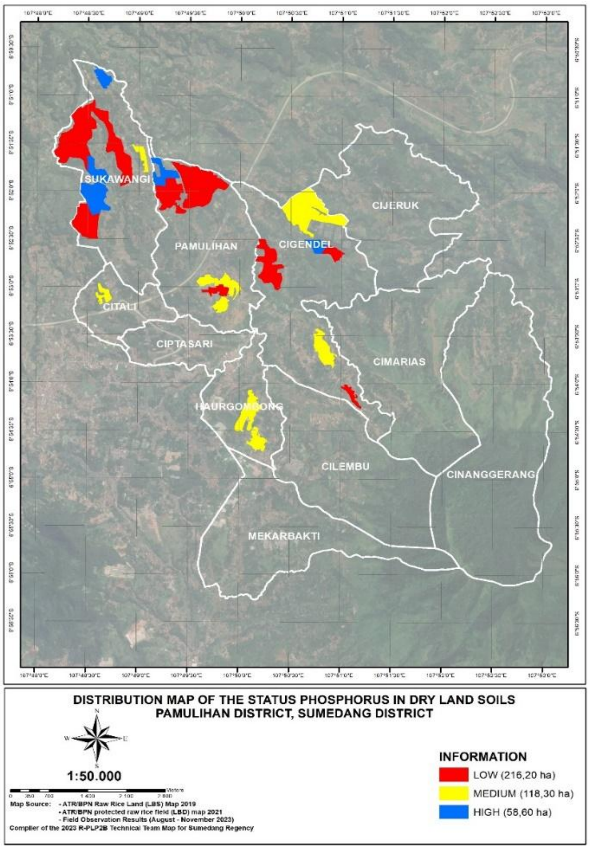
The results of C-Organic testing in Pamulihan Dystrictt are dominated by low status with an area of 393.10 ha which covers 100% of the total area of dry land used for sampling, especially the villages of Cigendel, Citali, Haurngombong, Pamulihan and Sukawangi.

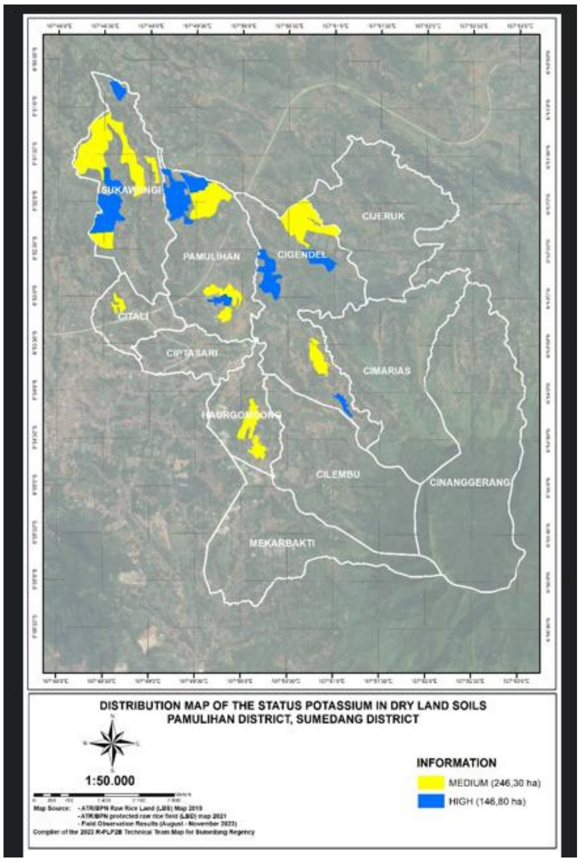
Organic material is one of the factors that plays a very important role in adding nutrients. The addition of organic material can increase the water holding capacity of soil, is able to bind large amounts of water thereby reducing the amount of water lost and reducing the incidence of erosion on agricultural land, helping the development of plant roots through formed soil pores and good soil aggregates. Organic matter in composted form is useful for increasing soil organic matter levels, improving the physical, chemical and biological fertility of the soil, increasing the diversity, population and activity of microbes and facilitating the provision of nutrients in the soil and providing macro and micro nutrients.

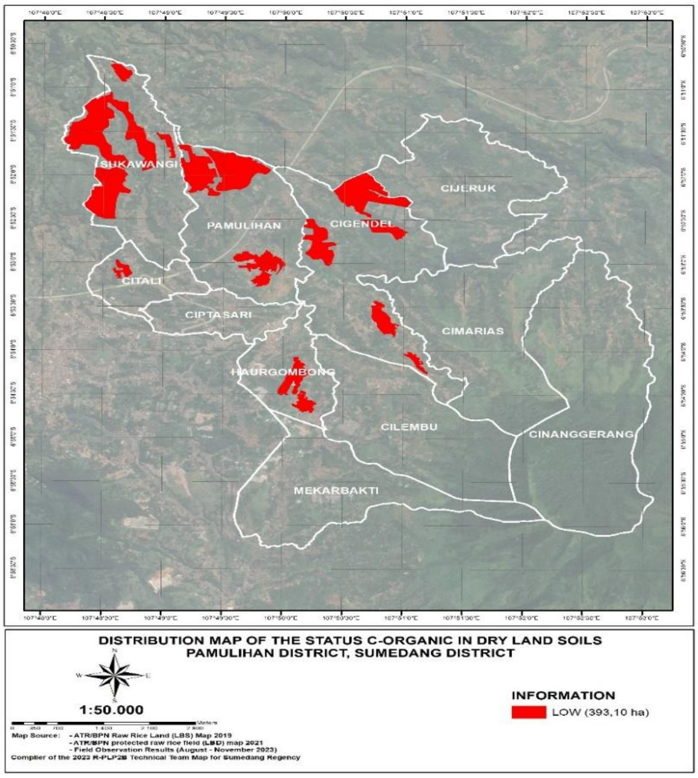
The more intensive the use of land and the lower the input of organic matter, the more rapid the organic matter levels will be on the land. Sources of organic material that function to increase the C-organic content of the soil are compost, green manure, manure, straw residue and livestock waste. Organic content influences the level of accumulation of organic material on the soil surface (Trisnawati, 2022).

Distribution Map of Phosphorus P, Potassium K and C-Organic Nutrient Status

Figure 2. Distribution map of phosphorus P, potassium K and C-organic nutrient status
Source: Data Processing Results of Testing the Nutrient Status of Phosphorus P, Potassium K and C-Organic Pamulihan Dystrictt


SUKAWANGI
PAMULIHAN
CIGENDEL
CIJERUK
CITALI
CIPTASARI
CIMARIAS
HAURGOMBONG
CILEMBU
CINANGGERANG
MEKARBAKTI
DISTRIBUTION MAP OF THE STATUS PHOSPHORUS IN DRY LAND SOILS
PAMULIHAN DISTRICT, SUMEDANG DISTRICT
1:50.000
INFORMATION
LOW (216,20 ha)
MEDIUM (118,30 ha)
HIGH (58,60 ha)
Map Source: - ATR/BPN Raw Rice Land (LBS) Map 2019
- ATR/BPN protected raw rice field (LBD) map 2021
- Field Observation Results (August - November 2023)
Compiler of the 2023 R-PLP2B Technical Team Map for Sumedang Regency


SUKAWANGI
PAMULIHAN
CIGENDEL
CIJERUK
CITALI
CIPTASARI
CIMARIAS
HAURGOMBONG
CILEMBU
CINANGGERANG
MEKARBAKTI
DISTRIBUTION MAP OF THE STATUS POTASSIUM IN DRY LAND SOILS
PAMULIHAN DISTRICT, SUMEDANG DISTRICT
1:50.000
INFORMATION
MEDIUM (246,30 ha)
HIGH (146,80 ha)
Map Source: - ATR/BPN Raw Rice Land (LBS) Map 2019
- ATR/BPN protected raw rice field (LBD) map 2021
- Field Observation Results (August - November 2023)
Compiler of the 2023 R-PLP2B Technical Team Map for Sumedang Regency


SUKAWANGI
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CITALI
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HAURGOMBONG
CILEMBU
CINANGGERANG
MEKARBAKTI
DISTRIBUTION MAP OF THE STATUS C-ORGANIC IN DRY LAND SOILS
PAMULIHAN DISTRICT, SUMEDANG DISTRICT
1:50.000
INFORMATION
LOW (393,10 ha)
Map Source: - ATR/BPN Raw Rice Land (LBS) Map 2019
- ATR/BPN protected raw rice field (LBD) map 2021
- Field Observation Results (August - November 2023)
Compiler of the 2023 R-PLP2B Technical Team Map for Sumedang Regency

Fertilization recommendations for plants are made based on the nutrient needs of each plant to provide optimal plant results. In order to fulfill the supply of nutrients needed by plants through recommended fertilization, the four main factors in fertilization that need to be considered are the right source of fertilizer, the right dose of fertilizer, the right time of fertilization and the right placement of fertilizer. Recommendations for fertilizing plants for each commodity are differentiated based on soil type, namely andisol and non-andisol soil (Agriculture and Regency, 2021).
The types, doses and application times of plant fertilizers are described as follows, adjusted to the guidebook on the Dry Soil Test Kit and the fertilizer recommendation book from the Soil Research Institute of the Agricultural Research and Development Agency, Ministry of Agriculture in 2021.
The average nutrient status of dry land in Pamulihan Dystrictt is based on the results of testing the nutrient elements phosphorus P, potassium K and C-organic using the Dry Soil Test Kit (PUTK).

Table 5. Average Nutrient Status of Phosphorus P, Potassium K and C-Organic Dry Land Pamulihan Dystrictt.

| No | SubDystrictt | Nutrient Status | | |
|---|---|---|---|---|
| | | P | K | C-Oranic |
| 1 | PAMULIHAN | Low | Medium | Low |

Nutrient status information: R (low), S (medium) and T (high)
The average nutrient status of dry land in villages where soil samples were taken in Pamulihan Dystrictt is based on the results of testing for phosphorus P, potassium K and C-organic nutrients using the Dry Soil Test Kit (PUTK).

Table 6. Average Status of Dry Land Nutrients Phosphorus P, Potassium K and C-Organic Villages as Soil Sampling Locations in the Dystrictt Recovery.

| No | Village | Organic Nutrient Status (ha) | | |
|---|---|---|---|---|
| | | P | K | C-Organic |
| 1 | CIGENDEL | M | M | L |
| 2 | CITALI | M | M | L |
| 3 | HAURGOMBONG | M | M | L |
| 4 | PAMULIHAN | L | M | L |
| 5 | SUKAWARGI | L | M | L |

Description: Nutrient Status L (Low), M (Medium and H (High)

Nutrient Status of Dry Land at Each Soil Sampling Location in Pamulihan Dystrict and Data in Table 7.

Table 7. Nutrient Status of Dry Land at Each Soil Sampling Location in Pamulihan Dystrict

| No | Sample No | Village | Land Type | Data Source | Coordinate Point | | | Land Type | No | Sample No | Slope | Slope Description | Rainfall/Year | Tested Nutrient | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Area (Ha) | Longitude (X) | Latitude (Y) | | | | | | | P | K | C-Organic |
| 1 | 0 | Cigendel | Additional Moor | Interpretation | 12,00 | 107,84492 | -6,86813 | Cambisol Humic | 1 | 0 | 8 % - 15 % | SLOPING | 2500 - 3000 Mm | L | L | L |
| 2 | 1 | Pamulihan | Additional Moor | Interpretation | 11,70 | 107,82596 | -6,86562 | Cambisol Dystrict | 2 | 1 | 8 % - 15 % | SLOPING | 2500 - 3000 Mm | L | L | L |
| 3 | 2 | Pamulihan | Additional Moor | Interpretation | 11,40 | 107,82152 | -6,86855 | Cambisol Dystrict | 3 | 2 | 8 % - 15 % | SLOPING | 2500 - 3000 Mm | L | T | L |
| 4 | 3 | Lukawangi | Additional Moor | Interpretation | 5,40 | 107,81709 | -6,86064 | Cambisol Dystrict | 4 | 3 | 8 % - 15 % | SLOPING | 2500 - 3000 Mm | L | L | L |
| 5 | 4 | HauLgombong | Moor | LBL 2023 | 8,60 | 107,83622 | -6,91007 | Cambisol Humic | 5 | 4 | < 8 % | FLAT | 2000 - 2500 Mm | L | L | L |
| 6 | 5 | HauLgombong | Moor | LBL 2023 | 8,60 | 107,83413 | -6,90671 | Cambisol Humic | 6 | 5 | < 8 % | FLAT | 2000 - 2500 Mm | L | L | L |
| 7 | 6 | Cigendel | Moor | LBL 2023 | 4,70 | 107,85165 | -6,90202 | Cambisol Humic | 7 | 6 | 8 % - 15 % | SLOPING | 2000 - 2500 Mm | L | T | L |
| 8 | 7 | Cigendel | Moor | LBL 2023 | 7,30 | 107,84758 | -6,89546 | Cambisol Humic | 8 | 7 | 8 % - 15 % | SLOPING | 2000 - 2500 Mm | L | L | L |
| 9 | 8 | Pamulihan | Moor | LBL 2023 | 5,90 | 107,83021 | -6,88649 | Cambisol Humic | 9 | 8 | 8 % - 15 % | SLOPING | 2000 - 2500 Mm | L | L | L |
| 10 | 9 | Citali | Moor | LBL 2023 | 5,60 | 107,81086 | -6,88477 | Cambisol Humic | 10 | 9 | 8 % - 15 % | SLOPING | 2000 - 2500 Mm | L | L | L |
| 11 | 10 | Pamulihan | Moor | LBL 2023 | 7,90 | 107,83175 | -6,88303 | Cambisol Humic | 11 | 10 | 8 % - 15 % | SLOPING | 2000 - 2500 Mm | L | L | L |
| 12 | 11 | Lukawangi | Moor | LBL 2023 | 11,00 | 107,80945 | -6,86902 | Cambisol Dystrict | 12 | 11 | 8 % - 15 % | SLOPING | 2500 - 3000 Mm | T | T | L |
| 13 | 12 | Lukawangi | Moor | LBL 2023 | 11,90 | 107,80833 | -6,85474 | Cambisol Dystrict | 13 | 12 | 8 % - 15 % | SLOPING | 2500 - 3000 Mm | L | L | L |
| 14 | 13 | Lukawangi | Moor | LBL 2023 | 7,00 | 107,81058 | -6,84700 | Cambisol Dystrict | 14 | 13 | 8 % - 15 % | SLOPING | 2500 - 3000 Mm | T | T | L |
| 15 | 14 | Cigendel | Moor | LBL 2023 | 6,70 | 107,84584 | -6,87608 | Gleisol Eutrict | 15 | 14 | 16 % - 25 % | A BIT STEEP | 2500 - 3000 Mm | T | T | L |
| 16 | 15 | Cigendel | Moor | LBL 2023 | 6,30 | 107,84858 | -6,87729 | Cambisol Humic | 16 | 15 | 16 % - 25 % | A BIT STEEP | 2000 - 2500 Mm | L | T | L |
| 17 | 16 | Cigendel | Moor | LBL 2023 | 7,70 | 107,84643 | -6,89271 | Cambisol Humic | 17 | 16 | 8 % - 15 % | SLOPING | 2000 - 2500 Mm | L | L | L |

| No | Sample No | Village | Land Type | Data Source | Coordinate Point | | | Land Type | No | Sample No | Slope | Slope Description | Rainfall/Year | Tested Nutrient | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Area (ha) | Longitude (X) | Latitude (Y) | | | | | | | P | K | C-Organic |
| 18 | 17 | HauLgombong | Moor | LBL 2023 | 8,50 | 107,83537 | -6,90371 | Cambisol Humic | 18 | 17 | < 8 % | FLAT | 2000 - 2500 Mm | L | L | L |
| 19 | 18 | Cigendel | Additional Moor | Interpretation | 8,80 | 107,83761 | -6,87704 | Cambisol Humic | 19 | 18 | < 8 % | FLAT | 2000 - 2500 Mm | L | T | L |
| 20 | 19 | Cigendel | Additional Moor | Interpretation | 8,30 | 107,83812 | -6,87978 | Cambisol Humic | 20 | 19 | < 8 % | FLAT | 2000 - 2500 mm | L | T | L |
| 21 | 20 | Cigendel | Additional Moor | Interpretation | 8,40 | 107,83858 | -6,88200 | Cambisol Humic | 21 | 20 | 8 % - 15 % | SLOPING | 2000 - 2500 mm | L | T | L |
| 22 | 21 | Pamulihan | Additional Moor | Interpretation | 12,00 | 107,82053 | -6,86360 | Cambisol Dystrict | 22 | 21 | 8 % - 15 % | SLOPING | 2500 - 3000 mm | T | T | L |
| 23 | 22 | Pamulihan | Moor | LBL 2023 | 6,40 | 107,82818 | -6,88227 | Cambisol Humic | 23 | 22 | < 8 % | FLAT | 2000 - 2500 mm | L | L | L |
| 24 | 23 | Pamulihan | Moor | LBL 2023 | 6,20 | 107,82962 | -6,88395 | Cambisol Humic | 24 | 23 | 8 % - 15 % | SLOPING | 2000 - 2500 mm | L | T | L |
| 25 | 24 | Lukawangi | Moor | LBL 2023 | 11,50 | 107,80816 | -6,87338 | Cambisol Dystrict | 25 | 24 | 8 % - 15 % | SLOPING | 2000 - 2500 mm | L | L | L |
| 26 | 25 | Lukawangi | Moor | LBL 2023 | 11,60 | 107,80937 | -6,86655 | Cambisol Dystrict | 26 | 25 | 16 % - 25 % | A BIT STEEP | 2500 - 3000 mm | T | T | L |
| 27 | 26 | Lukawangi | Moor | LBL 2023 | 11,00 | 107,80776 | -6,87090 | Cambisol Dystrict | 27 | 26 | < 8 % | FLAT | 2500 - 3000 mm | L | T | L |
| 28 | 27 | Cigendel | Additional Moor | Interpretation | 11,30 | 107,84249 | -6,87157 | Cambisol Humic | 28 | 27 | 8 % - 15 % | SLOPING | 2500 - 3000 mm | L | L | L |
| 29 | 28 | Cigendel | Additional Moor | Interpretation | 11,10 | 107,84760 | -6,87125 | Cambisol Humic | 29 | 28 | 8 % - 15 % | SLOPING | 2500 - 3000 mm | L | L | L |
| 30 | 29 | Cigendel | Additional Moor | Interpretation | 12,00 | 107,84308 | -6,86961 | Cambisol Humic | 30 | 29 | 8 % - 15 % | SLOPING | 2500 - 3000 mm | L | L | L |
| 31 | 30 | Pamulihan | Additional Moor | Interpretation | 11,90 | 107,82617 | -6,86826 | Cambisol Dystrict | 31 | 30 | 16 % - 25 % | A BIT STEEP | 2500 - 3000 mm | L | L | L |
| 32 | 31 | Pamulihan | Additional Moor | Interpretation | 11,10 | 107,82896 | -6,86532 | Cambisol Dystrict | 32 | 31 | 16 % - 25 % | A BIT STEEP | 2500 - 3000 mm | L | L | L |
| 33 | 32 | Pamulihan | Additional Moor | Interpretation | 12,00 | 107,82467 | -6,86335 | Cambisol Dystrict | 33 | 32 | 8 % - 15 % | SLOPING | 2500 - 3000 mm | L | T | L |
| 34 | 33 | Lukawangi | Moor | LBL 2023 | 9,30 | 107,81439 | -6,86354 | Cambisol Dystrict | 34 | 33 | < 8 % | FLAT | 2500 - 3000 mm | L | L | L |
| 35 | 34 | Lukawangi | Moor | LBL 2023 | 10,40 | 107,81327 | -6,85997 | Cambisol Dystrict | 35 | 34 | 8 % - 15 % | SLOPING | 2500 - 3000 mm | L | L | L |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | 35 | Lukawangi | Moor | LBL 2023 | 8,40 | 107,80547 | -6,85771 | Cambisol Dystrict | 36 | 35 | 8 % - 15 % | SLOPING | 2500 - 3000 mm | L | L | L |
| 37 | 36 | Lukawangi | Moor | LBL 2023 | 10,80 | 107,80673 | -6,85528 | Cambisol Dystrict | 37 | 36 | 8 % - 15 % | SLOPING | 2500 - 3000 mm | L | L | L |

| No | Sample No | Village | Land Type | Data Source | Coordinate Point | | | Land Type | No | Sample No | Slope | Slope Description | Rainfall/Year | Tested Nutrient | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Area | Longitude (X) | Latitude (Y) | | | | | | | P | K | C-Organic |
| 38 | 37 | Lukawangi | Moor | LBL 2023 | 10,30 | 107,80969 | -6,86329 | Cambisol Dystrict | 38 | 37 | < 8 % | FLAT | 2500 - 3000 mm | T | T | L |
| 39 | 38 | Lukawangi | Moor | LBL 2023 | 11,90 | 107,81117 | -6,85510 | Cambisol Dystrict | 39 | 38 | 8 % - 15 % | SLOPING | 2500 - 3000 mm | L | L | L |
| 40 | 39 | Pamulihan | Additional Moor | Interpretation | 11,10 | 107,82190 | -6,86614 | Cambisol Dystrict | 40 | 39 | < 8 % | FLAT | 2500 - 3000 mm | L | T | L |
| 41 | 40 | Lukawangi | Moor | LBL 2023 | 9,30 | 107,80402 | -6,85954 | Cambisol Dystrict | 41 | 40 | 16 % - 25 % | A BIT STEEP | 2500 - 3000 mm | L | L | L |
| 42 | 41 | Lukawangi | Moor | LBL 2023 | 9,80 | 107,807161 | -6,859706 | Cambisol Dystrict | 42 | 41 | < 8 % | FLAT | 2500 - 3000 mm | L | L | L |

Description: Status of Nutrient: L (Low),M (Medium) and H (High)

CONCLUSIONS AND RECOMMENDATIONS

## Conclusion

The results of testing the nutrient status of dry land in Pamulihan Dystrictt, West Region, especially the villages of Cigendel, Citali, Haurngombong, Pamulihan and Sukawangi with low, medium and high phosphorus P results, were dominated by low status with an area of 216.29 ha (55%).
Medium and high status potassium K testing is dominated by medium status with an area of 246.14 ha (62.61%). Low status C-Organic testing covers an area of 393.13 ha (100%) and fertilizer recommendations for plants are made based on the nutrient requirements of each plant according to the instructions for using the Dry Soil Test Kit (PUTK).
Mapping the status of P, K and C-Organic nutrients on dry land in Pamulihan Dystrictt is mapped on a semi-detailed map with a scale of 1:50,000.

**Recommendations**

Intensive cultivation of crops indicates that there is a tendency for excessive use of chemical fertilizers while productivity remains unchanged. Excessive use of chemical fertilizers and without paying attention to conservation principles can cause soil fertility to decrease, damaging agricultural land and the environment.
In order to prevent increased land degradation and reduce negative impacts on environmental sustainability and ensure the sustainability of farming, it is necessary to improve nutrient management (organic and inorganic fertilizers) by using the concept of balanced fertilization in accordance with plant needs and the nutrient carrying capacity of the soil through recommendations for fertilization according to the elements. nutrients available in the soil.

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