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PERAN TEKNIK PERTANIAN DALAM MEMACU PENINGKATAN KESEJAHTERAAN PETANI UNTUK MENDUKUNG INDEKS PEMBANGUNAN MANUSIA DI INDONESIA

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Abstract

National development in the context of human development index (HDI) should be carried out in the integrated pathway of indigenous knowledge & technology system (IKTS) and advanced science & technology system (ASTS) based on work synergy concept amongst configuration systems of bisnis activities. The dominant role of Agricultural Engineering (AE) is required in every synergical activity, particularly in farming work in forms of management & engineering, procedure & process, facility, networking, and marketing, that supported by sustainable local raw materials. At least, nine proposed policies have been highlighted to actualize the increase of HDI, including: 1) land integration; 2) keep maintaining agricultural land; 3) regulation of rights on land function change; 4) land consolidation; 5) regulation of agricultural infra-structures; 6) actualization of contingency system; 7) actualization of financial institution for farmers society; 8) actualization of configuration system and farm synergy; and 9) actualization of farmers’ minimal wages.

Keywords: community development, human development index, indigenous knowledge & technology system, advanced science & technology system, agricultural engineering, policy.

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Review

STUDI PENGELOLAAN LINGKUNGAN DI DAERAH ALIRAN SUNGAI CIDANAU, KABUPATEN SERANG, PROVINSI BANTEN

Gardjito¹, Budi I. Setiawan², dan S. Shiozawa³

Abstract

A series of research in watershed management in Cidanau Watershed has been conducted through activities as part of the JSPS-DGHE Core University Program in Applied Biosciences between Bogor Agricultural University and the University of Tokyo. The specific research project is entitled as “The Harmonization between Development and Environmental Conservation in Biological Production”. This two phase’s collaboration project was planned to last in ten years, starting from 1998 and would be terminated in 2008. One of the topics conducted by a research group is called “Study on Environmental Changes and Sustainable Development in Cidanau Watershed”. The first phase, starting from 1998 through 2004, comprised the monitoring of environmental changes occurred in the watershed and efforts in developing low loading technologies to overcome the problems. The second phase, which is ongoing until 2008, comprises the predictions of environmental changes that would occur as well as the selection of environmentally friendly technologies for sustainable rural and agricultural development in the watershed. This paper is a general review on the research project especially for the first phase.

Keywords: Environmental changes • Watershed management • Sustainable development

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Technical Paper

GROWTH OF TANTALUM DOPED BARIUM TITANAT (BTT) THIN FILMS BY CHEMICAL SOLUTION DEPOSITION (CSD) METHOD AND ITS APPLICATION FOR FILL FACTOR OF SOLAR CELL

Darmasetiawan Hanedi¹, Kamaruddin Abdullah², Siswadi³, Irzaman¹ And Cari⁴

Abstract

Tantalum doped barium titanate thin film (BTT) were prepared on 7059 corning glass substrates using chemical solution deposition (CSD) method. The films were deposited by spin coating method with 0.5 M precursor, spinning speed at 3500 rpm for 30 seconds. Post annealing was carried out at 400°C and 500°C for 10 hour in each deposited films. Optical properties observation were employed to characterize the deposited films with UV-VIS HP 8452A Diode Array Spectrophotometer. The transmittance measured was between 9 to 72%. Meanwhile, the optical band-gap (E_g) values were 2.98 eV and 3.07 eV for BTT at annealing temperature of 400°C and 500°C respectively. A theoretical study of the dependence of fill factor (FF) of solar cell on energy gap (E_g) of ferroelectric semiconductor material was conducted. By using exponential progression method, the FF function could be resolved and the result showed that FF of solar cell increased steeply till the value of energy gap was 1.5 eV, and the value of FF was relatively constant till the biggest calculated value of energy gap. The values of FF of solar cell were 95.04% and 95.16% for BTT ferroelectric semiconductor n-type at annealing temperature of 400°C and 500°C, respectively. Tantalum doped BaTiO₃ thin films, therefore, could be regarded as solar cell material that has the higher conversion coefficient compared to the other materials. These results showed that the BTT thin films were considered suitable for use as ferroelectric semiconductor solar cell.

Keywords: Barium Titanate Thin Films, Solar Cell.

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Technical Paper

PEMANTAUAN KONDISI PELUMAS DAN KOMPONEN MESIN BERBASIS PENGUKURAN TETAPAN DIELEKTRIK (Tan.δ): VALIDASI DEGRADASI PELUMAS PADA UJI BANGKU

Monitoring Of Oil Lubricant And Engine Component Conditions Based On The Measurement Of Dielectric Constant (Tan.δ): Validation Of Oil Degradation In Engine Test

Ihwan Haryono, Rizqon Fajar¹, I Dewa Made Subrata, Suroso²

Abstract

The objectives of monitoring of engine oil are to check oil quality and early detection of engine problems. Commonly, used oil lubricants are monitored using point to point method which measures one by one the physical and chemical properties of the oil. This method is time consuming and costly. More recent method developed to monitor oil lubricant is by means of measuring the dielectric constant. Previous study showed correlations between the oil properties and dielectric constant (tan.δ) using mineral oil on a 4-stroke 110 cc static test of single cylinder motorcycle engine. The aim of this study was to make verification of the correlations by means of road test using 4-stroke-125 cc motorcycle. These resulted in some oil service life of the oil tested. The static test provided the service life of 122 hours in which the sensor output shows the value of 7, while the road test provides the service life of 121 hours in which the sensor output shows the value of 7. Testing condition and engine design were the cause of the slight differences of the oil service life.

Keywords: oil properties, degradation, dielectric constant (tan.δ), engine components.

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Technical Paper

OPTIMASI PERTUMBUHAN TANAMAN KETIMUN MINI (CUCUMIS SATIVUS L. VAR. MARLA) PADA FASE VEGETATIF DENGAN ALGORITMA GENETIKA

Optimization of Vegetative Stage of Baby Cucumber (Cucumis sativus L. Var. Marla) Using Genetic Algorithm

Tamrin¹, K. B. Seminar, H. Suhardiyanto, S. Hardjoamidjodjo²

Abstract

An optimization was conducted to a growth model for baby cucumber (Cucumis sativus L. Var. Marla). The model gives information of nutrient intake and micro climate conditions (temperature, humidity, and irradiation) to get the response of the plant (ratio of canopy area and stem diameter) and the loss of nutrient solution. The model was then coupled with genetic algorithm in order to get optimum result efficiently. Two fitness functions were used in the application of genetic algorithm. The results showed that the first fitness function could be used to optimize the plant response (ratio of canopy area and stem diameter) and the loss of nutrient solution efficiently as indicated by the maximum fitness value (Pc = 0.6 and Pm = 0.01).

Keywords: genetic algorithm, artificial neural networks, plant response, nutrient solution, micro climate

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Technical Paper

ALGORITMA PENGOLAHAN CITRA UNTUK DETEKSI JERUK LEMON (CITRUS MEDICA) MENGUNAKAN KAMERA ONLINE

Image Processing Algorithm for Lemon (Citrus medica) Detection Using Online Camera

Jarot Prianggono¹, Kudang B. Seminar, Hadi K. Purwadaria, Usman Ahmad, Dewa Made Subrata²

Abstract

This research aimed to support the application of automatic lemon harvesting using camera. Detection of lemon existence by means of image processing started on the basis of color signal analysis of the surface of an object and its background. To realize this idea, some images of lemon fruits aged 120 day after flowering were recorded. The image data were processed to get the RGB information. Furthermore, the data were derived to get RGB index and HSI model for deep analysis required. The analysis was done in order to get some parameters that could be used to separate fruits from their background. Based on the experiment, separation of lemon fruits from their background including leaves, stems, flowers, and others could be done by the use of \( R > 200, \, G > 180, \) and \( R=G=B < 248 \) as main formula and \( 2r-0.5g-b \geq 0.15 \) and \( 2r-0.5g-b \leq 0.55 \) as an additional formula at level of illumination of 40 to 60 lux. Result of algorithm tested using the parameters showed that crucial factor implying to the unstable result was illuminance.

Keywords: Lemon, image processing, algorithm, illuminance

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Technical Paper

IDENTIFIKASI TINGKAT KETUAAN DAN KEMATANGAN MANGGIS MENGGUNAKAN PENGOLAHAN CITRA DAN JARINGAN SYARAF TIRUAN

Identification of Maturity Level of Mangosteen Using Image Processing and Artificial Neural Network

Ana Nurhasanah¹, Suroso², Usman Ahmad³

Abstract

The objective of this research was to identify the quality and maturity stage of mangosteen using image processing and artificial neural network. The images of mangosteen were captured using a charge couple-device (CCD) camera. The images were processed using an image processing algorithm. The area, texture, and color indexes were extracted from 188 object sample images. The area corresponded to weight while texture and color indexes corresponded to maturity level. The features extracted from the image were used as inputs for artificial neural network, which was modeled to use four and eight inputs. The validation showed that the highest prediction accuracy of quality was 95.3 % and the maturity level was 93.7 %.

Keywords: mangosteen, quality, maturity level, image processing, artificial neural network

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Research Methodology

ANALISIS KESALAHAN DALAM PENGUKURAN EVAPOTRANSPIRASI

Error Analysis in the Measurement of Evapotranspiration

Chusnul Arief¹, Budi I. Setiawan², Radite P.A. Setiawan³

Abstract

This paper describes an analysis of error in the measurement of evapotranspiration based on Penman-Monteith model. This model has 4 variables measured with time such as relative humidity, air temperature, irradiation and wind velocity. Error analysis based on the precisions of measurement showed that relative humidity contributed error than the other variables. But, this error can be decreased if the precision of the measurement increases. A computer program using Microsoft Word plus Visual Basic Editor is developed for this analysis, and is interactive and user friendly.

Keywords: Evapotranspiration, Error Analysis, VBE program

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