EXTENSION AGENT PERFORMANCE IN TRANSFERRING RICE CHECK TECHNOLOGY IN GRANARY AREAS OF MALAYSIA AS PERCEIVED BY FARMERS

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FP 2019 31

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By

MUNIFAH SITI AMIRA BT YUSUF

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of Requirements for the Degree of Master of Science

January 2019

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Master of Science

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Chairman : Salim Hassan, PhD
Faculty : Agriculture

Rice is a staple food and highly demanded in Malaysia. The need and consumption of rice are rising in parallel with population growth. However, Malaysia's food self-sufficiency and security are under threat as the adoption and application level of the rice check technology among farmers still require improvement. Performance of old granary reaches only about 50% of the targeted results despite 10 years of rice check technology dissemination. This is due to the extension agents' performance in technology transfer. Therefore, the study was done in advance to avoid low performance at new granary would be just the same as the old granary. The purpose of this research was to determine the level of planning, implementing, monitoring and evaluation (IVs) and work performance (DV) of extension agents in granary areas of Malaysia, to determine the relationship between planning, implementing, monitoring and evaluation factors with work performance of extension agents in old and new granary areas, as well as to determine which factors contribute most to work performance of extension agents in old and new granary areas. The data were collected using established instruments and quantitative research method. Cluster sampling technique was used to meet 542 respondents from old (IADA KETARA and IADA Seberang Perak) and new (IADA Rompin and IADA Pekan) granary areas. Data were analysed using SPSS correlation and multiple regression procedure to examine the relationship of the extension agents' competency with work performance. The findings showed that the level of planning is high while, implementing, monitoring and evaluation of extension agents in old and new granary areas are in a moderate level. Old and new granary have shown planning, implementing, monitoring and evaluation of extension agents have a positive correlation with work performance. This interpretation means that improvement of planning, implementing, monitoring and evaluation will cause to better work performance. However, the relationship for old granary shows that implementing, monitoring and evaluation have a moderate correlation (0.41<0.70), whilst, planning has a weak correlation (0.21<0.40). Multiple

regression analysis explains only monitoring and evaluation has significant relationship with work performance. This variable explains 40.1% variance of the work performance (Adj.R^2=0.401). In new granary areas, the correlation coefficients show that all the variables positively correlated and have moderate correlation with work performance. Moreover, multiple regression analysis explains three variables i.e. are planning, implementing, monitoring and evaluation have significant relationship with work performance. These variables explain almost 50% variance of the work performance (Adj.R^2=0.491). Therefore, extension programmes in granary areas should focus on these three variables in order to increase work performance. To realise maximum production potential from both granaries, module and training should be provided to enhance the capacity of the extension agents in technology transfer.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia
sebagai memenuhi keperluan untuk ijazah Master Sains

PRESTASI AGEN PENGEMBANGAN DALAM PENYAMPAIAN TEKNOLOGI SEMAKAN PADI YANG DITERIMA PETANI DI JELAPANG PADI, MALAYSIA

Oleh

MUNIFAH SITI AMIRA BT YUSUF

Januari 2019

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Beras adalah makanan ruji dan mendapat permintaan yang tinggi di Malaysia. Keperluan dan penggunaan beras semakin meningkat selari dengan pertambahan penduduk. Namun, makanan sara diri Malaysia dan kelestarian adalah membimbangkan dan tahap penerimaan teknologi semakan padi di kalangan petani masih perlu diperbaiki. Prestasi jelapang lama mencapai hanya kira-kira 50% daripada hasil sasaran walaupun 10 tahun teknologi semakan padi telah diperkenalkan. Ini disebabkan oleh prestasi agen pengembangan dalam menyampaikan teknologi. Oleh itu, kajian awal telah dilakukan untuk mengelakkan prestasi di jelapang padi baru akan menjadi sama seperti jelapang lama. Tujuan kajian ini untuk menentukan tahap prestasi agen pengembangan di kawasan jelapang padi, untuk mengkaji hubungan antara perancangan, pelaksanaan, pemantauan dan penilaian (IVs) dengan prestasi kerja (DV) agen pengembangan di jelapang padi lama dan baru di Malaysia, untuk mengenal pasti pembolehubah tidak bersandar yang banyak menyumbang tertinggi kepada prestasi kerja di jelapang padi lama dan baru. Data yang dikumpulkan menggunakan instrument yang stabil dan kaedah penyelidikan kuantitatif. Teknik persampelan kluster telah digunakan untuk mendapatkan 542 responden dari jelapang padi lama (IADA KETARA dan IADA Seberang Perak) dan jelapang padi baru (IADA Rompin dan IADA Pekan). Data dianalisis menggunakan SPSS prosedur korelasi dan prosedur regresi berganda untuk mengkaji hubungan pembolehubah tidak bersandar dengan prestasi kerja. Dapatan kajian menunjukkan tahap prestasi agen pengembangan di kawasan jelapang padi adalah tinggi dalam komponen perancangan namun pelaksanaan, pemantauan dan penilaian adalah pada tahap sederhana. Jelapang padi lama dan baru menunjukkan perancangan, pelaksanaan, pemantauan dan penilaian agen pengembangan mempunyai hubungan yang positif dengan prestasi kerja. Tafsiran menunjukkan peningkatan tahap perancangan, pelaksanaan, pemantauan dan penilaian akan

menyebabkan prestasi kerja yang lebih baik. Namun, hubungan jelapang padi lama menunjukkan pelaksanaan, pemantauan dan penilaian mempunyai hubungan yang sederhana (0.41<0.70), manakala, perancangan mempunyai hubungan yang lemah (0.21<0.40). Analisis regresi berganda menjelaskan hanya pemantauan dan penilaian mempunyai hubungan signifikan dengan prestasi kerja. Pembolehubah ini menerangkan 40.1% perbezaan prestasi kerja (Adj.R^2=0.401). Di jelapang padi baru, analisis korelasi menunjukkan semua pembolehubah positif dan mempunyai hubungan yang sederhana dengan prestasi kerja. Analisis regresi berganda menerangkan tiga pembolehubah iaitu perancangan, pelaksanaan, pemantauan dan penilaian mempunyai hubungan signifikasi dengan prestasi kerja. Pembolehubah ini menjelaskan hampir 49.1% perbezaan prestasi kerja (Adj.R^2=0.491). Oleh itu, program lanjutan dalam kawasan jelapang padi perlu memberi fokus kepada ketiga-tiga pembolehubah untuk meningkatkan prestasi kerja. Bagi merealisasikan potensi maksimum dari kedua-dua jelapang, modul dan latihan perlu disediakan untuk meningkatkan keupayaan agen pengembangan dalam tugas-tugas pemindahan teknologi.

ACKNOWLEDGEMENTS

In the name of Allah, the Most Gracious and Merciful, I am grateful to Allah the Al-Mighty for His guidance and blessing in my wonderful Master's degree journey. I would like to acknowledge and thank the following important people who have supported me during the ups and downs throughout the course of the project. Firstly, I would like to express my sincere gratitude to my very committed supervisor Dr. Salim Hassan (Department of Agriculture Technology), for his unwavering support and guidance for this research study. I owe a deep sense of gratitude to Prof. Dr.Zainal Abidin Mohamed and Dr.Kelly Wong Kai Seng, Department of Agribusiness and Bioresource Economics for their keen interest on me at every stage of my research. Their timely suggestions and comments have enabled me to complete my thesis. It is my privilege to thank my family especially my parents Yusuf bin Yeop and Maznah Binti Youb for their financial support and constant encouragement throughout my research period. Finally, I am extremely thankful to all my friends, colleagues and all academic staff of Department of Agricultural Technology, Faculty of Agriculture, Universiti Putra Malaysia for their continuing support, motivation and providing me necessary suggestions during my research pursuit.

This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Science. The members of the Supervisory Committee were as follows:

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LIST OF ABBREVIATIONS

DOA	Department of Agriculture
DV	Dependent Variables
IVs	Independent Variables
MOA	Ministry of Agriculture and Agro-based Industry
UPM	Universiti Putra Malaysia
IADA	Integrated Agriculture Development Area
MARDI	Malaysia Agriculture Research and Development Institute
MADA	Muda Agricultural Development Authority
KADA	Kemubu Agricultural Development Authority
KETARA	Northern Terengganu Integrated Agricultural Development Area
FOA	Farmers' Organization Authority
mt/ha	Metric tonnes per hectare
ToT	Transfer of Technology

CHAPTER 1

INTRODUCTION

This chapter consists of sections on introduction, background of study, problem statement, research objectives, limitations of the study and definition of terms.

1.1 Introduction

Paddy is the third most widely cultivated crop throughout Malaysia. Paddy crop cultivation covers about 681,559 ha in the year of 2015. This includes those that were planted twice a year (Paddy Statistics of Malaysia, 2015). Two-thirds of the areas are located in Peninsular Malaysia, half of which falls under ten major irrigation schemes. Malaysia's annual production of paddy is nearly two million tonnes produced from granary areas. According to the World Main Paddy Producers, 2014 (Paddy Statistic of Malaysia, 2015), China was the highest paddy producer followed by India, Indonesia, Bangladesh, Vietnam, Thailand, Myanmar, Malaysia and others. Malaysia imports rice for about 920,648 metric tonnes from countries such as Thailand, Vietnam, Pakistan, Cambodia, India and other countries. Paddy Statistic of Malaysia (2015) reported that overall production of paddy by states in Malaysia, for 2005-2015 was 2.8 mt/ha of paddy produced which represented all paddy areas (granary and non-granary) in the country. About 10% of the rice mills are in public sector, which occasionally import rice in order to meet the national requirement and customers' needs. This is because rice is the staple food for Malaysian people. However, the country's rice supply is still insufficient to cater the consumption of local population. This can be seen from Figure 1 as Agrofood-Based Industry Malaysia, 2011-2020 stated that rice consumption is expected to increase from 2.30 mt/ha in 2010 to 2.69 mt/ha in 2020. Thus, it showed an increment of 1.6% per year due to population increase and country's rice supply is still insufficient to cater the population of Malaysia.

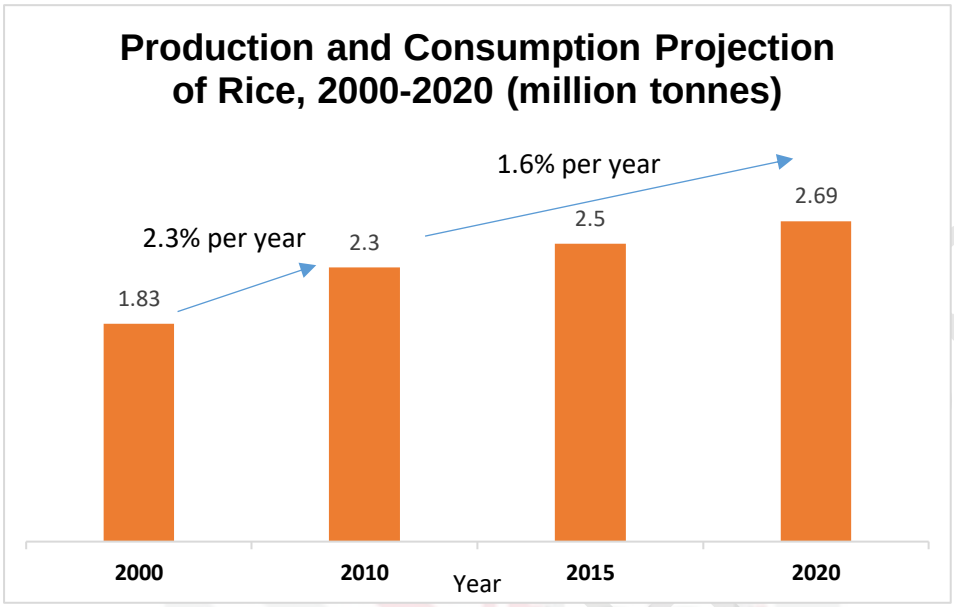


Figure 1: Graph of Rice Production and Consumption Projection, 2000-2020

(Source: Agrofood-Based Industry Malaysia, 2011-2020)

The Department of Agriculture (DOA) provides agricultural extension services through technology transfer meanwhile Integrated Agricultural Development Area (IADA) focuses to manage the agricultural infrastructure for the whole plantation of paddy. Both agencies involved in paddy plantation of Malaysia continue to monitor closely on the progress so that it is always sufficient. Rice Bowl is a large irrigation scheme (an area of over 4,000 hectares) and it is recognised by the Government in the National Agricultural Policy as a key area for rice production. There are eight granaries that have been long established in Malaysia since year 2007, which are MADA, KADA, IADA Kerian, IADA Barat Laut Selangor, IADA Pulau Pinang, IADA Seberang Perak, IADA KETARA and IADA Kemasin Semerak. Three granaries, IADA, KADA and MADA, act as bodies assigned by Ministry of Agriculture & Agro-Based Industry Malaysia (MOA) as an assistantship to the paddy farmers. They are responsible managing agricultural infrastructure, strengthening support services and farm management, providing consultation through programmes, and reinforcing service agencies. Rice being consumed as the main food in Malaysia, it makes the paddy industry as a national crop. In order to increase paddy production in Malaysia, the government had worked out with extension agencies to support paddy farmers' productivity to produce rice both for family of the farmers and for the nation as a whole. This is where the role of agricultural agencies is seen to be remarkable.

An agricultural extension will aid in transferring the technology to the farmers in the paddy area of Malaysia. Their services offer technical advice on paddy management and infrastructure, supplies with necessary inputs and services to

support paddy farmers' production. The empirical evidence from M. Sjakir et al., (2015) research showed that farmers who participated in the program had significantly increased in paddy productivity. This Agricultural Extension in paddy areas will provide information to farmers and transfer new technology developed by agricultural research institutes such as UPM, MARDI, etc. Agricultural extension programmes in paddy areas will contribute a broad area in terms of improved paddy varieties, improved water management, and better control of weeds, pests or plant diseases according to a better planning and implementing schedule of paddy management. Agricultural extension also allows the local farmers' groups and organizations to be benefited by the extension programmes. Therefore, agricultural extension is indispensable to provide essential elements to the farmers that are needed to improve the paddy productivity. According to Arafah et al., (2002) technology transfer can improve the rice productivity from 6.5 to 8.3 tons/ha while Wijanyanto (2005) mentioned 7.4 tons/ha in his work. In fact, there were many concepts of competency which have been measured on knowledge and skills in planning, implementing, monitoring and evaluation towards extension agents work performance (Athilia, 2015; Latifah, 2017; Amirul, 2016; Huril, 2017; Nabilah, 2017; Hafidz, 2016; Zarina, 2016; Diana, 2017). Despite that, competency of extension agents in management of technology transfer still becomes a major issue that has to be discussed.

The agricultural extension agents' priority is to transfer technology to the farmers. The main components in technology transfer involve planning, implementing, monitoring and evaluation. All levels of extension can be involving through extension planning and training sessions, this involvement and coordination of agencies can respond quickly to the demands generated through extension. Apart from that, monitoring and evaluation can be used as a regular management tool and as a feedback to improve the entire extension system. These components should be reviewed by extension management in granary so that extension activities can be monitored and improved according to necessity.

1.2 Research Background

1.2.1 Agricultural Extension Agent

Agricultural extension has an ultimate potential to improve agricultural productivity and increase incomes through transfer and facilitation of knowledge, skills, and technologies (Feder et al., 2010; Swanson and Rajalahti, 2010; Davis, 2008; Dercon et al., 2006). On a different perspective, rates of return in economic and social contribution of agricultural extension programme in some countries are high (Davis et al., 2012; Benin et al., 2011; Van den Berg and Jiggins, 2007). However, this is contradicting with extension systems and delivery methods in many developing countries which have been constantly seen as ineffective in responding to the demands and technological challenges of various types of clients and in reaching the rural poor (Birner et al. 2009; Rivera, Qamar and Crowder 2001). There is a major knowledge gap on assessing performance and

management of extension systems and understanding the comparison and specific components of competency in different granary areas.

1.2.2 The Role of Agricultural Extension Agent in Transferring Rice Check Technology

In Malaysia, the Department of Agriculture provides agricultural extension services through technology transfer meanwhile Integrated Agricultural Development Area (IADA) is focused to manage agricultural infrastructure for the whole of paddy plantation. The manual of Rice Check technology has been introduced since 1990's by MARDI and collaboration with MADA. According to Johari Abdullah (2010), the Rice Check system showed a positive impact in increasing the rice yield in a few countries such as Indonesia, Thailand, Vietnam, and America. In addition, rice check and manual technology were established under DOA in 2002 and used as guidance for farmers to manage the paddy crop according to the target set. Each rice check technology must be fulfilled for a better growth of paddy towards high production and income.

An agricultural extension will transfer the rice check technology to the farmers in paddy areas of Malaysia. The service offers technical advice on paddy management and infrastructure to farmers, and also supplies with necessary inputs and services to support paddy farmers' production. Appropriate actions need to be taken from the previous experience to improve the management of the farm every season (DOA, 2002). Besides that, agricultural extension in paddy areas will also provide information to farmers and transfer new technology developed by agricultural research institutes such as UPM, MARDI, etc. Agricultural extension programmes in paddy area will help improved paddy varieties, improved water management, and better control of weeds, pests or plant diseases according to a better planning and implementing schedule of paddy management.

1.2.3 Importance of Agricultural Extension Agent in Paddy Production

Extension is necessary to widespread and sustain agricultural development. The extension helps farmers to take advantage of research findings and technological advances, adapt to seasonal and economic conditions, and effectively use support services to increase their production and income. Without extension agents' guidance, farmers are often unable to fully utilise the opportunities available to them. According to Suvedi and Kaplowitz (2016), extension workers can link farmers/producers with research-based information to improve agricultural production, productivity, processing and marketing of agricultural goods and services. However, according to M.Sjakir et al., (2015) findings showed that 62.5% of the farmers stated that extension workers are well versed to the subject is sufficient. But skills of extension workers in teaching are still moderate (74.4%). The extension worker's skills in teaching to disseminate new technology have a significant influence on farm productivity (Hendayana et

al., 2009; Hauser et al., 2010). Moreover, several studies also showed that individual competencies and skills are positively related with extension agents' performance (Thatch, 2008; Khalil et al., 2008; Boyd, 2003).

In intensifying the effort, the DOA provides agricultural extension services to the farmers to disseminate improved technology and new innovations to the farmers. This is because extension worker can be uplifting farmers' motivation and inspire good faith of latest agriculture technology (Rosganda and Hendayana, 2004; Bulkis, 2010). Technology dissemination is carried out through various communication channels using the local language. Extension services are the core business for Department of Agriculture. The Extension Department consists of Agriculture Officer, Assistant Agriculture Officer and Extension Agent which function to serve in giving extension services such as encouraging farmers, providing information, technical assistance and advising farmers. The officers are responsible in planning, implementing and monitoring extension activities. Besides, Department of Agriculture is also responsible to provide training and technical support to extension agents of Integrated Agriculture Development Area (IADAs). Department of Agriculture will provide farmers and area profile and also provide activity planning documents. Extension services have a major role in achieving the goal of national agricultural development. Hence, Department of Agriculture is responsible for implementing it to achieve the targeted impact.

1.2.4 Granary Areas

Granary areas in Malaysia are known as Integrated Agriculture Development Area (IADA) where it is a statutory body assigned by MOA as an assistantship to the paddy farmers. The obligation of IADA since 1967 aims to manage the whole plantation of paddy. The main job scopes of IADA are to increase agricultural infrastructure especially on irrigation and drainage system, strengthen support services and farm management, provide consultation through programme/training and reinforce service agencies such as development of agriculture institute and farmers. Since the extension agents from IADA receive training and technical support from DOA, the agents will transfer technology based on rice check technology to the farmers in granary areas.

1.2.4.1 Old Granary Production

There are eight granary areas in Malaysia, recognised as MADA, KADA, IADA KERIAN, IADA BLS, IADA Pulau Pinang, IADA Seberang Perak, IADA KETARA and IADA Kemasin Semerak. These granary areas known as old granaries were established since 1967.

Table 1: Hectareage of Planted Areas, Average Yield and Production for Wetland Paddy by Old Granary Areas, Peninsular Malaysia

Granary Area	Hectareage of Planted Area (Hectares)	Average Yield (mt/Ha)	Production (mt)
MADA	190,127	5.539	1,053,116
KADA	50,268	4.297	216,000
IADA KERIAN	41,944	4.514	189,356
IADA BARAT LAUT SELANGOR	37,842	6.403	242,320
IADA PULAU PINANG	25,564	5.872	150,112
IADA SEBERANG PERAK	27,594	4.484	123,733
IADA KETARA	9,752	5.738	55,956
IADA KEMASIN SEMERAK	6,512	3.715	24,194
OVERALL	**389,603**	**5.274**	**2,054,787**

(Source: Paddy Statistic, 2016)

1.2.4.2 New Granary Production

After around 10 years of IADA establishment in Malaysia, four new granary areas were established in 2013 to contribute towards improving rice yields and local requirements. The new granary areas are known as IADA Pekan, IADA Rompin, IADA Kota Belud, and IADA Batang Lupar. According to Ministry of Agriculture and Agro-Based Industry Malaysia (2010), the Integrated Agricultural Development Project (IADA) will be established to coordinate all projects related to upgrading these areas. As these granary areas are new, the infrastructure most of the areas are still in progress and developing. However, the irrigation and drainage system of the granary areas are still not complete. Hence, the new granary areas job scope involving planning, implementing and monitoring as the areas are still developing. Their functions are not only focused on the technical part but also to the management part. For instance, they are required to handle granary infrastructure to meet up farmers need. Therefore, the research only focuses on IADA that are completed with infrastructures which consist of IADA Pekan and IADA Rompin.

Table 2: Hectareage of Planted Areas, Average Yield and Production for Wetland Paddy by New Granary Areas, Peninsular Malaysia

Granary Area	Hectareage of Planted Area (Hectares)	Average Yield (mt/Ha)	Production (mt)
IADA PEKAN	6,030	2.671	16,107
IADA ROMPIN	5,100	3.442	17,555
OVERALL	**11,130**	**3.024**	**33,662**

(Source: Paddy Statistic, 2016)

1.2.4.3 Issue on Rice Yield Performance

In 2014, the world's total production of paddy was 744.2 million metric tonnes and the rice consumption stood at 492.7 million metric tonnes per year. Top ten countries that are world main paddy producers are dominated by: 1) China (208.2 million metric tonnes); 2) India (157.2 million metric tonnes); 3) Indonesia (70.8 million metric tonnes); 4) Bangladesh (52.2 million metric tonnes); 5) Vietnam (45.0 million metric tonnes); 6) Thailand (32.6 million metric tonnes); 7) Myanmar (26.4 million metric tonnes); 8) Philippines (19.0 million metric tonnes); 9) Japan (10.5 million metric tonnes); 10) Brazil (12.2 million metric tonnes). Meanwhile, Malaysia has been at the 15th place with a total rice production of 2.6 million metric tonnes, fairly constant since 2012. Due to supply instability, demand increasing and quantity of rice trading in the small international market cause the rice prices tend to experience volatility. Therefore, local rice production needs to be increased to ensure the country's rice supply sufficient as only 7% of the volume of world rice production is traded.

During the Tenth Malaysia Plan (2011-2015) period, the government had a set target for every paddy farmer to achieve 10 mt/ha in order to ensure the availability and accessibility of rice are maintained and sufficient for food consumption. However, the latest figures from 2015 (Refer Table 1) revealed that the average production from the old granary areas was still 5.0 mt/ha, not much different from the new granary which opened to accommodate the country needs as resulted as 2.8 mt/ha (Refer Table 2). Figure 2 shows the rice productivity gap between old and new granary in Malaysia.

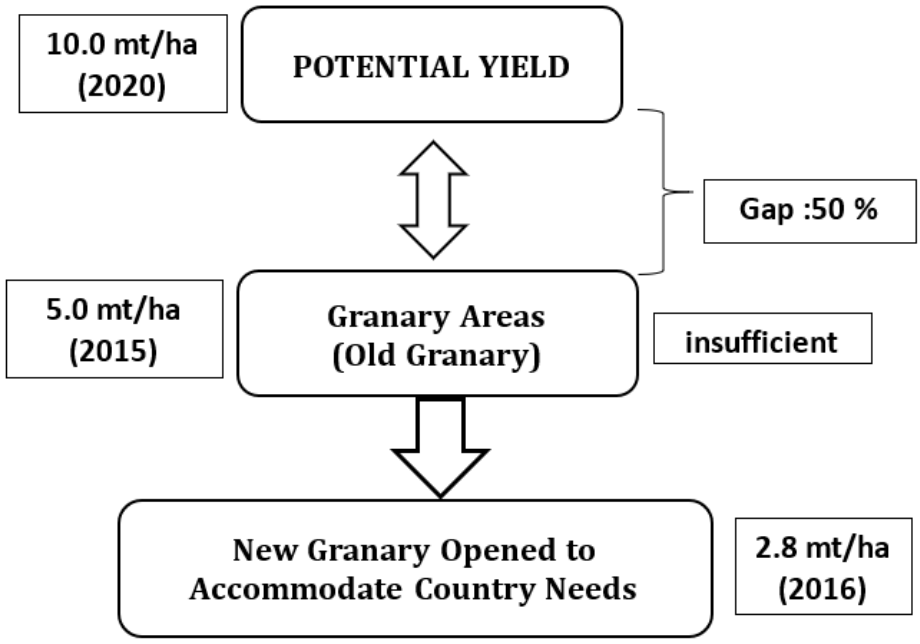
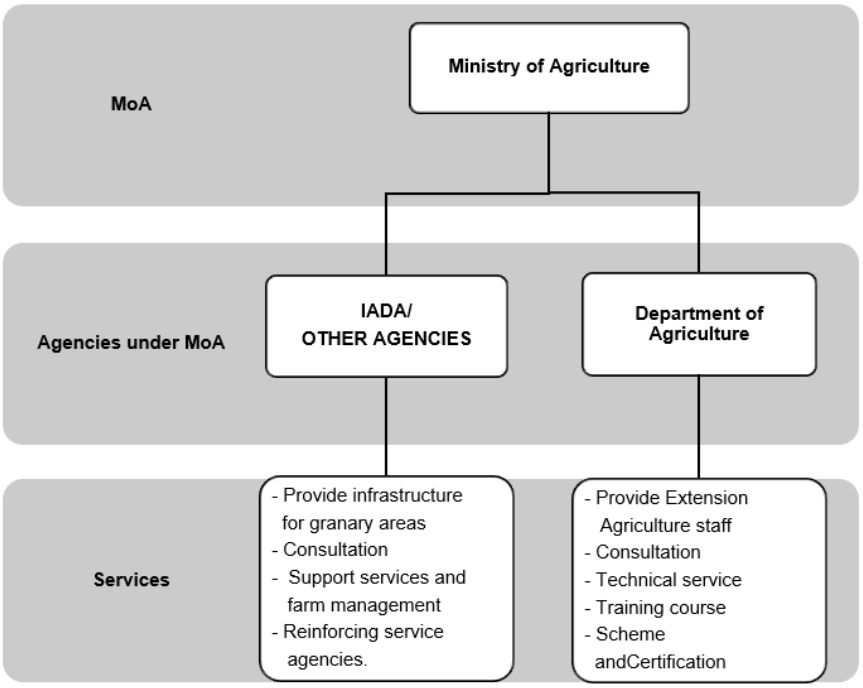


Figure 2: Rice Productivity Gap between Old and New Granary

1.2.4.4 Organization of Agriculture Agency



1.2.4.5 Department of Agriculture (DoA)

Department of Agriculture (DoA) was established in 1905 where the emphasis revolved around crop research, equipping the farmers with technical skills, and business development for farmers (DoA, 2018). In 1974, departments of agriculture were set up in each state of the country with their core function to conduct development programs especially for small-scale farmers. Various government agencies had been set up to facilitate the growth and advancement of the agriculture sector including Malaysia Agriculture Research and Development Institute (MARDI) in 1970 with the main function to develop cutting edge technologies for rapid growth in the agricultural sector (DoA, 2018). Besides providing technological support, MARDI plays an important role in Transfer of Technology (ToT) to the Department of Agriculture. Hence the strategic mission of MARDI is to support the agriculture sector by developing and promoting newly improved technologies to increase productivity, efficiency and competitiveness. Research officers employed by MARDI, are to carry out activities for transferring of technologies. In intensifying the effort, the DoA provides agricultural extension services to the farmers to disseminate improved technology and new innovations to the farmers. Technology dissemination is conducted through various communication channels using the local language. An extension service was a core business for Department of Agriculture. The Extension Department consists of Agriculture officer, Assistant Agriculture Officer and Extension Agent which function to serve in giving extension services such as encouraging farmers, providing information, technical assistance and advising farmers. The officers are responsible in planning, implementing and monitoring extension activities. Besides, Department of Agriculture also responsible in providing training and technical support to extension agents of IADAs. Apart from that, Department of Agriculture will provide farmers and area profile and also provide planning activities documents. Extension services have a major role in achieving the goal of national agricultural development. Hence, Department of Agriculture is responsible for implementing it to achieve the targeted impact.

1.2.5 Focus of Study

1.2.5.1 IADA KETARA

IADA KETARA was selected in this study according to the highest productivity represent from East Coast Malaysia with productivity 5.7 mt/ha. IADA KETARA was established in 1991 and is one of eight granaries in Malaysia. The main focus of IADA KETARA is to develop rice industry in Malaysia. It is an agency under the Ministry of Agriculture and Agro-based Industry to carry out development in the rice bowl of Besut. The role of IADA KETARA in implementing the National Agriculture Policy-3 includes developing the rice industry which sets the achievement of at least 90% self-sufficiency in the country. The whole project covers an area of 208.212 hectares covering Besut (49.708 hectares) and Setiu (85,381.70 hectares). One of the strategies of IADA

KETARA to achieve their performance is by strengthening extension services and programme through human resource development include the aspects of knowledge, skills and attitude. Hence, IADA KETARA have their own extension agents to manage the granary area for consultation and technical support in planning, implementing and monitoring.

Table 3: Production of Paddy in IADA KETARA, 2010-2015

Granary Areas	Production of Paddy (Metric Tonnes)					
	2010	2011	2012	2013	2014	2015
Projek Pembangunan Pertanian Terengganu Utara (KETARA)	52,711	57,163	54,910	54,114	55,956	53,622

(Source: Agrofood Statistic, 2016)

1.2.5.2 IADA Seberang Perak

According to Paddy Statistic of Malaysia, (2016) the average yield produced by IADA Seberang Perak (4.6 mt/ha), and this IADA was selected according to the middle rank represent from West coast Malaysia. IADA Seberang Perak is considered as old granary area as it was established since around 1965-2000 with completed infrastructure. Mission of IADA Seberang Perak is to increase paddy production about 6.62 metric ton/hectare by 2020. IADA main focused are to increase agriculture infrastructure especially irrigation system and drainage for certain region and also to improve social life of farmers by increasing their income through innovation and researches. Besides, the organisation also expands support services in agriculture and human resource management. Their main functions are also to standardised advisory services and extension services to target groups through human development programs. IADA Seberang Perak has completed with infrastructure however; their extension agents are still provided by Department of Agriculture due to shortage of staff they could provide.

Table 4: Production of Paddy in IADA Seberang Perak, 2010-2015

Granary Area	Production of Paddy (Metric Tonnes)					
	2010	2011	2012	2013	2014	2015
Seberang Perak	70,814	75,612	81,461	126,027	123,733	146,323

(Source: Agrofood Statistic, 2016)

1.2.5.3 IADA Pekan

In this study, IADA Pekan was selected to represent a new granary that is in Pahang from the East coast of Malaysia. IADA Pekan is opened in 2013 at Pekan in order to achieve national yield. The existing rice cultivation area is capable of serving as a granary, thereby to increase the country's rice production, IADA Pekan is still in upgrading their facilities, including roads, drainage and irrigation systems. The construction works such as providing infrastructure has not yet been implemented because of IADA is in the process of refining to facilitate the work undertaken to develop the rice sector. IADA Pekan consists of six schemes that have been planted by paddy such as Pahang Tua, Ganchong, Pulau Jawa, Mambang, Serandu and Merchong. These six schemes will be divided into four extension area that will monitor the activities by the farmers. Extension agents involved in this project are mainly provided by the Department of Agriculture as the IADA Pekan is still new and could not allocate their own staff.

Table 5: Production of Paddy in IADA Pekan, 2010-2015

Granary Area	Production of Paddy (Metric Tonnes)					
	2010	2011	2012	2013	2014	2015
Pekan	-	-	-	-	16,107	17,920

(Source: Agrofood Statistic, 2016)

1.2.5.4 IADA Rompin

IADA Rompin is one of the four new granaries developed in 10th Malaysian Plan (RMK 10), which is one of the strategies made to increase rice production in Malaysia and reduce the reliance of imported rice from other countries. IADA Rompin was selected in this study as it also represents the East coast of Malaysia. There are five schemes developed under IADA Rompin but only two of the schemes (Paya Sepayang and Paya Setajam) are assumed completed with infrastructures. About five extension agents are responsible to provide assistance to paddy farmers within the area. Extension agents that serve under IADA Rompin were mainly from Department of Agriculture, this is because IADA Rompin is a new granary and they need supported staff in their management.

Table 6: Production of Paddy in IADA Rompin, 2010-2015

Granary Area	Production of Paddy (Metric Tonnes)					
	2010	2011	2012	2013	2014	2015
Pekan	-	-	-	-	17,555	25,500

(Source: Agrofood Statistic, 2016)

1.2.5.5 Rice Check and Manual Technology of Paddy Planting

Rice check is a guidance to manage the paddy crop according to the set target. Each rice check technology must be fulfilled for a better growth of paddy towards a high income and production. Monitoring and observation of the paddy and the status of the farm in terms of growth, water management, fertilization, weed and pest attack and harvest are essential to identify problems and take immediate action settlement. Paddy growth should be observed, measured and data must be recorded as a guide for next season of management. Appropriate action need to be taken from the previous experience to improve the management of the farm every season (DOA, 2002). In Australia, the Rice Check System practice has been proven to be able to increase rice yields from 6 tons per hectare in the mid-1980s to more than 8.5 metric tonnes per hectare in the late 1990s (Tran et al., 2006). In Malaysia, Rice Check was established in 2002 under the Department of Agriculture and was known as “Manual of Rice Check Technology” that has been introduced since 1990’s by Mardi and collaboration with MADA. This Rice Check manual technology was transferred by extension agents in granary areas according to three management components which are planning, implementing, monitoring and evaluation.

1.2.6 Management of Extension Program

Managing extension programme is adapted from extension concepts. Management can be defined as “the process by which people, technology, job tasks and other resources are combined and coordinated in order to achieve organizational objectives effectively” (Waldron et al., 1997). In contrast, extension manager or extension agent is “a person who is assigned with formal authority over an organisation and had authority to access information, devise strategies, make decisions and implement actions (Waldron et al., 1997; Mintzberg, 1988). Managing people effectively in extension programme is a skill that requires constant planning and development. Therefore, agricultural extension is indispensable to provide essential elements to the farmers that need to improve the paddy production. Agricultural extension agent is the most common type of extension to be found in rural areas since agriculture is the basis of a rural economy. Areas of knowledge, management and new ideas in transfer of technology by agricultural extension agent are required for farmers to have practices that can lead to future development.

Management is concerning optimum attainment of organisational goals and objectives with and through other people. Every extension management organisation has their own settings and strategies. Their operating guideline cannot be standardized to one standard that will work for all organisations in general. Nevertheless, all extension managers of organizations are facing the same problems and challenges to manage the objectives and resources to accomplish tasks and implement ideas (Waldron, 1994). Management functions are based on a few philosophies of management and approach. There are mainly three activities pertaining to management function for extension agents in transfer of technology in granary areas. The three basic activities are planning, implementing and monitoring and evaluation based on rice check technology.

1.2.6.1 Planning Stage

Planning is a basic management and administrative skills that are necessary to deliver competencies in organisational management (M. Lopokoiyit et al., 2013). Agricultural extension is responsible to transfer the technology of a rice check according to the set target to the farmers. A good planning programme based on rice check technology to transfer of technology should be done by the extension agent to achieve the objective of rice technology. A finding obtained from Strong and Harder (2009) found that mentoring and evaluation can improve the proficiency in planning extension program. Therefore, a good planning programme will involve extension agents to do mentoring and evaluation in planning schedule of paddy planting, fertilizing, water management, pest and disease control and weeds control. All the activities should be well planned among extension agents with the involvement of farmers in their granary areas. Planning activities based on the rice check must be precise with objective, activities and inputs or sources. For example, they can organise meeting involving the farmers and organise a site visit.

1.2.6.2 Implementing Stage

Basic management and administrative skills such as implementing is compulsory to enhanced competency in organisational management (M. Lopokoiyit et al., 2013). Implementing activities must be done accordingly to the planning setting. This is meant for avoiding the plan from losing out of the track. Implementing programme must use the bottom up approach, where the extension agents will identify the input needs of the project and informed to the top. Implementing programme will be smooth and effectively done if the inputs or source are provided equally so that the project will be done according to the planning setting. For example, extension agent will teach the farmers on the water management schedule, way to control weeds, way to clean paddy field, cultivate paddy, how to determine the time for paddy harvesting, and teach on how to control paddy disease. All these activities need adequate knowledge and skills so that the activities could be well implemented by the extension agents. According to M. Lopokoiyit et al. (2013) reported that inadequate conflict management skills contributed most to ineffective extension incidences.

1.2.6.3 Monitoring and Evaluation Stage

The activities of technology transferred should be recorded in programme activities by extension agents. All the activities implemented are important to be monitored and evaluated by extension agents. This evaluation requires a person who is specialised in the field or advisor to gain improvement from the activities implemented.

1.2.6.3.1 Formative Evaluation

Formative evaluation is a systematic identification that provides information to improve the programme activities. The identification was done by extension agents during the program implementation to evaluate and monitor the staff and farmers during the period of programme. It provides continuous feedback to both extension agents and farmers concerning programme successes and failure while instruction is in process. Feedback to farmers provides reinforcement of successful learning and identifies the specific learning mistake that need to be improved. Feedback to extension agents provides information for modifying instruction of technology transferred. This formative evaluation aims at improvement of skills and knowledge of extension agents during technology transferred based on rice check technology. Report of the formative evaluation will be presented to the agriculture officer and be made some improvements for upcoming programme.

1.2.6.3.2 Summative Evaluation

Summative evaluation refers to the assessment of farmers, extension agents and all staff involved with paddy crop where the focus is on the outcome of a programme. This evaluation summarises the farmers' and extension agents' development at a particular time. The information throughout this evaluation will provide a good decision to be taken in the future of the programme.

All in all, a review conducted by Faure, Desjeux, and Gasselin (2012) highlights significant knowledge gaps on institutional environment and governance structures that affect way of working and performance of agricultural extension. Hence, does the extension agents' competency of technology transfer in new granary be better than extension agents' competency of technology transfers in old granary or will it be the same as before? Is the extension agents' performance in transferring rice check technology in old and new granaries able to achieve national targets?

1.3 Research Problem Statement

By the year of 2020, the agricultural sector needs to meet requirements to succeed as a developed country. In order to achieve transformative change in agriculture it demands both human and institutional capacity development. The agricultural extension agents play a crucial role in promoting agricultural productivity by giving consultancy services to farmers, increasing food security, improving rural livelihoods, and promoting agriculture as a profitable venture.

Paddy becomes the third most widely cultivated crop throughout Malaysia. However, Malaysia still imports 920,648 metric tonnes per year of rice from other countries to accommodate population demand. This can be seen that it is the adoption and practical application level of the rice check technology among paddy farmers in the old and new granary areas which was low, resulting in actual paddy yield to be lower than the potential yield.

From the existing production shown in 2015, the expected national average paddy yield was 10.0 mt/ha, while the average yield for the granary areas was 5.0 mt/ha. The current situation in 2015 showed that out of eight old granaries (IADA's), there were different rates of yield between the old and new granaries, where the yield averages in old granaries IADA Barat Laut Selangor, IADA Pulau Pinang, IADA KETARA, MADA, IADA Seberang Perak, IADA Kerian, KADA, IADA Kemasin Semarak were below the average yield (5.0 mt/ha). In contrast to new granary, IADA Pekan and IADA Rompin have shown trivial yield growth (3.0 mt/ha) that may take a long term to accommodate old granary to attain 10 mt/ha (DOA, 2015). This yield achievement between two group of granaries is 2 mt/ha gap which is obviously far from government target in 2020 which is 10 mt/ha, as to ensure food subsistence and rice sufficiency.

What is the cause of this substantial disparity in production? Although low performance of paddy yield was due to multitude factors such as agronomic cause, land problems, farmers' best practices etc., in this situation, this study is aimed to focus on the performance of extension agents in transferring technology which their performance outcome would be indicated in productivity of paddy production. This is because extension agents could introduce farmers with new technologies and practices. Among other factors, extension agents' performance is one of the factors that contribute to low yield of rice due to lack of adoption of new technology. The effectiveness of extension agents work performance in transferring of technology is depending on their knowledge, capacity building and support network to disseminate technology. This is the reason human contributing factor (extension agents work performance) should not be overlooked even though a lot of efforts had been taken in order to increase rice productivity.

Malaysia requires a dedicated and enhanced performance of extension workers with a set of core competencies and skills to empower farmers as our developing

country is facing low agricultural productivity and food insecurity in order to intensify paddy production. Although the government has taken an initiative to open a new granary with the intention to increase the national paddy yield, it is still unable to guarantee a worth return. Since the old granary has a poor performance, precautions should be taken in order to make sure the new granary extension workers do not repeat the same mistake as the old granary extension workers.

Performance of new granary can be identified early by investigating the extension agents' performance from old and new granaries. The difference in performance between old and new granaries will serve as a benchmark to evaluate the extension agents' performance in the granary areas. This is because the paddy development areas in Malaysia demand high competency of agriculture extension officers in ensuring their paddy area is well developed.

In order to improve the performance of agricultural extension agents in paddy areas and to intensify paddy industry, one of the ways is by getting to know their performance level in planning, implementing, monitoring and evaluation skills based on transferring rice check technology program in old and new granaries.

1.4 Objectives of Study

The general objective of this study is to investigate work performance of extension agents' in planning, implementing, monitoring and evaluation based on Rice Check Technology between old and new granary areas of Malaysia.

The specific objectives of this study are as follows:

1. To determine the level of planning, implementing, monitoring and evaluation (IVs) and work performance (DV) of extension agents in granary areas of Malaysia.
2. To determine the relationship between planning, implementing, monitoring and evaluation factors with work performance of extension agents in old and new granary areas.
3. To determine which factors contribute the most to work performance of extension agents in old and new granaries.

1.5 Limitations of the Study

The study had several limitations and constraints. Firstly, it was the budget constraint as the data need to be collected in four granary areas which are IADA KETARA, Terengganu, IADA Seberang Perak, Perak, IADA Pekan and IADA Rompin in Pahang. Thus, it requires cost for transportations, accommodations and providing honorarium to the respondents. Secondly, the research was only

limited to the quantitative approach due to time and budget constraint. Besides, it only focused on farmers' perception on extension agents whereby there is no evaluation from both the parties. The data were solely based on farmers' honesty and cooperation in giving expected information regarding extension agents' competency in transferring rice check technology. Thirdly, the location of granary areas in this study was also limited and the respondents were only focused on paddy farmers and it only involved granary areas instead of non-granary areas.

1.6 Definition of Terms

Work Performance: Work performance refers to the outcome produced or behaviour exhibited by extension workers in order to perform certain job activities over a specific period of time (Ali, 2008). According to Williams (1998), performance has been used as a synonym for output, efficiency, motivation individual productivity, organisational effectiveness, production, profitability, cost effectiveness, competitiveness and work quality.

Competency: Competency is defined as knowledge, skills, abilities, traits and behaviours that make a person to perform a task within a specific function or job (Vichita and Jintawee, 2007). Competence is one's ability to demonstrate a system and function-based layout of the behaviour in achieving performance goals (Rohaila, Faridah and Norasmah, 2007).

Extension Agent: Extension agents are change agent that bring about changes of farmers' knowledge, skills and attitudes. The role of extension agents will be more on knowledgeable workers who would give advisory and consultancy services to the farmers. The extension agents were the officers from various agricultural department and agencies who serve paddy farmers in Malaysia (J. Shah, A. Asmuni and A. Ismail, 2013).

Planning: Planning is a basic management and administrative skill that is necessary to deliver competencies in an organisational management (M. Lopokoiyit et al., 2013). Planning includes outlining philosophy, policy, objective and resultant thing to be accomplished and the technique for accomplishment (Sachez, J. and Undong, 2016).

Implementing: Basic management and administrative skill such as implementing is compulsory to enhance competency in an organisational management (M. Lopokoiyit et al., 2013). Occurred when establishing structures and systems through arranged, defined and coordinated activities in line with the programme objectives. The mobilisation, utilisation and control of resources and project operation are the main elements in this section (Sachez, J. and Undong, 2016).

Monitoring and Evaluation: Monitoring is a continuous process of collecting and analyzing information and supervising the progress of activities to ensure the project or programme is being implemented well in accordance with the expected results, objectives and performance targets. It provides information for

project planning and implementation. Evaluation is made based on the planning and implementing activities that have to take place (Sachez, J. and Undong, 2016).

Rice Check Technology: Rice check is a guidance to manage the paddy crop according to the target set. There are ten main components of Rice Check Manual that must be followed by the farmers, extension agents, supervisors, workers and all people who are involved directly in paddy plantation. The 10 main components of rice check are (i) Suitability of land, (ii) Design of land, (iii) Land preparation, (iv) Sowing, (v) Fertilizer application, (vi) Water management, (vii) Pest and disease control, (viii) Weed control, (ix) Harvesting and, (x) Quality of rice (DOA,2002).

Granary Areas: Granary areas refer to major irrigation schemes (areas greater than 4,000 hectares) and documented by the Government in the National Agriculture Policy as the main paddy producing areas. Integrated Agriculture Development Area (IADA) is a statutory body assigned by MOA as an assistantship to the paddy farmers. The obligation of IADA is to manage the whole plantation of paddy (Paddy Statistic of Malaysia, 2015).

Old Granary: There are eight granary areas in Malaysia, recognised as MADA, KADA, IADA KERIAN, IADA BLS, IADA Pulau Pinang, IADA Seberang Perak, IADA KETARA and IADA Kemasin Semerak. These granary areas are known as old granary where they were established since 1967. The main job scopes of IADA are to increase agricultural infrastructure especially on irrigation and drainage system, strengthening support services and farm management, consultation through programme/training and reinforcing service agencies such as development of agriculture institute and farmers. Since the old granary areas have been established, the agriculture infrastructure in old granary areas are completed (MOA, 2018).

New Granary: New granary is granaries that were newly opened in 2013 after 10 years of IADA's establishment in Malaysia to contribute towards improving rice yields and local requirements. The new granary areas are namely as IADA Pekan, IADA Rompin, IADA Kota Belud, and IADA Batang Lupar. According to the Ministry of Agriculture and Agro-Based Industry Malaysia (2010), the Integrated Agricultural Development Project (IADA) will be established to coordinate all projects in relation to upgrading these areas. As these granary areas are new, the infrastructure in most of the areas are still under progress and development. The irrigation and drainage systems of the granary areas are still not complete (MOA, 2018).

1.7 Organization of Thesis

This thesis is divided into five chapters. In Chapter One, it discusses about the background of the study which is about extension background, agricultural extension and paddy industry in Malaysia. The objective of the study involves the level of planning, implementing and monitoring of extension agents based on Rice Check Technology between old and new granary areas of Malaysia and

problem statement were explained in detail in this chapter. Chapter Two shows methods and analysis used by previous study, planning, implementing, monitoring and evaluation, and work performance as well as research framework. All the variables that are discussed and terms used are listed and explained in this chapter. Meanwhile, Chapter Three explains the data collection procedures, analytical and estimation tools of the study. In this study, three variables were used namely, (1) Planning, (2) Implementing and (3) Monitoring and Evaluation. On top of that, work performance of extension agents was viewed from the rice productivity perspective. Chapter Four, discusses the findings of descriptive analysis, correlation and regression analysis of the study. Lastly, Chapter Five includes the major findings of summary, conclusion, implications and recommendations of study.

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