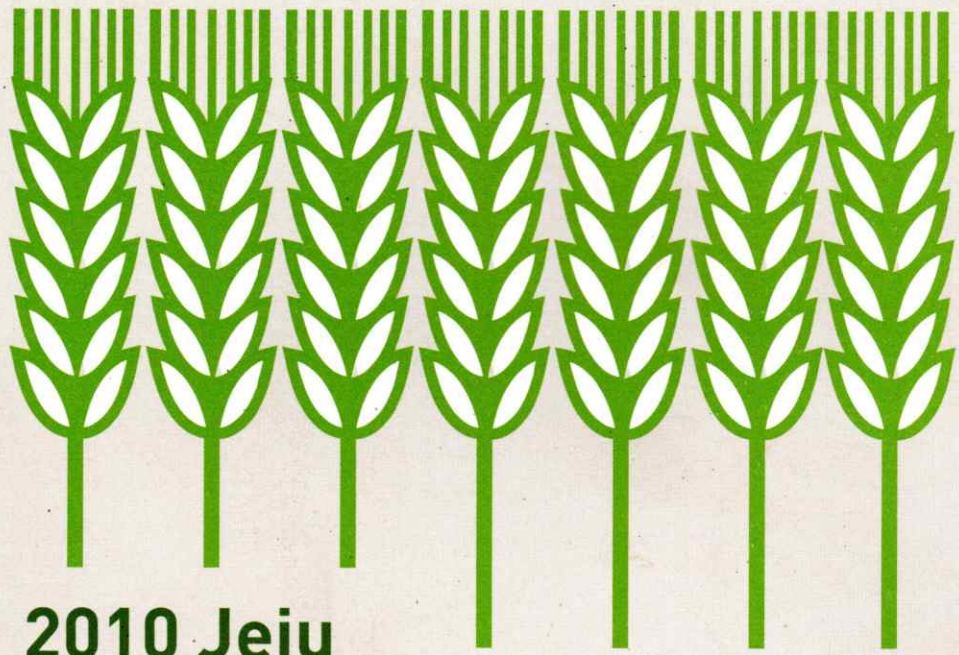
2010 Jeju
INWEPF - PAWEES
Joint Symposium & Steering Meeting



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Joint Symposium & Steering Meeting

October 27~29, 2010 ICC Jeju

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Joint Symposium & Steering Meeting

Hosted by Ministry for Food, Agriculture, Forestry and Fisheries

Co-organized by

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4. Congratulatory remarks: President of KSAE, Dr. Kyu-Seok Yeon

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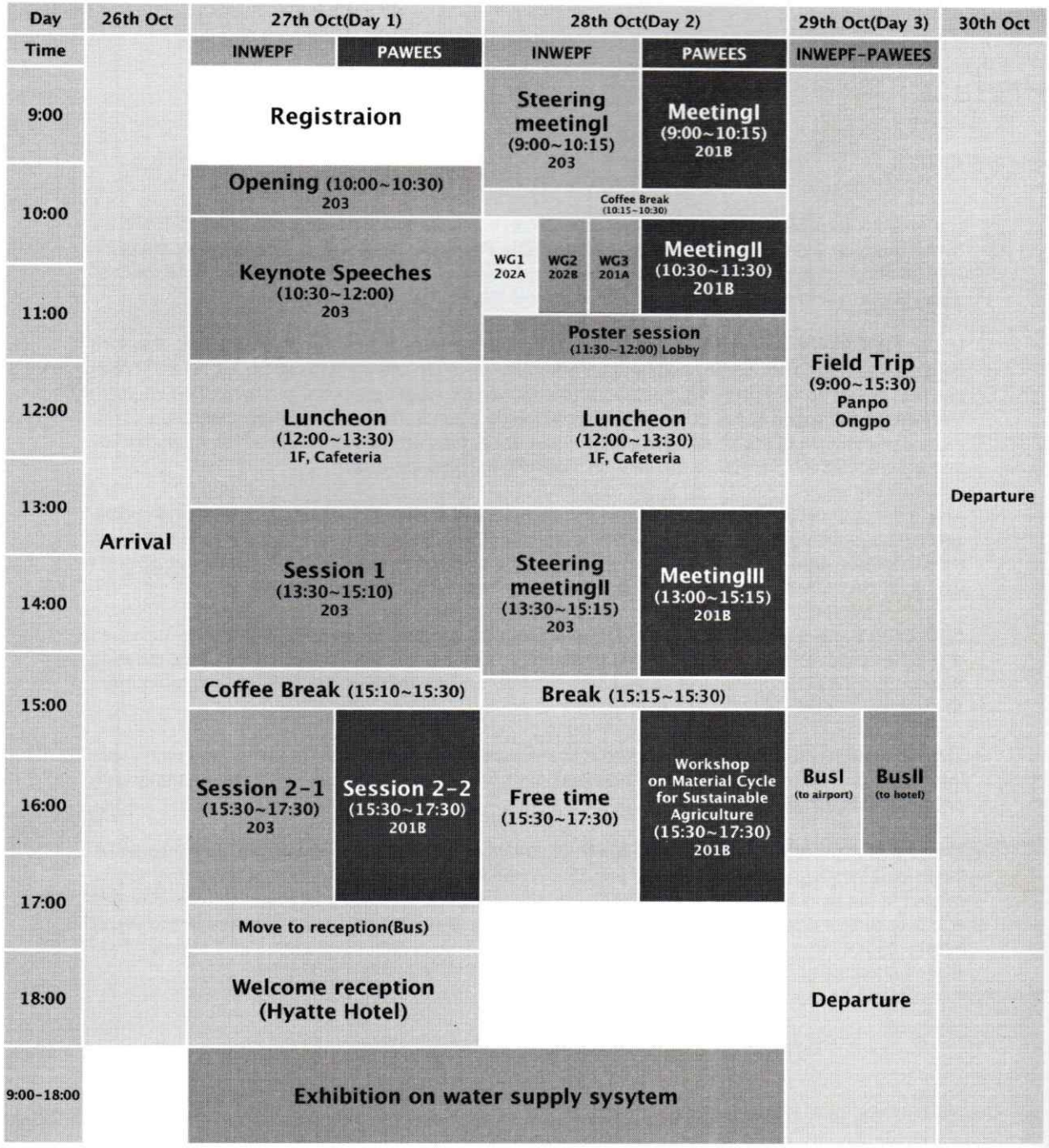

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Spatio-temporal Variability of Soil Physical Properties in Different Potato Ridge Designs in Relation to Soil Erosion and Crop Production*)

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Introduction

Vertical ridge (VR) has been intensively utilized for cultivating potato crop in tropical highland agriculture over decades to enhance its production. However, the ridge is susceptible to soil erosion causing higher soil and nutrient loss from a field (Mastur et al., 1996; Gancai, 2005; Auerswald et al., 2006). In contrast, horizontal ridge (HR) with slope of 35 % is effective to reduce runoff and soil loss about 31.4 and 37.9 %, respectively although it potentially lowers potato production about 12.4 % due to oversaturation in root zone (Soleh et al., 2002).

Waterlogged or well-aerated condition of a field is strongly related to the distribution of soil physical properties either spatially or temporary. For instance, dry bulk density affects water and air proportion as well as its distribution in soil (Hillel, 1998; Zhuang et al., 2000), which in turn controls crop growth and yield (De Freitas et al., 1996; Kirkham, 2005).

In this study, spatial and temporal variability of dry bulk density and water content in potato VR and HR plot well as its impact on crop productivity and soil erosion were identified.

Material and Method

The research was conducted in Serang village, Central Java, Indonesia from November 2007 to February 2008. Two potato plots, namely VR and HR plot, with 15 % in slope and (2 x 2) m^2 in large were prepared (**Fig. 1**). Undisturbed soil samples and its dielectric properties were collected from each subplot of (0.5 x 0.5) m^2 in large at the depth of 0-10 and 0-20 cm by using 100 cc core and ADR probe, respectively. The samples were used to predict water content (θ or VWC) and dry bulk density (ρ_b) by using Wijaya et al. (2003)'s equation (**Eqn. 1, 2**). Runoff rate and soil loss were measured once a week from each sediment collector. Crop height, crop and leaf number, tuber weight, and root depth were observed at every crop clump.

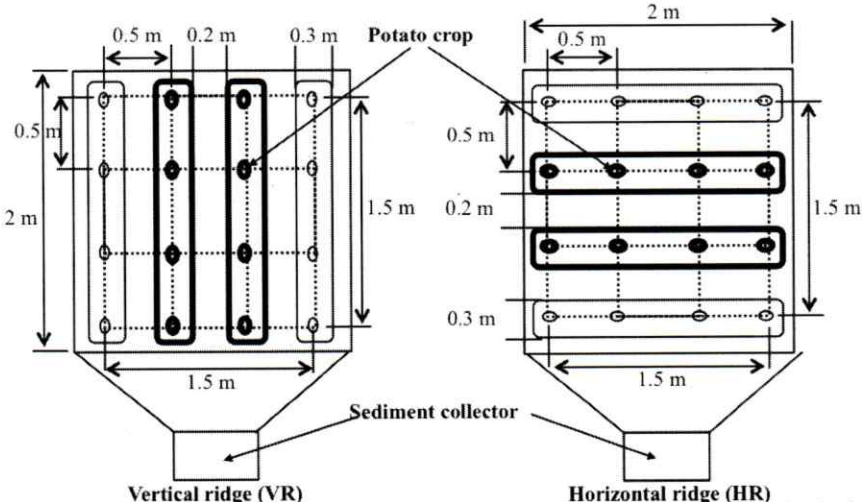

Fig. 1. Field monitoring of soil physical properties, soil erosion, and potato phenological characteristics.

$$\theta = 2.1014v^3 - 4.1763v^2 + 3.0959v - 0.3777 \quad (1)$$

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$$\rho_b = \rho_t - (\theta_{ADR} \cdot \rho_w) \quad (2)$$

where, v: output voltage of the ADR probe, ρ_t: total bulk density of soil (g cm^{-3}), θ_{ADR}: predicted volumetric water content by ADR data, and ρ_w: density of water (= 1 g cm^{-3}).

Result and Discussion

Temporary, dry bulk densities of VR and HR soil increased initially and then decreased toward harvesting time in which those at the upper depth were higher than those at the lower one. In other hand, VWC were lower in the initial stage and then increased about 10-15 % in the end due to higher total soil porosity (Miyazaki, 1996). Although VWC in both ridges were not significantly different (2 %), the dry bulk densities in VR plot were 20 % lower than in HR plot (**Fig. 2A**, **2B**). Regarding crop growth, VR plot had plant height and leaf number respectively 6 and 20 % higher than HR one (**Fig. 2C**, **2D**). Tuber weight and root depth were also higher in VR plot (30 and 8 %) than HR plot. This suggested that VR was better in maintaining soil porosity as well as aeration suitable for crop productivity than HR (Soleh et al., 2002).

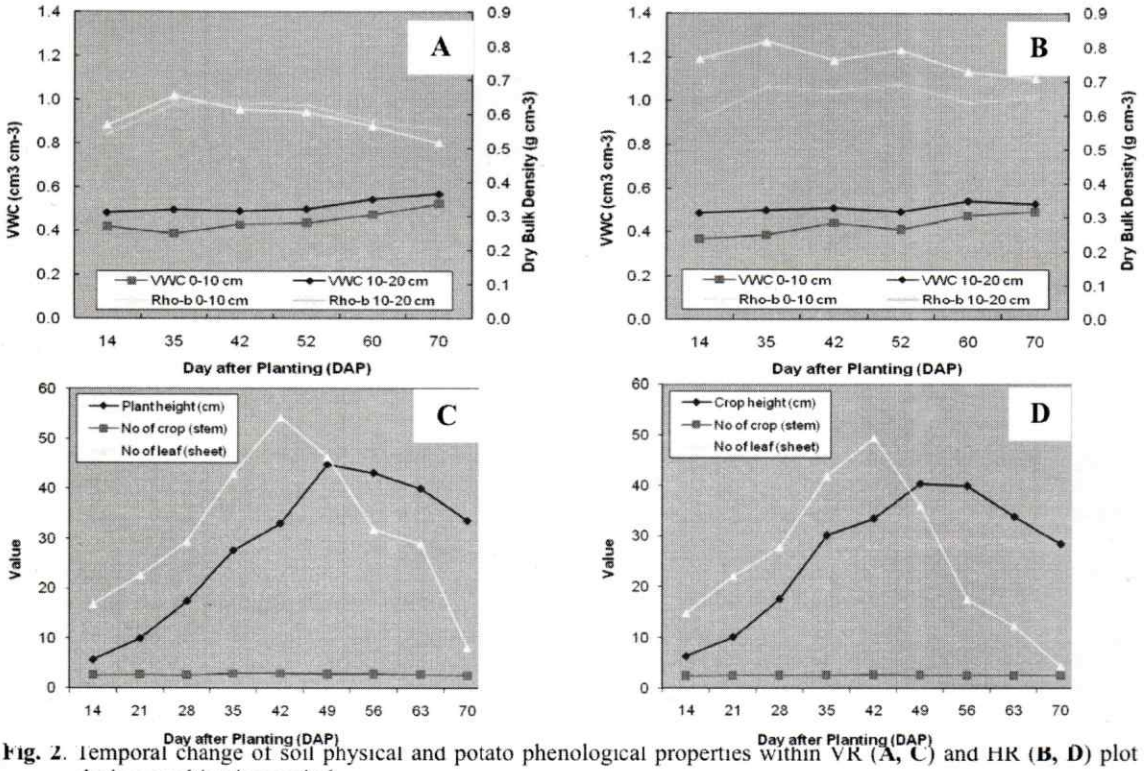


Fig. 2. Temporal change of soil physical and potato phenological properties within VR (**A, C**) and HR (**B, D**) plot during a cultivation period.

Spatially, dry bulk densities and VWC in VR and HR plot at the depth of 0-10 and 10-20 cm had reciprocal correspondence each other in which higher the former values coincided with lower the latter one and vice versa (**Fig. 3A, 3B, 3D, 3E, 4A, 4B, 4D, 4E** for the data of 42 days after planting or DAP). Crop height and leaf number (**Fig. 3C, 3F, 4C, 4F**) showed better correspondence with dry bulk density rather than with VWC. As compared to HR plot (**Fig. 4**), the correspondence among these four parameters in VR plot (**Fig. 3**) was more reasonable particularly at lower depth where root density as well as capacity to uptake water and nutrient from soil was higher (Kirkham, 2005). The results corroborated the idea that dry bulk density is a key factor affecting total porosity, aeration or drainage capability, and water movement in soil which in turn strongly influences crop growth (Islami dan Utomo, 1995; De Freitas et al., 1996).

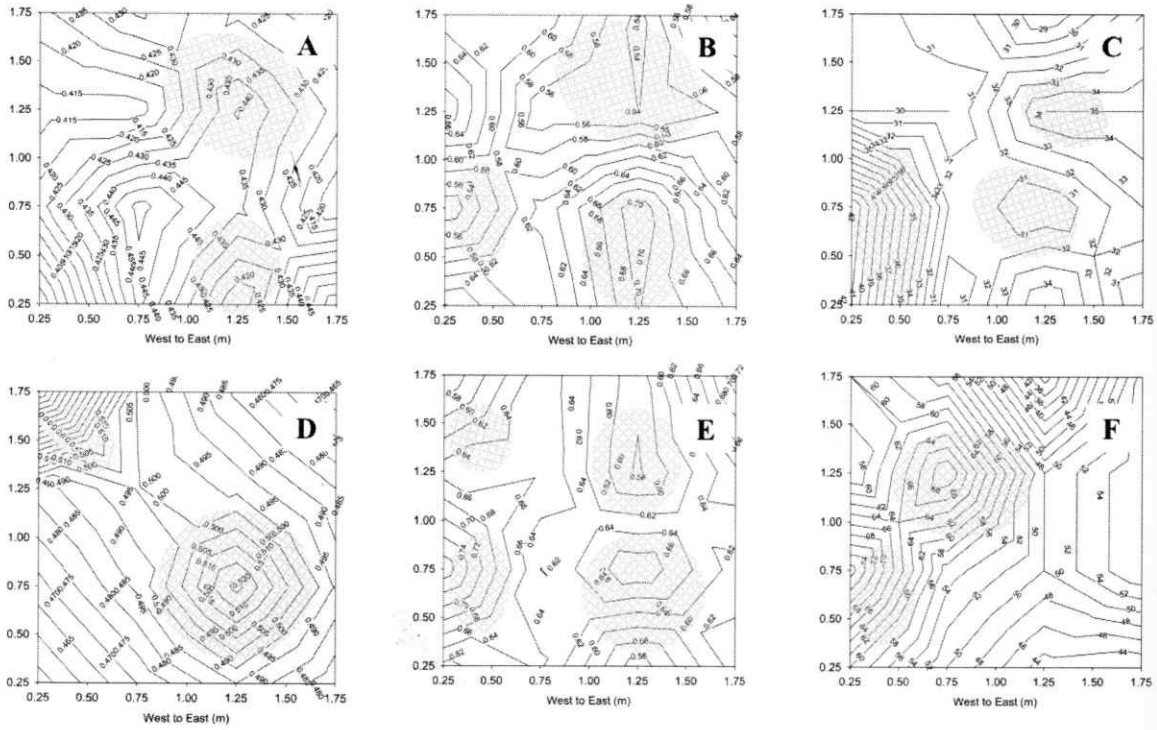


Fig. 3. Spatial variability: VWC (**left**) and dry bulk density (**middle**) at the depth of 0-10 cm (**A, B**) and 10-20 cm (**D, E**) versus height (**C**) and leaf number (**F**) of potato crop in VR plot during 42 DAP.

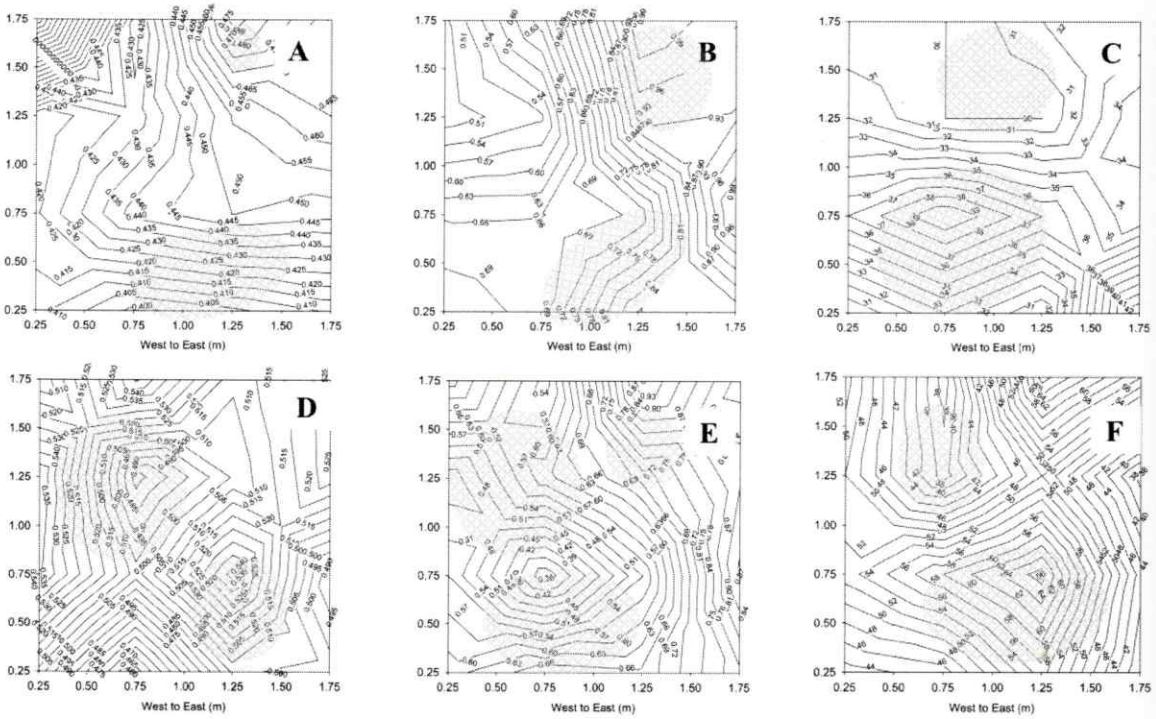
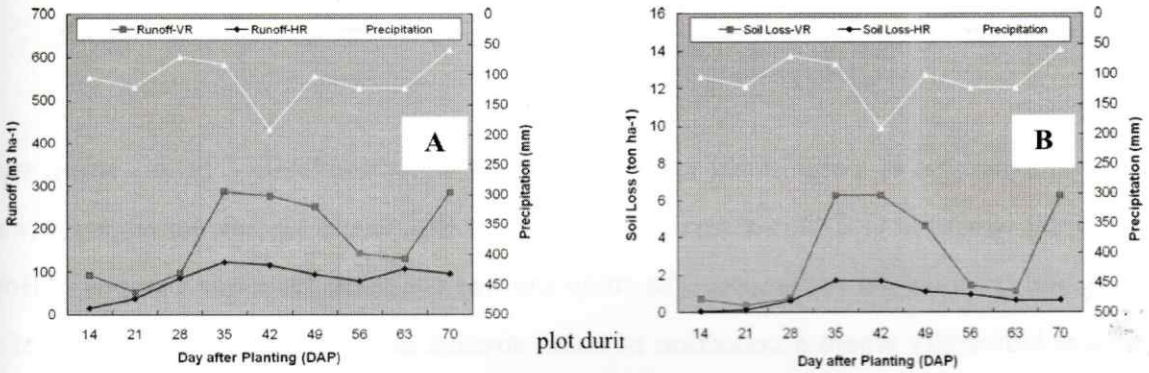


Fig. 4. Spatial variability: VWC (**left**) and dry bulk density (**middle**) at the depth of 0-10 cm (**A, B**) and 10-20 cm (**D, E**) versus height (**C**) and leaf number (**F**) of potato crop in HR plot during 42 DAP.

Concerning erosion characteristics, with total precipitation of 974 mm throughout a

cultivation period, VR plot had total runoff rate and soil loss of 1,619.5 m^3 ha^{-1} and 28 ton ha^{-1}, respectively, while HR plot produced total runoff rate and soil loss about 755 m^3 ha^{-1} and 7.5 ton ha^{-1}, respectively (**Fig. 5A, 5B**). It revealed that HR plot can reduce total runoff and soil loss respectively about 53 and 73 % more effective than VR one, and this was better than the results reported by Soleh et al. (2002).



plot duri

Conclusion

Dry bulk densities had temporary and spatially reciprocal correspondence with volumetric water content, and had stronger positive impact on the growth of potato crop particularly in VR plot and at lower depth. Accordingly, VR plot produced crop height, leaf number, tuber weight, and root depth respectively 6, 20, 30, and 8 % higher than HR one. As compared to VR plot, HR plot was more effective in reducing total runoff and soil loss about 53 and 73 %, respectively. In further research, the overall results may be useful for re-designing HR with appropriate aeration or drainage system to support an optimal growth and yield of potato crop.

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Spatio-temporal Variability of Soil Physical Properties in Different Potato Ridge Designs in Relation to Soil Erosion and Crop Production

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Abstract

Spatio-temporal change of soil physical properties and its effect on soil erosion and crop growth in potato's VR and HR plot were observed from November 2007 until February 2008. Volumetric water content (VWC) and dry bulk density at the depth of 0-10 and 10-20 cm were predicted based on dielectric constant (ADR) data. Runoff and soil loss were measured weekly from sediment collector. Phenological characteristics of potato crop were observed routinely at crop clump. Dry bulk density increase initially and decreased toward harvesting time in which upper values were greater than lower ones, while VWC showed a contrary condition. Although VWC in both plots were insignificantly different (2 %), dry bulk density in VR were 20 % lower than that in HR, causing the former had crop height, leaf number, tuber weight and root depth respectively 6, 20, 30 and 8 % higher than the latter. Phenomena of which dry bulk density had a close spatial correspondence with crop productivity corroborated the results. In addition, with 974 mm d^{-1} total rainfall throughout cultivation period, HR can significantly reduce total runoff and soil loss by 53 and 73 %, respectively.

Keywords: Spatial and temporal variability, soil physical properties, ridge design, soil erosion, potato crop

Introduction

Vertical ridge (VR) has been intensively utilized for cultivating potato crop in tropical highland agriculture of Indonesia over decades to enhance domestic production. However, the ridge is susceptible to soil erosion causing higher soil and nutrient loss from field (Mastur et al., 1996; Gancai, 2005; Auerswald et al., 2006). In contrast, horizontal ridge (HR) with slope of 35 % is effective to reduce runoff and soil loss by 31.4 and 37.9 %, respectively, although it potentially lowers potato production about 12.4 % due to oversaturation in root zone (Soleh et al., 2002). Waterlogged or well-aerated condition of a field is strongly related to the distribution of soil physical properties either spatially or temporary. For instance, dry bulk density affects water and air proportion as well as its movement in soil (Hillel, 1998; Zhuang et al., 2000), which in turn may controls crop growth and yield (De Freitas et al., 1996; Kirkham, 2005).
In this study, spatial and temporal variability of VWC and dry bulk density in potato's VR and HR plot as well as its impact on soil erosion and crop productivity were observed.

Material and Method

- The plot (2 x 2 m^2) at Soedirman Univ. Farm (**Fig. 1, Table 1**) was prepared and cultivated by potato crop from November 2007 to February 2008.
- Soil samples and its dielectric properties at the depth of 0-10 and 10-20 cm were collected from each subplot (0.5 x 0.5 m^2) by using 100 cc core and ADR probe , respectively.
- VWC (θ) and dry bulk density (ρ_b) were predicted based on dielectric properties of soil (**Eqn. 1, 2**).
- Runoff and soil loss were measured weekly from each sediment collector
- Crop height, crop and leaf number, tuber weight, etc. were routinely monitored at crop clump.

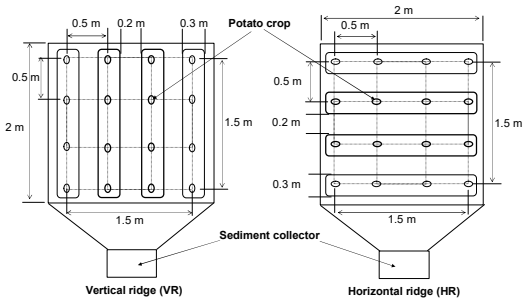


Fig. 1. Field monitoring plot

Table 1. Soil physical properties (*Andisol* soil)

Parameters (unit)	Value
Texture (kg kg^{-1}), sand : silt : clay	0.37 : 0.48 : 0.15 (*Loam*)
Organic carbon content, *SOM* (g kg^{-1})	93.96
Particle density, ρ_s (g cm^{-3})	2.42
Dry bulk density, ρ_b (g cm^{-3})	0.416 – 0.776
Total density, ρ_t (g cm^{-3})	0.713 – 1.214
Water content at field capacity (g g^{-1})	0.810
Water content at permanent wilting point (g g^{-1})	0.214

- Wijaya et al. (2003):

$$\theta = 2.1014v^3 - 4.1763v^2 + 3.0959v - 0.3777 \quad (1)$$

$$\rho_b = \rho_t - (\theta_{ADR} \cdot \rho_w) \quad (2)$$

v: ADR output voltage, ρ_t: total bulk density, θ_{ADR}: predicted VWC by ADR, and ρ_w: water density.

- Semivariogram:

$$\gamma(h) = \frac{1}{2N(h)} \sum_{i=1}^{N(h)} [z(x_i) - z(x_i + h)]^2$$

Measured data at x_i

Measured data at a distance h from x_i

Result and Discussion

- Temporary, dry bulk density (DBD) of VR and HR soil increased initially and then decreased toward harvesting in which upper were higher than lower.
- VWC were lower at the initial stage and then increased by 10-15 % at the end due to higher total soil porosity (Hillel, 1998).
- Although VWC in both ridges were only 2 % different, the dry bulk density in VR were 20 % lower than in HR (**Fig. 2A, 2B**).
- VR had crop height and leaf number respectively 6 and 20 % higher than HR (**Fig. 2C, 2D**). Similarly, tuber weight and root depth were also higher in VR (30 and 8 %) than HR.
- VR was better in maintaining soil porosity/aeration suitable for crop productivity compared to HR (Soleh et al., 2002).

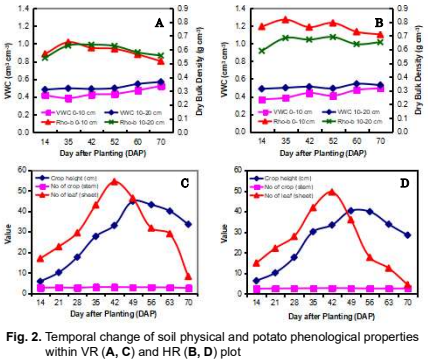


Fig. 2. Temporal change of soil physical and potato phenological properties within VR (**A, C**) and HR (**B, D**) plot

- Spatially, dry bulk density and VWC in VR and HR at the depth of 0-10 and 10-20 cm had reciprocal correspondence, which higher the former coincided with lower the latter, and vice versa (**Fig. 3, 4**, *left side and middle*).
- Crop height and leaf number (**Fig. 3, 4,** *right side*) showed better correspondence with dry bulk density rather than with VWC (**Table 2**).
- The correspondence among four parameters in VR was more reasonable compared to those in HR (**Table 2**) .

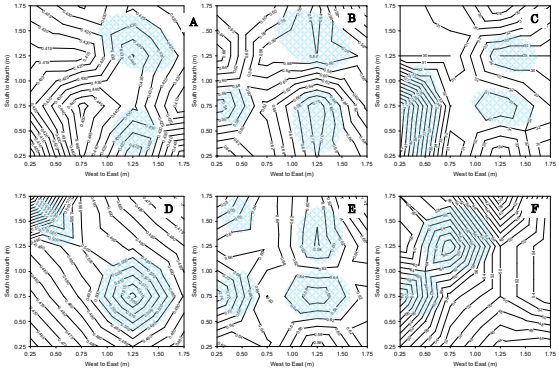


Fig. 3. Spatial distribution of VWC (*left*) and DBD (*middle*) at the depth of 0-10 (**A, B**) and 10-20 cm (**D, E**) versus potato crop height (**C**) and leaf number (**F**) in VR

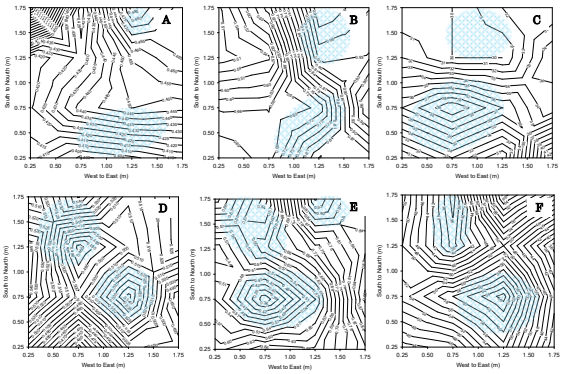
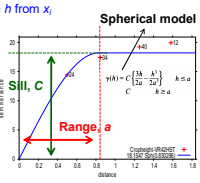


Fig. 4. Spatial distribution of VWC (*left*) and DBD (*middle*) at the depth of 0-10 (**A, B**) and 10-20 cm (**D, E**) versus potato crop height (**C**) and leaf number (**F**) in HR

- The results corroborated the idea that dry bulk density is a key factor affecting total porosity, aeration or drainage capability, and water movement in soil, which in turn strongly influences crop growth (Islami and Utomo, 1995; De Freitas et al., 1996)

Table 2. Semivariorgram parameters

Parameter	Depth (cm)	VR Sill, C	VR Range, a (m)	HR Sill, C	HR Range, a (m)
VWC (cm³ cm⁻³)	0-10	0.000275	0.458	0.09	139.742
	10-20	0.000856	1.625	0.000705	0.489
Dry bulk density (g cm-3)	0-10	0.00382	0.459	0.143	6.812
	10-20	0.00326	0.498	0.0337	1.311
Crop height (cm)		18.155	0.83	15.192	0.609
Leaf number (sheet)		100.242	0.936	112.366	0.591



- With total rainfall of 974 mm, VR had total runoff and soil loss of 1,619.5 m^3 ha^{-1} and 28 ton ha^{-1}, while HR produced total runoff and soil loss of 755 m^3 ha^{-1} and 7.5 ton ha^{-1}, respectively (**Fig. 5**).
- HR can reduce total runoff and soil loss respectively 53 and 73 % more effective than VR, and it was better than the results of Soleh et al. (2002).

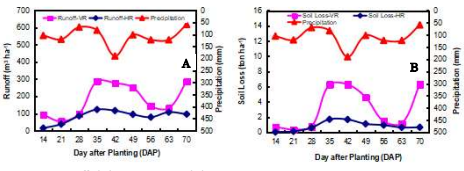


Fig. 5. Runoff (**A**) and soil loss (**B**) in VR and HR during a cultivation period

Conclusion

Dry bulk density had spatio-temporally reciprocal correspondence with volumetric water content, and had significant impact on potato crop growth particularly in VR. VR produced crop height, leaf number, tuber weight and root depth respectively 6, 20, 30 and 8 % higher than HR. As compared to VR, HR was more effective in reducing total runoff and soil loss by 53 and 73 %, respectively. In further research, the overall results is useful for modifying HR design with appropriate aeration or drainage system to support an optimal potato production as well as soil conservation.

Gmail **Krissandi Wijaya <kwijaya77@gmail.com>**

Registration Form for INWEPF-PAWEES Joint Symposium 2010 (PDF file is attached)

Krissandi Wijaya <kwijaya77@yahoo.com> Tue, Sep 21, 2010 at 10:09 AM
To: inwepf.korea@gmail.com
Cc: iamchoi@snu.ac.kr

Dear INWEPF-PAWEES Committee,

Here I would like to submit the registration form for INWEPF-PAWEES Joint Symposium 2010 (PDF file is attached). I do apologize for being late to submit, since until this moment I have been still waiting for your response on the acceptance of my abstract submitted about 4 months ago (May/June 2010). Last email that I had sent to the committee and Prof. Jin-yong Choi as well was on August 17, 2010. Hopefully, I would have a good chance to participate as well as to present the research findings in the coming symposium.

Thank you very much for your kind help and attention.

With best regards,

Krissandi Wijaya

==========
Current Office:
Lab. of Water Resources Restoration Engineering [Postdoctoral Researcher]
College of Agriculture, Ibaraki University, Japan

3-21-1 Chuo, Ami, Inashiki, Ibaraki 300-0393, Tel./Fax. +81-298-87-1261

E-mail: kwijaya@mx.ibaraki.ac.jp, Website: http://kwijaya.yolasite.com/

Home Office:
Agricultural Engineering Study Program [Ph.D., Lecturer & Researcher]
Faculty of Agriculture, Jenderal Soedirman University, Indonesia
Jl. dr. Soeparno Kampus Karangwangkal PO BOX 125 Purwokerto 53123
Tel./Fax.+62-281-638791, Mobile Ph. +62-813-9104-4879
E-mail: kwijaya77@yahoo.com / kwijaya77@gmail.com

Registration Form for INWEPF-PAWEES Symposium 2010.pdf
807K

8. Registration Form

Participants are asked to complete and submit the registration to the Coordinator for invitation at inwepf.korea@gmail.com or by fax to +82-31-400-1744 before August 31.

I join the meeting for INWEPF ( ) or PAWEES (✓) event.

Delegate Information				
Title	Mr. ( ) Mrs. ( ) Ms. ( ) Dr. (✓) Prof.( ) etc.( )			
First Name	KRISSANDI	Last Name	WIJAYA	
Country	JAPAN	Gender	Male (✓)	Female ( )
Position	RESEARCHER			
Organization	IBARAKI UNIVERSITY, JAPAN			
Address	3-21-1, CHUO, AMI, INASHIKI, IBARAKI			
City	AMI		Zip Code	300-0393
Email	kwijaya@mx.ibaraki.ac.jp		Fax	+81-29-888-8525
Phone	+81-29-888-8601		Mobile hone	+81-80-4371 1703
Date of Birth	Month/Date/Year 10/09-1977			

Flight Information				
Arrival	Airline	KOREAN AIR		
	Flight No.			
	Date	10/26-2010	Time	
Departure	Airline	KOREAN AIR		
	Flight No.			
	Date	10/30-2010	Time	

Type of Participation	Oral Presenation( ) Poster ( ) Representative( ) Observer ( )

Hotel Reservation (No advance payment is necessary)			
Hotel Type	Suites Hotel ( ) Hotel Hana (✓)	Room Type	Double ( ) Twin (✓)
Date (5) days (4) nights	Check in Date	10/26-2010	
	Check out Date	10/30-2010	
Remark	Vegetarian (✓) Non- Vegetarian ( )		

Gmail **Krissandi Wijaya <kwijaya77@gmail.com>**

[Fwd: Invitation letter]

SK Saptomo <saptomo.sk@gmail.com> Mon, Oct 4, 2010 at 9:10 AM
To: Berty Sompie <bsompie@yahoo.com>, Jito Gardjito <jgardjito@yahoo.com>, Krissandi Wijaya <kwijaya77@gmail.com>, chusnul arif <chusnul_ar@yahoo.com>, "Budi I. Setiawan" <budindra@yahoo.com>, "Hanhan A. Sofiyuddin" <hanhan.ahmad@gmail.com>

Dear all,

Berikut diforwardkan invitation letter dari PAWEES 2010.
Mohon info apabila akan menghadiri karena informasi delegasi Indonesia harus kita submit ke PAWEES 2010

Untuk yang mendapatkan jadwal poster namun tidak dapat hadir, silakan dikirimkan ke kami untuk dipersiapkan dan disajikan saat seminar.

Deadline extended abstract (sd 4 halaman) atau full paper adalah pertengahan tanggal 15 bulan ini.
Untuk pengiriman extended abstract/full paper saya bisa membantu kalau dalam minggu ini sudah saya terima.

regards,
Saptomo

-------- Original Message --------
Subject: Invitation letter
Date: Tue, 28 Sep 2010 18:20:53 +0900 (KST)
From: Jin-yong Choi(최진용) <iamchoi@snu.ac.kr>
Reply-To: Jin-yong Choi(최진용) <iamchoi@snu.ac.kr>
To: Berty Sompie <bsompie@yahoo.com>, Krissandi Wijaya <kwijaya@mx.ibaraki.ac.jp>, SK Saptomo <saptomo.sk@gmail.com>

Dear authors,
Please find attached for the invitation letters for the VISA application.
The attached includes all participants' invitation letter, so if possible, please deliever the letter to your co-authors.
Best regards.

Jin-Yong Choi

-- ^^ -- ~~ ^.^ ---- -^.^- ---------
http://rwiel.snu.ac.kr
Jin-Yong Choi, Ph. D.,Associate Professor
Director General of Bio Venture Valley
Rural Water and Information Engineering Lab.
Rural Systems Engineering Program
College of Agriculture and Life Sciences, Seoul National University
San 56-1, Sillim-dong, Kwanak-gu, Seoul, Korea 151-742
Fax. +82.2.873.2087
Voice +82.2.880.4583

11 attachments

JAPAN_INDONESIA_Chusnul Arif_invitation letter_for_pawees.docx
88K

INDONESIA_ I Wayan Astika_invitation letter_for_pawees.docx
88K

INDONESIA_Arief Sabdo Yuwono_invitation letter_for_pawees.docx
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INDONESIA_Budi Indra Setiawan_invitation letter_for_pawees.docx
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INDONESIA_Gardjito_invitation letter_for_pawees.docx
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INDONESIA_Hanhan A. Sofiyuddin_invitation letter_for_pawees.docx
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INDONESIA_Krissandi Wijaya_invitation letter_for_pawees.docx
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INDONESIA_Lolly M. Martief_invitation letter_for_pawees.docx
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INDONESIA_Mustafril_invitation letter_for_pawees.docx
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INDONESIA_O. B. A. Sompie_invitation letter_for_pawees.docx
88K

INDONESIA_Satyanto K. Saptomo_invitation letter_for_pawees.docx
88K

Korea National Committee of INWEPF

1031-7, Sa-dong, Sangnok-gu, Ansan-si, Gyeonggi-do. 426-170, Republic of Korea.
Phone: +82-31-400-1757, Fax: +82-31-400-1744 E-mail: inwepf.korea@gmail.com

Ref: Mif-INV-29 Date: September 20, 2010

Mr. Krissandi Wijaya
Faculty of Agriculture
Jenderal Soedirman University
Purwokerto, Indonesia
Tel:

Invitation Letter for INWEPF-PAWEES meeting

Dear Mr. Krissandi Wijaya

It is my great pleasure and honor to invite you to the INWEPF & PAWEES joint symposium and steering meeting under the theme of Climate Change and Sustainable Agriculture.

- Event: INWEPF & PAWEES joint symposium and steering meeting
- Venue: Jeju ICC, Jeju island, Republic of Korea
- Date: October 27-29, 2010
- Host: Ministry for Food, Agriculture, Forestry and Fisheries,
  Korea National Committee of INWEPF

This visit will provide an opportunity for you to contribute your expertise to the INWEPF's work on sustainable agriculture with climate change. We, Korea national committee of INWEPF, appreciate your participation in this event and hope you play a role in enhancing the betterment of this occasion.

Any foreign visitors wishing to enter Korea must have a valid passport. Visitors from some countries with the confirmed outbound tickets may stay in Korea up to 30 days without visas. However, visitor from other countries should apply for visas at a Korean Consulate or diplomatic mission in their countries.

If you have any questions about the visit, please contact Ms. Sujin Jung at (82) 31-400-1757 or by email (inwepf.korea@gmail.com) from Secretariat office. Looking forward to seeing you in Korea.

Yours sincerely,

Chung, Hwang-Keun

Chairman of Korea INWEPF Committee,
Director-General of Rural Policy Bureau
Ministry for Food, Agriculture, Forestry and Fisheries

Gmail **Krissandi Wijaya <kwijaya77@gmail.com>**

Re: PAWEES attendee

SK Saptomo <saptomo.sk@gmail.com> Mon, Oct 11, 2010 at 4:34 PM
To: "\"Jin-yong Choi(최진용)\"" <iamchoi@snu.ac.kr>
Cc: "Budi I. Setiawan" <budindra@yahoo.com>, 김진수 <jskim@cbnu.ac.kr>, chusnul arif <chusnul_ar@yahoo.com>, Krissandi Wijaya <kwijaya77@gmail.com>

Dear Prof Choi,

Attached is the delegates list from Indonesia as far as I know.
I cc the email to the other name in the list.

As for the hotel, we'd like to stay at the same Hotel Hana.

Also attached in my registration and extended abstract. There are few updates in my registration, but the same as noted in the delegation list.

Best regards,
Saptomo

Jin-yong Choi(최진용) wrote:
> Dear Dr. Tan and Dr. Saptomo,
> Could you make a participants list of your country for PAWEES meeting
> including paper speaker and awardee?
> Please use the attached file for the participant list. This is quite
> important for accomodation arrangement, so please send me the list as
> soon as possible.
> Best regards.
>
> Jin-Yong Choi
>
> -- ^^ -- ~~ ^.^ ---- -^.^- ---------
> http://rwiel.snu.ac.kr
> Jin-Yong Choi, Ph. D.,Associate Professor
> Director General of Bio Venture Valley
> Rural Water and Information Engineering Lab.
> Rural Systems Engineering Program
> College of Agriculture and Life Sciences, Seoul National University
> San 56-1, Sillim-dong, Kwanak-gu, Seoul, Korea 151-742
> Fax. +82.2.873.2087
> Voice +82.2.880.4583

3 attachments

PAWEES2010-Extended-Abstract - Saptomo.doc
273K

PAWEES2010-Registration - Saptomo.doc
90K

Delegation(2010_list)_Indonesia.doc
45K

Delegation of Indonesia (2010 PAWEES Conference and Award Ceremony, Updated on Oct 11, 2010

Name and Affiliation	Title	Arriving date/Time Flight No.	Departure date/Time Flight No.	Hotel (Self Reservation/Korea PAWEES)	Type of Attendance	Remarks
Budi Indra Setiawan	☑ Professor ☐ Dr. ☐ Mr. ☐ Mrs/Ms.	Oct 26	Oct 30 KE1210Y	Hana Hotel – Double Bed	Paper	Comes with spouse
Satyanto Krido Saptomo	☐ Professor ☑ Dr. ☐ Mr. ☐ Mrs/Ms.	Oct 26 KE1233Y	Oct 30 KE1210Y	Hana Hotel – Double/Twin Bed	Paper	
Krissandi Wijaya	☐ Professor ☑ Dr. ☐ Mr. ☐ Mrs/Ms.	Oct 26	Oct 30	Hana Hotel – Double/Twin Bed	Paper	
Chusnul Arif	☐ Professor ☐ Dr. ☑ Mr. ☐ Mrs/Ms.	Oct 26	Oct 30 KE1210Y	Hana Hotel – Double/Twin Bed	Paper	
	☐ Professor ☐ Dr. ☐ Mr. ☐ Mrs/Ms.					
	☐ Professor ☐ Dr. ☐ Mr. ☐ Mrs/Ms.					
	☐ Professor ☐ Dr. ☐ Mr. ☐ Mrs/Ms.					
	☐ Professor ☐ Dr. ☐ Mr. ☐ Mrs/Ms.					

Notes:

- Prof Budi, Dr Krissandi and Mr. Chusnul will come together from Tokyo with the same flight, I am not sure the number yet
- Dr. Krissandi will return to Tokyo afterwards, flight number also not confirmed yet.

July 30, 2010

2010 INWEPF-PAWEES Joint Symposium And The 7th INWEPF Steering Meeting

Second ANNOUNCEMENT

JEJU ISLAND, 27-29 OCT. 2010

The Korean INWEPF Committee & PAWEES

1. Overview

2010 INWEPF-PAWEES Joint Symposium

INWEPF-PAWEES joint Symposium will be held at Jeju Island to exchange knowledge and experiences based on expertise among the INWEPF member countries. One-day Symposium, the 7th steering meeting and field trip during 27-29 October 2010 will take place at the ICC Jeju(International Convention Center), Jeju Island, Republic of Korea.

The 7th INWEPF steering meeting and PAWEES meeting

The Korean INWEPF Committee agreed to hold the steering meeting and symposium during the last 6th steering meeting in Japan, and it will organize and provide the arena to achieve the mission and challenges of INWEPF. During the PAWEES meeting 9th International Conference on Educational Accreditation System and APEC Engineers Project for Agricultural Engineering in Paddy Farming Regions, and PAWEES Award Ceremony will occur.

2. Call for paper

We invite scholars, policy makers, local governments and anybody interested in or contributing to the goal of INWEPF and PAWEES missions.

Theme for INWEPF-PAWEES Joint Symposium

- Paddy and rural environment, Climate change and food security, sustainable irrigation management, etc. (Attachment : guidelines for extended abstract)
- Due to limited allocation of time for oral presentation, about 10 papers will be posted up for poster session in the lobby.

Theme for Country report

- Balance between productivity and environmental protection

Exhibition

- To share the experiences in Korea, materials related to symposium topics and international cooperation will be exhibited for two days in the five booths. We can include some of the materials from member country. Please consult to organizing committee for the exhibition.

3. Program structure

<table>
<tr><td>Day</td><td>26th Oct</td><td colspan="2">27th Oct(Day 1)</td><td colspan="2">28th Oct(Day 2)</td><td>29th Oct(Day 3)</td><td>30th Oct</td></tr>
<tr><td>Time</td><td rowspan="3">Arrival</td><td>INWEPF</td><td>PAWEES</td><td>INWEPF</td><td>PAWEES</td><td>IN-PW</td><td rowspan="3">Departure</td></tr>
<tr><td>9:00</td><td colspan="2">Opening & symposium</td><td>S. meeting 1</td><td>Meeting 1</td><td rowspan="2">Field Trip</td></tr>
<tr><td>13:30</td><td colspan="2">Session 1</td><td>S. meeting 2</td><td>Meeting 2</td></tr>
<tr><td>15:30</td><td></td><td>Session 2</td><td>Session 3</td><td>Free time</td><td>Workshop</td><td rowspan="2"></td><td></td></tr>
<tr><td>18:00</td><td>Pre-meeting</td><td colspan="2">Welcome reception</td><td colspan="2">Free time</td><td></td></tr>
<tr><td>09:00-18:00</td><td></td><td colspan="4">Exhibition on water supply system</td><td></td><td></td></tr>
</table>

Day I: Symposium (Tentative)

Time	INWEPF-PAWEES	
09:20 - 09:50	Accommodation to ICC (Suite Hotel, Hana Hotel to Jeju ICC)	
09:50 - 10:00	Registration (Lobby)	
10:00 - 10:30	Opening ceremony	
10:30 - 12:00	Keynote Speech International Organization Korea: Prof. Sun-Joo Kim (Kunkuk Univ) Japan: Prof. Masayoshi Sato (Univ. of Tsukuba)	
12:00 - 13:30	Luncheon (Cafeteria)	
13:30 - 15:10 (Symposium)	Session I: Climate change and Food security with sustainable agriculture (Moderator: Philippine) 1. Malaysia(Zaliah Selamat), 2. Japan(Shizuko Hashimoto), 3. Taiwan(Ling-Fang Chang), 4. Korea 5. A country	
15:10 - 15:30	Coffee Break (Lobby)	
15:30 - 17:30 (Symposium)	Session II: Sustainable irrigation techniques (Moderator: MRC) 1. Thailand(Va-soon Boonkird) 2. Pakistan(Asjad Imitaz Ali) 3. Bangladesh, 4. China, 5. Philippines, 6. Indonesia, 7. Egypt, Vietnam, etc Discussion: other member countries	Session III: (PAWEES) 1. Japan, 2. Korea, 3. Indonesia, 4. India, 5. Taiwan, etc
18:00 - 20:00	Official Banquet (SEAES Hotel)	

Day 2: Steering meeting

Time	INWEPF	PAWEES
08:30 - 09:00	Accommodation to ICC by shuttle bus	
09:00 - 10:30	Steering meeting I	9th International Conference on Educational Accreditation System and APEC Engineers Project for Agricultural Engineering in Paddy Farming Regions and PAWEES Award Ceremony Award Ceremony Agenda I, II, III
10:45 - 12:00	Working group meetings (Country report)	
11:30 - 12:00		Poster session
12:00 - 13:30	Luncheon (Cafeteria)	
13:30 - 15:00	Steering meeting II	Agenda III, IV Seoul Statement
15:30 - 17:30	Free time	Workshop on Material Cycling for Sustainable Agriculture

Day 3: Field trip

Pan po rural development project site

Important dates

- 31st of August: Submission of Registration form
- 20th of September: Country report submission: (only for INWEPF member, less than 30 pages, please refer to call for paper)
- 30th September: Extended abstract submission (3-4 pages, please refer to call for paper)
- 15th of October: PPT and Poster material submission (1 page-ppt slide for print)
- 20th of October: Final Circular

4. Financial Arrangement

Japanese government will provide financial support for a national delegation, which is airfare, 4 night accommodation and per-diem excluding Japan, Korea and Thailand. INWEPF committee will finalize nomination of the national delegation before 10th of September. Finance for keynote speaker will be covered by organizing committee.

(16)_Spatio-temporal Variability of Soil Physical Properties in Different Potato Ridge Designs in Relation to Soil Erosion and Crop Production.pdf

by Krissandi Wijaya

Submission date: 03-Apr-2023 06:13AM (UTC+0700)
Submission ID: 2053823595
File name: idge_Designs_in_Relation_to_Soil_Erosion_and_Crop_Production.pdf (349.67K)
Word count: 3513
Character count: 11322

Spatio-temporal Variability of Soil Physical Properties in Different Potato Ridge Designs in Relation to Soil Erosion and Crop Production*)

Krissandi Wijaya[1], Budi Indra Setiawan[2], and Tasuku Kato[3]

[1] *Faculty of Agriculture, Jenderal Soedirman University, Purwokerto, Indonesia*
[2] *Dept. of Civil and Environ Engineering, Bogor Agricultural University, Bogor, Indonesia*
[3] *College of Agriculture, Ibaraki University, Ibaraki, Japan*
Email: kwijaya77@yahoo.com

Introduction

Vertical ridge (VR) has been intensively utilized for cultivating potato crop in tropical highland agriculture over decades to enhance its production. However, the ridge is susceptible to soil erosion causing higher soil and nutrient loss from a field (Mastur et al., 1996; Gancai, 2005; Auerswald et al., 2006). In contrast, horizontal ridge (HR) with slope of 35 % is effective to reduce runoff and soil loss about 31.4 and 37.9 %, respectively although it potentially lowers potato production about 12.4 % due to oversaturation in root zone (Soleh et al., 2002).

Waterlogged or well-aerated condition of a field is strongly related to the distribution of soil physical properties either spatially or temporary. For instance, dry bulk density affects water and air proportion as well as its distribution in soil (Hillel, 1998; Zhuang et al., 2000), which in turn controls crop growth and yield (De Freitas et al., 1996; Kirkham, 2005).

In this study, spatial and temporal variability of dry bulk density and water content in potato VR and HR plot well as its impact on crop productivity and soil erosion were identified.

Material and Method

The research was conducted in Serang village, Central Java, Indonesia from November 2007 to February 2008. Two potato plots, namely VR and HR plot, with 15 % in slope and (2 x 2) m^2 in large were prepared (**Fig. 1**). Undisturbed soil samples and its dielectric properties were collected from each subplot of (0.5 x 0.5) m^2 in large at the depth of 0-10 and 0-20 cm by using 100 cc core and ADR probe, respectively. The samples were used to predict water content (θ or VWC) and dry bulk density (ρ_b) by using Wijaya et al. (2003)'s equation (**Eqn. 1, 2**). Runoff rate and soil loss were measured once a week from each sediment collector. Crop height, crop and leaf number, tuber weight, and root depth were observed at every crop clump.

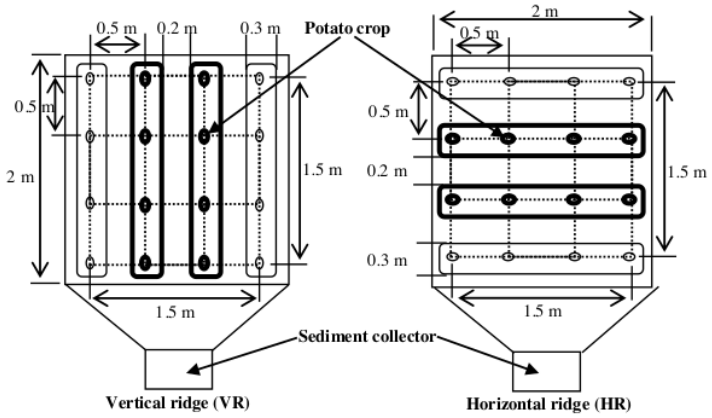

Fig. 1. Field monitoring of soil physical properties, soil erosion, and potato phenological characteristics.

$$\theta = 2.1014v^3 - 4.1763v^2 + 3.0959v - 0.3777 \quad (1)$$

$$\rho_b = \rho_t - (\theta_{ADR} . \rho_w) \quad (2)$$

where, v: output voltage of the ADR probe, ρ_t: total bulk density of soil (g cm^{-3}), θ_{ADR}: predicted volumetric water content by ADR data, and ρ_w: density of water (= 1 g cm^{-3}).

Result and Discussion

Temporary, dry bulk densities of VR and HR soil increased initially and then decreased toward harvesting time in which those at the upper depth were higher than those at the lower one. In other hand, VWC were lower in the initial stage and then increased about 10-15 % in the end due to higher total soil porosity (Miyazaki, 1996). Although VWC in both ridges were not significantly different (2 %), the dry bulk densities in VR plot were 20 % lower than in HR plot (**Fig. 2A**, **2B**). Regarding crop growth, VR plot had plant height and leaf number respectively 6 and 20 % higher than HR one (**Fig. 2C**, **2D**). Tuber weight and root depth were also higher in VR plot (30 and 8 %) than HR plot. This suggested that VR was better in maintaining soil porosity as well as aeration suitable for crop productivity than HR (Soleh et al., 2002).

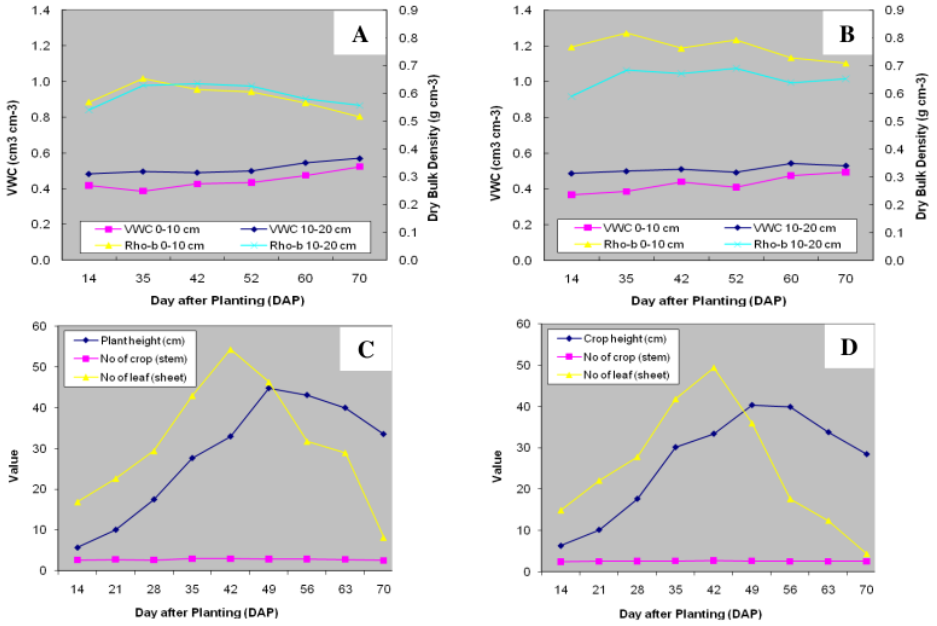

Fig. 2. Temporal change of soil physical and potato phenological properties within VR (**A, C**) and HR (**B, D**) plot during a cultivation period.

Spatially, dry bulk densities and VWC in VR and HR plot at the depth of 0-10 and 10-20 cm had reciprocal correspondence each other in which higher the former values coincided with lower the latter one and vice versa (**Fig. 3A, 3B, 3D, 3E, 4A, 4B, 4D, 4E** for the data of 42 days after planting or DAP). Crop height and leaf number (**Fig. 3C, 3F, 4C, 4F**) showed better correspondence with dry bulk density rather than with VWC. As compared to HR plot (**Fig. 4**), the correspondence among these four parameters in VR plot (**Fig. 3**) was more reasonable particularly at lower depth where root density as well as capacity to uptake water and nutrient

from soil was higher (Kirkham, 2005). The results corroborated the idea that dry bulk density is a key factor affecting total porosity, aeration or drainage capability, and water movement in soil which in turn strongly influences crop growth (Islami dan Utomo, 1995; De Freitas et al., 1996).

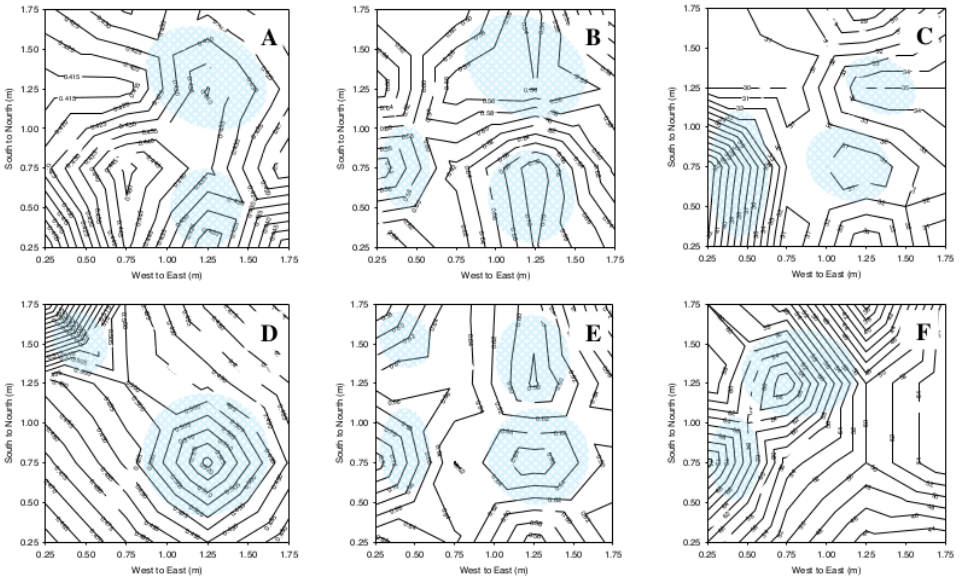

Fig. 3. Spatial variability: VWC (**left**) and dry bulk density (**middle**) at the depth of 0-10 cm (**A, B**) and 10-20 cm (**D, E**) versus height (**C**) and leaf number (**F**) of potato crop in VR plot during 42 DAP.

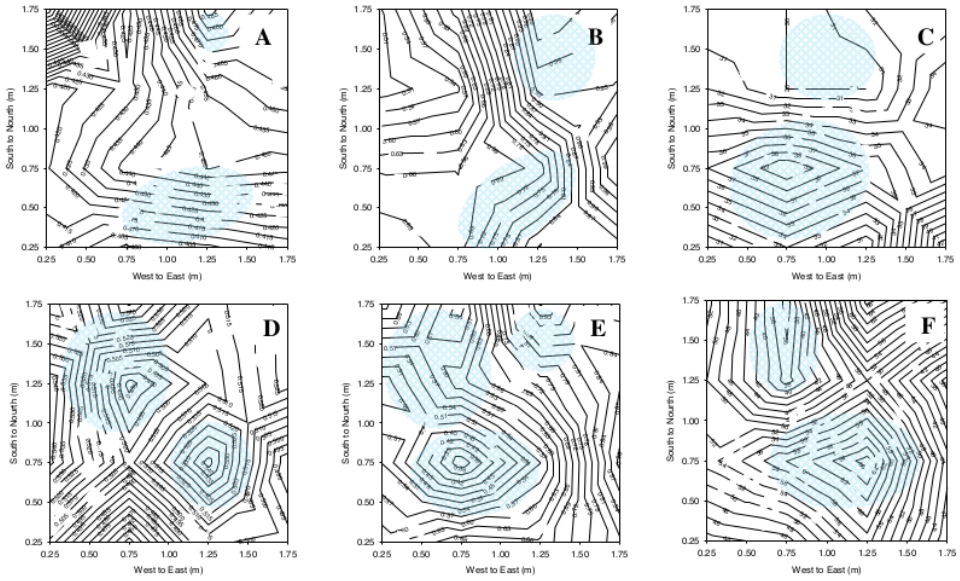

Fig. 4. Spatial variability: VWC (**left**) and dry bulk density (**middle**) at the depth of 0-10 cm (**A, B**) and 10-20 cm (**D, E**) versus height (**C**) and leaf number (**F**) of potato crop in HR plot during 42 DAP.

Concerning erosion characteristics, with total precipitation of 974 mm throughout a cultivation period, VR plot had total runoff rate and soil loss of 1,619.5 m^3 ha^{-1} and 28 ton ha^{-1}, respectively, while HR plot produced total runoff rate and soil loss about 755 m^3 ha^{-1} and 7.5 ton ha^{-1}, respectively (**Fig. 5A, 5B**). It revealed that HR plot can reduce total runoff and soil loss respectively about 53 and 73 % more effective than VR one, and this was better than the results reported by Soleh et al. (2002).

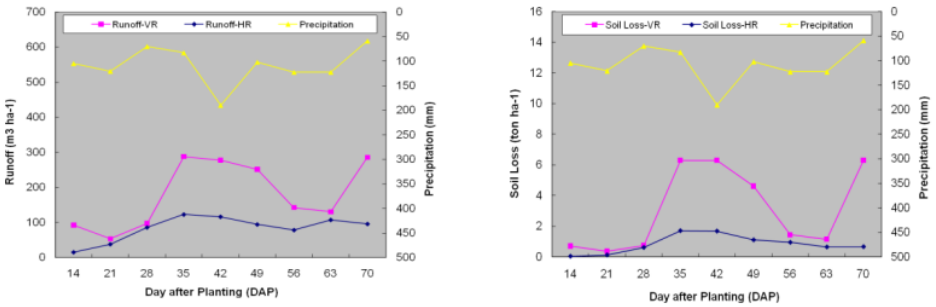

Fig. 5. Runoff rate (**A**) and soil loss (**B**) in VR (A) and HR plot during a cultivation period.

Conclusion

Dry bulk densities had temporary and spatially reciprocal correspondence with volumetric water content, and had stronger positive impact on the growth of potato crop particularly in VR plot and at lower depth. Accordingly, VR plot produced crop height, leaf number, tuber weight, and root depth respectively 6, 20, 30, and 8 % higher than HR one. As compared to VR plot, HR plot was more effective in reducing total runoff and soil loss about 53 and 73 %, respectively. In further research, the overall results may be useful for re-designing HR with appropriate aeration or drainage system to support an optimal growth and yield of potato crop.

References

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