



# FULLPAPERS NIGRC2016

The National and International Graduate Research Conference 2016  
Graduate School, Khon Kaen University, Thailand and  
Universitas Muhammadiyah Yogyakarta, Indonesia

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Message from the Dean of Graduate School, Khon Kaen University

The Graduate Research Conference is annually organized by the Graduate School at Khon Kaen University to disseminate knowledge from research work of graduate students from higher education institutes in Thailand and foreign countries. The graduate students take this opportunity to present research and share ideas, knowledge, and experience with other research students and lecturers to develop and raise the standard of graduate research.

This year, the “National and International Graduate Research Conference 2016” introduces more opportunity for international publication, and the Graduate School KKU is partnering with the University Muhammadiyah Yogyakarta, Indonesia. This is good start for strengthening our academic relationship with Asian countries, leading to academic and research development at the international graduate level.

The Graduate School would like to thank the keynote speaker, and the reviewers who reviewed and evaluated the articles. The articles submitted for this conference passed quality evaluations. This conference is designed to benefit all participants so they will be able to apply the knowledge they gained for themselves, their organization, institutes, communities, and their country. I would like to thank you all lecturers, students, and staff for all your assistance.

(Assoc. Prof. Dr. Surasakdi Wongratanacheewin)

Dean of Graduate School, Khon Kaen University



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### Message from the President of Khon Kaen University

The research direction for Khon Kaen University includes both basic research, to develop new knowledge and applied research using our expertise in important areas. The university has a policy of systematically supporting research in every way, including the development and promotion of everyone contributing to our research efforts - staff, the new researchers, middle age and senior researchers. The research office was established to develop the organization and system for research at the university, and we strongly support our researchers with the tools and equipment that they need. The result of the University's priority on research is our growing body of research, nationally and internationally. Applied research at KKU not only make an academic contribution and yields intellectual property, but it importantly fosters industrial development and development in rural and regional communities.

Khon Kaen University has made excelling in graduate research a key focus of its mission. Our reputation for graduate level research and publishing at national and international levels continue to grow. Each year, the Graduate School KKU sponsor a Graduate Research Conference, we are excited to make this year's Research Conference the first international research conference for KKU. In planning this year's conference, Graduate School KKU has partnered with University Muhammadiyah Yogyakarta, Indonesia. We value strengthening our academic partnership with University Muhammadiyah Yogyakarta, and look forward to the 2016 Graduate Research Conference leading to academic and research development at an international level.

On behalf of Khon Kaen University, I would like to welcome you to the "National and International Graduate Research Conference 2016" and I wish this conference the highest success. I know you will apply what you learn for development of your research programs, benefitting your institutes, organizations, communities, and countries in the future.

(Assoc. Prof. Dr. Kittichai Triratanasirichai)

President of Khon Kaen University



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International Oral Presentation Schedule  
 Humanities and Social Sciences (Doctoral Degree)  
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No.	Code	Time	Name - Surname	University	Program Study	Title	Page
1	IHDO1	11.00-11.20 am	Mr.Surasak Paje	Sukhothai Thammathirat Open University	Educational Technology & Communications	Development of a Ubiquitous Instructional System for Upper Secondary Studentsin Upper Northern Thailand	1,356
2	IHDO2	11.20-11.40 am	Miss Nitchamon Rakkapao	Khon Kaen University	Public Health	The Development of a Breast Cancer Awareness Scale for Thai Women: Moving Towards a Validated Measure	-,*
3	IHDO3	11.40 am-12.00 pm	Mrs.Nawathiwa Seehanam	Khon Kaen University	Tourism and Hospitality Innovation Management	Factors for Success in National Culture Festival Administration by Local Government Units	1,366
12.00 – 01.00 pm Lunch							
4	IHDO4	01.00-01.20 pm	Mrs.Puttaporn Aksornpairoj	University of Phayao	Tourism Management	Factors Related to Service Competitiveness of International Tourists Perspective toward Spas in Hotels and Resorts, Phuket	1,375
5	IHDO5	01.20-01.40 pm	Mr.Kasmil Abdulwahid	Universitas Muhammadiyah Yogyakarta, Indonesia	Islamic Education Psychology	Linguistic Performance, Emotional and Spiritual Intelligenceof Grade Nine Muslim Studentsin Yogyakarta, Indonesia and Bongao, Tawi-Tawi, Philippines	1,386

No.	Code	Time	Name - Surname	University	Program Study	Title	Page
6	IHDO6	01.40-02.00 pm	Mrs.Mega Hidayati	Universitas Muhammadiyah Yogyakarta	Political Islam-Political Science	Public Policy and Power Relations: Analyzing the Indonesian Ministry of Religious Affairs' Discourse on Religious Defamation and Deviation in the Reformation Era	1,397
7	IHDO7	02.00-02.20 pm	Mr.Alivermana Wiguna	Universitas Muhammadiyah Yogyakarta	Islamic Education Psychology	Character Building PsychologyBased on The Term 'Faith' (Iman) in The Qur'an (A Study of Thematic Interpretation/Tafsir Maudhu'i)	1,406
8	IHDO8	02.20-02.40 pm	Mrs.Yeni Widowaty	Universitas Muhammadiyah Yogyakarta	Magister IlmuHukum	Model Application of Legal Protection Toward Society as A Victim of Pollution or Environmental Destruction by the Corporation with the Restorative Justice Principle	1,418 , **
9	IHDO9	02.40-03.00 pm	Mr.Azam Syukur Rahmatullah	University of Muhammadiyah Yogyakarta	Islamic Education Psychology	Treatment Efforts on Juvenile Delinquency in School by Applying Death Education (Best Practice at Madrasah AliyahPlus "Nururrohmah" Tambaksari KuwarasanKebumen Central Java)	1,427 , **
10	IHDO10	03.00-03.20 pm	Mr.Aris Slamet Widodo	Universitas Muhammadiyah Yogyakarta	Agribusiness	Joint-Well Technology and the Effect on the Risk Production of Sweet Potatoes in Coastal Land Farming	1,436 , **

International Poster Presentation Schedule  
 Humanities and Social Sciences (Doctoral Degree)  
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1	IHDP1	01.00-02.30 pm	Mr.Parama Kwangmuang	Khon Kaen University	Educational Technology	Designing Framework of Cognitive Innovation Model Enhance Information Processing Process for the Learners Integrating Between Pedagogy and Neuroscience	-, *

**\* No Publication**

**\*\* Independent Study**





## Joint-Well Technology and the Effect on the Risk Production of Sweet Potatoes in Coastal Land Farming

Dr.Aris Slamet Widodo\*

### ABSTRACT

Marginal land including coastal land is expected as an alternative to be used as agricultural productive land. One obstacle of the coastal land is that the sandy soil porosity is high and limited water resources. Technology of joint-well has been applied to supply water in coastal land farming. The purpose of this study was to analyze the technology of joint-well and determine the influence of the joint-well technology to the risk production of sweet potatoes in Bantul regency. This study used survey method in which the location is Sanden Beach, Bantul. This research used risk analysis by using the software program package Eviews for regressing equation production function with maximum likelihood estimation method to determine the influence of joint-well on production and that of joint-well to the risk production. The study concluded that the technology of joint-well is as alternative watering system that can be applied on coastal land. Joint-well means water sumps and usually made of concrete bus functioning to juxtapose and ease farming irrigation. The need of joint-well on the lands of 1000m<sup>2</sup> is about 8 - 10 concrete bus units. Working mechanism of joint-well is that concrete busput in a row within 8 - 10 mand then embedded in the farming lands. Underneath of the concrete bus is casted with concrete buscover and madeimpermeable, and thenamong concrete busis joined withpipes (paralon). The irrigation system i.e. the farmers take water from its source (ground wells, river) by using machine (diesel) and then insert it into one of joint-wells until all the join-wells fully filled. The farmers do water the cropping by taking water from joint-well using "gembor". Joint-well affects to the risk of sweet potatoes farming production only in the dry season 1 and dry season 2, which amount to 20.07% and 13.69%. While in the rainy season, the joint-well does not affect significantly.

**Keywords:** Joint-well, Risk production, Coastal land

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## Introduction

Marginal land including coastal land is expected as an alternative to be used as agricultural productive land. In terms of this, considering the so-width coastal land in Indonesia, covering 95.181 km with broad area of the sea 5,4 million km square (*WorldResources Institute* (1998) cit the policy of Minister of Marine and Fisheries of Indonesian Republic, Number Per.06/MEN/2010).

Potential of coastal land as alternative of farming production is constrained by the wind erosion so continuously that the condition of land be marginal. Impacts of sand erosion are 1) The soil on coastal land being rough textured and so weak off that sensitive to wind erosion, 2) Erosion resulting sand dune could cover cultivation and settlement areas backwards, and 3) Granular salt sand brought from the wind erosion could damage and decrease productivity of crops.

Support from the government in terms of coastal land usage as productive land, has been issued in the policy of Ministry of Marine and Fisheries Number 10/Men/2002 about general guide of integrated coastal management planning; and Act No. 5 Year 1990 regarding Biodiversity Conservation and the ecosystems; and the coastal significance full of biodiversity resources and environmental services; that is, the usage of sandy coastal land should be done right and properly and double-functioning as well. Sandy coastal land could function to control erosion (the wind) and to increase people's income by cultivating seasonly-crops properly and economically. By such model of management, it is expected that the results could change abandoned land to potential farming land (Harjadi B, dan Octavia., 2008; Dahuriet, *al.*, 2001).

Farming development at coastal land has once studied in Bantul Regency.

Research by Harjadi B, and Octavia (2008) explained that sandy coastal land conservation at Samas Coast, Bantul Regency, done by the method of cultivating windbreaker plants, soil improvement with manure and irrigation development facilities with joint-well technique.

Water is the most vital element in the agricultural process. It is needed by plants in the process of photosynthesis or plant physiology in adequate number. High porosity as sandy soil nature and the high wind speed causing high transpiration plants as well as steam salt water attached on the plant made water element should always be available. Salt attached on the leaves allow for plasmolisis. Plasmolisis means the mass flow process of fluid cells from within plants to the outside through stomata leaves. This happens as the blinding difference on the leaf surface due to the salt accumulation and thus it lacks of liquid then dries. The following negative impact is the emergence of fungus around the leaf crown due to the increased humidity. Joint-well system is one of irrigation systems many used by farmers to overcome those things.

## Objective of the study

The purpose of this study was to analyze the joint-well technology and to know the major influence toward production risk of sweet potatoes farming at coastal land, Bantul Regency.

## Methods

This research used a survey method situated in Bantul Regency, Special Province of Yogyakarta. The samples of village and sub-district purposively determined were Sanden sub-district, along the Samas Beach by village-sampling in Srigading and Gadingsari. The area was conservation

and farming activities at coastal land existing long time since 1996 as well as conservation monitoring from the Office of Forestry, Agriculture, Coastal and Livestock, Fisheries in Bantul Regency.

Method of withdrawal sample farmers used in this study was proportional random sampling i.e a technique of collecting sample randomly with proportional number for each sub-population (farmer group) in accordance with the size of the population (Sekaran, 2003). Furthermore, the technique of data collection used three ways. They were interview, observation, and note-taking.

The technique of analysis used risk analysis approach and *software* program EVIEWS package for regression equation of production function with MLE (*maximum likelihood estimation*) method. The analysis done in two stages; they are, production analysis using double regression to know major influence of joint-well toward production. Secondly, risk analysis to know major influence of joint-well toward farming risk.

$$\ln Q(uj) = \alpha_0 + \alpha_1 \ln K + \alpha_2 \ln L + \alpha_3 \ln SR + \alpha_4 \ln WB + e$$

$$\ln e^2 = \beta_0 + \beta_1 \ln K + \beta_2 \ln L + \beta_3 \ln SR + \beta_4 \ln WB + \eta$$

$$\frac{\partial e^2}{\partial SR} = \beta_3 \cdot \frac{1}{SR} = sruj$$

$$\frac{\partial e^2}{\partial WB} = \beta_4 \cdot \frac{1}{WB} = wbuj$$

Explanations:

Q	= production (Kg)
SR	= joint-well (unit)
K	= capital (Rp)
WB	= windbarrier (unit)
L	= manpower (HOK)
UJ	= sweetpotatoes

## Results and Discussion

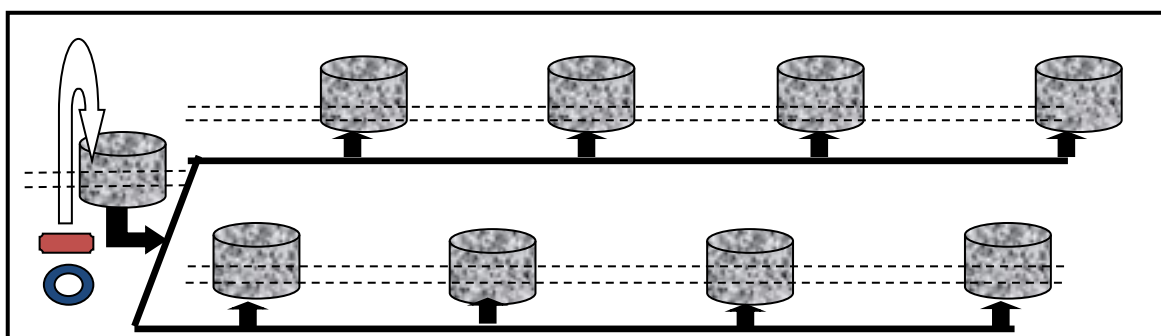
### Technology of Joint-well

The system of coastal land irrigation in the location of study (Sanden District) used joint-well system. The joint-well irrigation system means engineering application of energy efficiency and water usage fit with the condition of plant and the location. Practically, joint-well consists of reservoirs made of concrete bus to come close and ease plants irrigation.

The working mechanism of joint-well is that concrete bus set lined with distance 8 - 10 man embedded at the farming land. Underneath the concrete bus is casted with a cover of concrete bus and made impermeable as well, then connected with pipes among the concrete. Pipes should be casted underground in order not to expose to the sunshine so that it is more durable. The system of refilling means that farmers from the water source (artesian well, river, tower) using machine and fill it into one of joint-well until all of them fully filled. They water the crops using *gembor* and take it from the joint-well. The joint-well is capable of enduring for about 15 years, but still needs maintenance especially changing pipes which can maximally last for 5 years. Based on the field observation and the field test, the setting of joint-well should be considering things as follow:

1. Ground water stock around farming location.
2. Sufficiency ground water for sucked into reservoirs next distributed into joint-well.
3. Sufficiency diesel for sucking water as well as the irrigation installation made of pipes and plastic hoses.

Based on primary data, system of joint-well needs initial capital which is quite expensive. The following table shows the amount of initial capital for constructing joint-well as well as cost of depreciation over coastal land farming in Bantul Regency. take water



**Explanation of images:**

-  : Artesian well
-  : Concrete Bus
-  : Water Pump / Diesel
-  : Pipe toward joint-well
-  : Hose from Diesel toward reservoirs
-  : Land surface

**Table 1** Initial Capital, Cost and Depreciation Cost per 0.1 ha on Sandy Coastal Land in Bantul Regency in 2014.

Tools	Depreciation	
	Initial Capital (Rp)	Cost (Rp)
Concrete Bus ( 9 unit)	362.945,00	36.294,50
Pipes (10 stem)	750.000,00	150.000,00
Hose (14 m)	246.535,00	61.633,75
Diesel (1 unit)	2,130,227.00	142.015
Total Cost/year	3.489.707,00	389.943,25
Total Cost/ season (1 year : 3 cultivating season)		129.981,08

The use of concrete bus in the joint-well irrigation system be the main facility as reservoirs. Average number of concrete bus for farming scale are 9 units and initial capital needed is Rp 362,945,- with depreciation cost Rp36.294,50,- per year. Concrete bus has quite long ages of use about 10 years but it is sensitive to leakage whether on the well basis or floor

or pipe connector so that maintenance needed.

Pipes used for connecting one concrete bus to the others and for sucking underground water or main well. Pipes used in average are 10 stems. Initial capital for purchasing pipes is Rp 750,000,- with depreciation cost Rp150.000,- per year. The function of plastic hose is almost similar with that of pipes which is as installation facility for flowing water from diesel into the nearest concrete bus. Initial capital for providing plastic hoses is the cheapest one which is Rp 246,535,- with depreciation cost Rp61.633,75,- per year.

Besides those tools, there needs a diesel which is a primary tool in terms of joint-well irrigation system. This functions to suck water from the water source; that is, primary well. Average diesel possess is one unit with initial costRp 2,130,227,- and has depreciation cost as muchRp 142.015,-/year.

**Influence of Joint-well toward Production Risk**

This research study focuses on production risk of sweet potatoes farming owing to the use of joint-well technology. The risk analysis used in two stages; first, production analysis using double-regression to see the big influence of joint-well toward production. Secondly, the risk analysis to know the big influence of joint-well toward farming production risk.

Sweet potatoes commodity cultivated on rainy season, dry season 1 and dry season 2. How major influence of joint-well as well as the risk value can be seen on table 2.

**Table 2** Production Risk of Sweet Potatoes in Rainy Season.

Variables	Rainy Season	
	Coefficient	t-Stat
<b>Production</b>		
Joint-well	0.262	4.508***
Windbarrier	0.199	2.938**
C	1.921	2.679**
R-square	0.986	
<b>Risk Analysis</b>		
Joint-well	-0.741	-0.241 <sup>ns</sup>
Windbarrier	-6.961	-1.932*
C	119.045	3.134
R-square	0.634	

**Table 3** Production Risk of Sweet Potatoes in Dry Season 1.

Variables	Dry Season 1	
	Coefficient	t-Stat
<b>Production</b>		
Joint-well	0.144	3.781***
Windbarrier	0.313	7.453***
C	2.293	6.324***
R-square	0.998	
<b>Risk Analysis</b>		
Joint-well	-20.075	-1.777*
Windbarrier	-14.485	-1.196 <sup>ns</sup>
C	188.983	1.613
R-square	0.734	

**Table 4** Production Risk of Sweet Potatoes in Dry Season 2.

Variables	Dry Season 2	
	Coefficient	t-Stat
<b>Production</b>		
Joint-well	0.313	3.423*
Windbarrier	0.258	2.924*
C	3.479	4.467*
R-square	0.996	
<b>Risk Analysis</b>		
Joint-well	-13.69	-
Windbarrier	1.14	0.215 <sup>ns</sup>
C	70.84	1.149
R-square	0.855	

Table 2, 3 and 4 shows major coefficient as well as significant level over joint-well variable. Production analysis result, show that on rainy season, dry season 1 and dry season 2 concludes that joint-well significantly influences level of sweet potatoes production with significant level between 95% until 99%. Such situation due perhaps to, on all season, the needs of water for crops has been mostly fulfilled by joint well.

The result of risk analysis shows that, on rainy season, joint-well has non-significant influence. The significant level on dry season 2, it is so significant that trust level be 99%, while on dry season 1 the significant level only 90%. The major influence of joint-well toward sweet potatoes production risk on dry season 1 and dry season 2 are 20.07 % and 13.69% out of the total production.

**Conclusion**

a. Technology of joint-well is an alternative one in terms of irrigation system applied on marginal lands (coastal) with technique using concrete bus set lined and connected with pipes to fill water from water pump or diesel into the concrete bus.

b. Joint-well influences the production risk of sweet potatoes farming on the dry season 1 and dry season 2 as much as 20.07 % and 13.69% out of the total production.

### Remarks

a. Well proven technology of joint well have a good function in water supply, so the technology of joint-wells needs to introduce to the community and developed to optimize the farming of coastal land

b. Joint-well technology is applicable; still, further studies needed in order that its usage be more efficient as the initial capital of procuring tools and operations is quite expensive.

### Acknowledgment

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