



**UISFS**  
2016

**50** SEAMEO  
SEARCA  
1966-2016

**ISFA**  
Indonesian SEARCA Fellow Association

ISBN : 978-602-0860-10-7

# CONFERENCE PROCEEDINGS

# 2016

August 23-24, 2016  
Bandar Lampung, Lampung, Indonesia

## UISFS

### THE USR INTERNATIONAL SEMINAR ON FOOD SECURITY

“Improving Food Security : The Challenges for  
Enhancing Resilience to Climate Change”

**Volume II**

**The University of Lampung**

**Indonesian SEARCA Fellow Association**

Southeast Asian Regional Center for Graduate Study and Research in Agriculture

ISBN : 978-602-0860-10-7

# **USR INTERNATIONAL SEMINAR ON FOOD SECURITY**

*Improving Food Security : The Challenges for Enhancing Resilience to  
Climate Change*

**Emersia Hotel and Resort, Bandar Lampung,  
Lampung, Indonesia**

**23 – 24 August 2016  
Volume II**

Organized by



ISFA



Research and Community Service Institution  
The University of Lampung – Republic of Indonesia,  
Indonesian SEARCA Fellow Association,  
SEARCA

2016

## ***EDITORS***

Christine Wulandari, Ph.D  
Dr. Maria Viva Rini  
Hari Kaskoyo, Ph.D  
Hidayat Saputra, S.P.,M.Si  
Windi Mardiqā Riani, S.Hut.,M.Si  
Aristoteles, S.Si.,M.Si  
Ade Pamungkas

## ***REVIEWERS***

Prof. Dr. Neti Yuliana  
Prof. Dr. Bustanul Arifin  
Prof. Dr. Kukuh Setiawan  
Prof. Dr. Udin Hasanudin  
Prof. Dr. Yusnita Said  
Dr. Dwi Hapsoro  
Endang Linirin Widiastuti,Ph.D  
Dr. Siti Nurjanah  
Wamiliana,Ph.D  
Dr. Yaktiworo Indriani

## LIST OF CONTENTS

No	Title and Author	Page
1	<b>FOOD SECURITY POTENTIALS OF AGROFORESTRY SYSTEMS IN SELECTED UPLAND FARMING COMMUNITIES IN THE PHILIPPINES</b> Leila D. Landicho, Romnick S. Baliton, Rowena D. Cabahug, Roselyn F. Paelmo, Reynaldo A. Comia, Roberto G. Visco, Arnold Karl Castillo, Russel Son Cosico and Maryanne Abadillos	1-19
2	<b>SHELF LIFE PREDICTION OF LOCAL ORANGES USING SPECTRAL INFORMATION IN UV-Vis-NIR REGION COMBINED WITH PLS REGRESSION</b> Diding Suhandy, Dwi Dian Novita, Meinilwita Yulia, Arion Oktora and Yuni Kurnia Fitri	20-28
3	<b>FOOD SECURITY UNDER PARTNERSHIP SCHEME AT PRODUCTION FOREST REGISTER 42 WAY KANAN, LAMPUNG PROVINCE</b> Christine Wulandari and Pitojo Budiono	29– 37
4	<b>ANALYSIS FOR SELF-SUFFICIENCY OF RICE IN INDONESIA: FORECAST OF ITS PRODUCTION AND CONSUMPTION</b> Agus Hudoyo, Dwi Haryono and Indah Nurmayasari	38 -47
5	<b>RISK MANAGEMENT AS A PILLAR IN FOOD SECURITY FOR PEPPER SMALLHOLDER FARMER</b> Suci Wulandari	48 – 58
6	<b>INDIRECT SELECTION OF SOYBEAN ELITE LINES DERIVED FROM WILIS X B3570 CROSSES</b> Nyimas Sa'diyah, Viska Nurisma, Setyo Dwi Utomo, and Maimun Barmawi	59 - 65
7	<b>A REVIEW ON FOOD SECURITY IN MALAYSIA: TOWARDS SUSTAINABILITY AND CHALLENGES</b> Kamziahabd Kudus	66 –74
8	<b>SAVING IRRIGATION WATER AND ENERGY WITH LASER LEVELING EQUIPMENT TOMITIGATE EFFECTS OF CLIMATE CHANGE AND TO ENSURE FOOD SECURITY</b> Phan Hieu Hien, Tran Van Khanh, Nguyen Duc Canh and Nguyen Thanh Nghi	75 - 94
9	<b>THE ROLE OF <i>Saccharomyces cerevisiae</i> AS MODIFICATION AGENT ON THE CASSAVA STARCH</b> Maria Erna Kustyawati, Azhari Rangga and Sri Setyani	95-102
10	<b>DESIGNING AND CONSTRUCTING OF SUN DRYING WITH SEMI-AUTOMATIC MOVING RACKS</b> Tamrin and Hendra Saputra	103-111

- 11 **A REVIEW OF VARIOUS MATERIALS AND LEVELS MODULE ON THAI PEPPER (*Capsicum frutescens* L.) IN VERTICULTURE PATTERN OF LEVELS MODULE** 112- 120  
Sitawati, Agus Suryanto and Euis Elih Nurlaelih
- 12 **ECONOMIC ANALYSIS OF SMALL RUMINANT MIXED FARMING TO THE FARMER'S INCOME IN YOGYAKARTA-INDONESIA** 121-126  
Tri Anggraeni Kusumastuti
- 13 **OXYGEN SATURATION OF LAMBS DURING ESTROUS CYCLE WITHIN DIETS WITH DIFFERENT CATION AND ANION RATIO** 127-133  
Farida Fathul and Endang Linirin Widiastuti
- 14 **DIFFERENCE OF CATION AND ANION DIETS ON LEUCOCYTES DIFFERENTIATION OF LAMB DURING ESTROUS CYCLE** 134-141  
Farida Fathul and Endang Linirin Widiastuti
- 15 **EFFECT OF SIGER RICE FROM CASSAVA ON BLOOD GLUCOSE LEVEL AND THE PANCREAS IN MICE INDUCED ALLOXAN** 142-157  
Subeki, Wisnu Satyajaya, Murhadi and Erwin Yuliadi
- 16 **PHYSICOCHEMICAL CHARACTERISTICS OF CASSAVA STARCH PRODUCED BY ITTARA - A SMALL SCALE TAPIOCA INDUSTRY : *A Case Study at PD Semangat Jaya , Lampung*** 158-165  
Siti Nurdjanah, Udin Hasanudin, Neti Yuliana and Desy Silvianti
- 17 **THE SHELF LIFE DETERMINATION OF CAPSAICIN ON RED CHILLI PASTE USING THE ARRHENIUS MODEL APPROACH** 166-174  
Dharia Renate
- 18 **ENHANCEMENT OF THE CAMERA CAPACITY MEASURING THE CATTLE WEIGHT** 175-180  
H. Winoto, H. C. Pangestika, A. D. Putridinanti, A. Riyanto, G. Al Hadid and Daud Samsudewa
- 19 **BODY CONDITION SCORE AND NON RETURN RATE PERCENTAGE OF COW BEEF AFTER FLUSHING IN CENTRAL JAVA** 181-185  
Daud Samsudewa, Marry Christiyanto, Mukh Arifin and Andri Hanindyo
- 20 **BODY MEASUREMENT OF TIMOR DEER (*Rusa timorensis*) IN CAPTIVITY OF CENTRAL JAVA** 186-190  
Daud Samsudewa, Alfina Handayani, and Baroto Agus Aryadi
- 21 **THE ACCURACY LEVEL OF GOLD RING FOR SEX DETERMINING USING THE THEORY OF INTENSITY ELECTROMAGNETIC WAVES AGAINTS ULTRASONOGRAPHY (USG)** 191-194  
M. Anwar, A. Zabiq, M. Shobirin, Y. Fatikhaturrohmah, M. F. Ridho and

Daud Samsudewa

- 22 **EFFECTIVENESS OF POLISULFON MEMBRANE WITH NANOSILICA ADDITION OF BOILER ASH OF SUGAR INDUSTRY** 195-203  
Elsa Windiastuti, Suprihatin, Nastiti Siswi Indrasti, and Udin Hasanudin
- 23 **INFESTATION OF MAJOR PESTS AND DISEASES ON VARIOUS CASSAVA CLONES IN LAMPUNG** 204-218  
I Gede Swibawa, F.X. Susilo, Purnomo, Titik Nur Aeny, S.D. Utomo and Erwin Yuliadi
- 24 **INTEGRATION OF OIL PALM PLANT AND ANIMAL IN LAMPUNG PROVINCE** 219-224  
Muhtarudin, Kusuma Adhianto, Liman, Yusuf Widodo, and Apriansyah Marga
- 25 **BREAST ANTICANCER ACTIVITY OF BRUCEIN-A FROM MAKASAR FRUIT (*Brucea javanica*) AGAINST EXPRESSION OF GENE p53 IN RAT INDUCED DIMETILBENZAANTRAZENA** 225-234  
Muhartono, Subeki
- 26 **ACCESS TO BIODIVERSITY TO ENHANCE RESILIENCE AND FOOD SECURITY FOR LOCAL AND INDIGENOUS PEOPLE IN HEART OF BORNEO (HOB)** 235-244  
Yusurum Jagau, Hastin Ernawati Nur Chusnul Chotimah, Adri Aliayub, Cristina Eghenter, Didiek Surjanto, and Eri Panca Setyawan
- 27 **FETAL SKELETON DEVELOPMENT OF MICE (*Mus musculus* L) THREATED WITH NUTGRASS (*Cyperus rotundus*) EXTRACT** 245-252  
Nuning Nurcahyani, Yan Wirasti, Jamsari, Djong Hon Tjong and Hendri Busman
- 28 **PERFORMANCE OF REPRODUCTION AND PRODUCTION OF BUFFALO (*Bubalus bubalis*) IN TULANG BAWANG REGENCY LAMPUNG PROVINCE** 253-257  
Muhammad Dima Iqbal Hamdani, Idalina Harris and Liman
- 29 **STUDY OF PHYSICAL, CHEMICAL, AND SENSORY CHARACTERISTICS OF MIXED FRUIT LEATHER SNAKE FRUIT (*Salacca edulis*) AND JACKFRUIT (*Artocarpus heterophyllus*) WITH VARIATIONS ON ARABIC GUM CONCENTRATION** 258-266  
Nur Her Riyadi P, Ardhea Mustika Sari and Palupi D Respatiningrum
- 30 **THE ROLE OF *Trichoderma* spp. ON CORN DOWNY MILDEW (*Peronosclerospora maydis*)** 267-275  
Joko Prasetyo
- 31 **EXPLORATION OF THE PREDATORS OF SUGARCANE SCALE INSECT (*Aulacaspis tegalensis* Zehntn) AND TESTING THE DURABILITY OF THE PREDATOR WITH ALTERNATIVE FEEDS** 276-285

Sudi Pramono, Fx. Wagiman, Y. Andi Trisyono and Witjaksono

- 32 POTENTIAL OF RICE ANALOGUES MADE FROM MODIFIED CORN FLOUR AND CASSAVA FLOUR PROCESSED BY GRANULATION METHOD AS FUNCTIONAL FOOD WITH LOW GLYCEMIC INDEX** 286-295  
Beni Hidayat, Syamsu Akmal, Surfiana, and Bambang Suhada
- 33 PERFORMANCE OF SINGLE-CROSS MAIZE HYBRIDS FROM DIVERSE CROSS COMBINATION OF PARENTAL INBRED LINES IN ACID SOIL CONDITIONS** 296-304  
P.K. Dewi Hayati , Sutoyo, and Teguh Budi Prasetyo
- 34 THE EFFECT OF MAGNETIC FIELD EXPOSURE TO MEDIUM ON PROTEASE PRODUCTION OF *Bacillus sp.* IN QUALITATIVE TEST** 305-313  
Ajeng Pratiwi, Sumardi, and Rochmah Agustina
- 35 PHYSICAL, CHEMICAL, AND COLOR SCORE CHARACTERISTICS OF SLICED PAPAYA (*Carica papaya* L.) PROCESSED BY OSMOTIC DEHYDRATION AND CONTINUED BY CONTROLLED ATMOSPHERE DRYING** 314-327  
Rofandi Hartanto, Siswanti and Gagah Analdi
- 36 ANALYSIS OF ENERGY INPUTS IN RICE PRODUCTION OF VARYING YIELD LEVELS AMONG SELECTED MUNICIPALS OF LAGUNA, PHILIPPINES** 328-348  
Gyaw Shine Oo
- 37 NUMBER OF ARBUSCULAR MYCORRHIZA FUNGI SPORE FROM TRAP CULTURE AFFECTED BY TYPE OF MEDIA USED** 349-355  
Maria Viva Rini



## INTEGRATION OF OIL PALM PLANT AND ANIMAL IN LAMPUNG PROVINCE

MUHTARUDIN\*, KUSUMA ADHIANTO\*, LIMAN\*, YUSUF WIDODO\* AND APRIANSYAH MARGA\*

\*Department Animal Science, Agricultural Faculty Lampung University,  
e-mail: [muhtarudin.1961@fp.unila.ac.id](mailto:muhtarudin.1961@fp.unila.ac.id)

### ABSTRACT

The aims of the research were to evaluate carrying capacity of palm oil by product including of forage among palm oil plant. The data were collected consisted of secondary and primary data. Secondary data was collected from agriculture department. Primary data was collected by dry weight range method. The samplings were collected from forage among palm oil plant. Primary data and secondary data were combined to evaluate the carrying capacity of forage. The research showed that there were two methods of farmer to integrate of oil palm and animals. The first the animal cattle was housed and secondary the animal was grazed among oil palm plant. Each farmer had 4—5 cattle in housed anime method. The cattle tend to fattening. In grazing method, the farmer had 5—20 cattle. This method was efficient for breeding system of cattle. The totally potency of forage from palm oil in Lampung Province was 670.852, 23 ton/years. The carrying capacity of the forage was 204.208,59 animals unit. If the assumption of dry matter requirement of cattle was 9 kg/day, therefore, 1 ha of palm oil plant had 3 animals unit for its carrying capacity. On the other hand, if the resource of forage was only from among palm oil plant then the carrying capacity was 2.2 animals unit. From field observation on forage in palm oil plant that non productive site (such as in young plant palm) we found 20 species of plants, and 15 species of plant found in plant oil palm productive site.

**Key□ords:** carrying capacity, integration of oil palm and animal

### INTRODUCTION

Beef importing in Indonesia was increasing, to decreasing beef importing livestock population must be increased. On the other head productivity of livestock must be improved. To



improve productivity of livestock, feed management must be combined by feed technology, including feed processing and feed supplement utilization.

A viability of forage was a problem to developed ruminant productivity. Integration program between livestock and crop plant could increase viability of forage in palm oil plant. Forage among palm oil plant had high potential to serve forage for livestock, especially cattle. Carrying capacity and botanical composition of forage was important to observe.

## METHODS

The data was collected consisted secondary and primary data. Secondary data was collected from agriculture department. Primary data was collected by dry weight range method. The samplings were collected from forage among palm oil plant. Primary data and secondary data were combined to evaluate the carrying capacity of forage. To collect carrying capacity data, was used assumption that dry matter consumption was 3% from weight of animal (Parakkasi, 1999). One animal unit (AU) equal with one cattle that weight 455 kg (Santoso, 1995).

## RESULTS AND DISCUSSION

Based on field observation, there were two methods/ways of farmer make integration between oil palm plant and animal, first livestock was housed, and second livestock was grazed.

### A. Housed $\bar{a}y$ / system

In housed system farmer used cut and carry to serve forage. Farmer was not fully used forage from palm oil plant. The farmer also used other forage.

In housed system, the livestock feces was collected and used for fertilizer. In this system, dietary feed concentrate was used to improve of growth of the livestock. This housed system attempted to fattening livestock, especially cattle. Otherwise, most of farmer had breeding system. In housed system was suggested to fattening of cattle.

### B. Grazing System

Based on field observation, grazing system was used in the palm oil plant at PTPN VII Lampung, in where Rejosari and Bekri plantation area cattle were let grazing among the crops. At this condition, the system had high efficient for the farm, it could be grazed by 5—20 of cattle. Further information in regard the plantation, the palm oil plants were in five years old.

### Carrying Capacity

Based on sampling unit the forage among the plant of palm oil could produce 7237.42 kg/ha/years and produce of palm leaf blante was 264785 kg/ha/years. If the assumption one animal unit (1 AU) needs 9 kg of dry matter per day so, one ha of palm oil plantation could have carrying capacity of 3 animals unit.

The potential carrying capacity of palm oil plant to serve forage could be seen in Table 1. From this Table 1, Mesuji district had high potential to serve forage from palm oil plant (53669.75 AU) and followed by Way Kanan district (35903.25 AU) Lampung Tengah district (28279.75 AU), and Tulang Bawang district (24185.39 AU). Total ability of Lampung Province to be potential to serve forage from oil palm plant was 670,852.22 ton/years and carrying capacity 204,208.59 animal unit.

### Botanical Composition

The research showed there were different botanical/plant composition species between forage plant oil palm production and oil palm pre-production. Different plants species at oil palm pre-production site had much more species of plants compare those in the oil palm production site. The percentage of botanical/plant composition species from these two different sites of palm oil plant could be seen in Table 2. From this table, forage species that growth under pre production of palm oil plant site had more variance (20 species) compared to those growth under of palm oil plant production (15 species).

The variance species was caused by different of shading oil palm plant. The shading of crops/plant decreased of forage species variance. The shading of palm oil plant in production site had more shudder combined to palm oil plant in pre production site. According to Hutari (2006) shading effected forage species variance caused forage needs sunlight for forage metabolism. Similar to it, Reksohadiprodjo (1994) stated that the most of species forage did not resistant to shading. Human factor also effect on growth of forage under oil palm plant. Harvesting process of palm oil plant could distract forage under palm oil plant.

Dominant forage species that growth under palm oil plant at production site were *Paspalum conjugatum* 20.58%, *Asystasia gangetica* 17.47%, *Ottochloa nodosa* 15.40%.

*Calopogonium mucunoides* had better growth under palm oil at production site with 0.30%. *Calopogonium mucunoides* did not need full of sunlight to grow.

Forage species that growth under pre production site were *Asystasia gangetica* 23.19%, *Paspalum conjugatum* 11.95%. *Asystasia gangetica* did grow better than others, because it does resistant to shading. The least forage species that growth under pre production site was *Cleome rutidosperma* with 0.29%.

## CONCLUSION

1. There were two different methods of farmer in handling their livestock by grazing system and housed system.
2. The grazing system was suggested for breeding of livestock.
3. Potentially of ability forage from palm oil in Lampung Province was 670,852.23 ton/years. The carrying capacity of the forage was 204,208.59 animals unit.
4. If the assumption of requirement of dry matter of cattle was 9 kg/day, so 1 ha of palm oil plant had 3 animals unit of carrying capacity. On the other hand if resource of forage only from of palm oil plants the carrying capacity was 2.2 animals unit.
5. Other plants composition of forage in palm oil plant that non production (young plant palm) site were 20 species, and 15 species in plant oil palm production site.

## REFERENCES

- Hutari, R.D. 2006. Retensi Hijauan di Bawah Naungan Kelapa Sawit di PTPN VII Unit Usaha Rejosari, Lampung Selatan. Skripsi. Universitas Lampung. Lampung
- Parakkasi, A. 1999. Ilmu Gizi dan Makanan Ternak . Institut Pertanian Bogor. Bogor.
- Reksohadiprodjo, S. 1994. Produksi Tanaman Hijauan Makanan Ternak. BPFE. Yogyakarta
- Santoso, U. 1995. Tatalaksana Pemeliharaan Ternak Sapi. Penebar Swadaya. Jakarta

**Table 1.** Planting area of palm oil plant, forage production, carrying capacity of each district in Lampung Province

No.	Districts	Total Planting area	Total forage production of palm oil plant	Total forage production of under palm oil	Total forage production (kg/years )	Total forage production (ton/years)	Total carrying capacity (AU)
1	Lampung Barat	3052	8081252,605	16122922,48	24204175,09	24204,17509	<b>7368,09</b>
2	Tanggamus	0	0	0	0	0	<b>0,00</b>
3	Lampung Selatan	4169	11038906,33	22023743,06	33062649,39	33062,64939	<b>10064,73</b>
4	Lampung Timur	2805	7427232,49	14818085,7	22245318,19	22245,31819	<b>6771,79</b>
5	Lampung Tengah	11714	31016970,19	61882016,36	92898986,55	92898,98655	<b>28279,75</b>
6	Lampung Utara	8571	22694762,81	45278364,54	67973127,35	67973,12735	<b>20691,97</b>
7	Way Kanan	14872	39378895,4	78564909,28	117943804,7	117943,8047	<b>35903,75</b>
8	Tulang Bawang	10018	26526208,58	52922489,32	79448697,9	79448,6979	<b>24185,30</b>
9	Pesawaran	511	1353053,762	2699480,14	4052533,902	4052,533902	<b>1233,65</b>
10	Prengsewu	1005	2661093,994	5309153,7	7970247,694	7970,247694	<b>2426,26</b>
11	Mesuji	22231	58864458,28	117440592,9	176305051,2	176305,0512	<b>53669,73</b>
12	Tulang Bawang Barat	5612	14859760,69	29646736,88	44506497,57	44506,49757	<b>13548,40</b>
13	Bandar Lampung	24	63548,51328	126785,76	190334,2733	190,3342733	<b>57,94</b>
14	Metro	3	7943,56416	15848,22	23791,78416	23,79178416	<b>7,24</b>
15	<b>Proinsi Lampung</b>	<b>84587</b>	<b>223974087,2</b>	<b>446851128,4</b>	<b>670825215,6</b>	<b>670825,2156</b>	<b>204.208,59</b>

**Table 2.** Forage Species and percentage botanical composition of palm oil plant preproduction and Production

Code	Species Name	Local Name	Preproduction (%)	Production (%)
A	<i>Mucuna pruriens</i>	Kara benguk	2,66	7,31
B	<i>Ottlochloa nodosa</i>	Rumput sarang buaya	5,34	15,40
C	<i>Centrosema pubescens</i>	Kakacangan	0,98	6,69
D	<i>Asystasia gangetica</i>	Ara sungsang	23,19	17,47
E	<i>Mikania micrantha</i>	Sembung rambat	8,23	2,80
F	<i>Paspalum conjugatum</i>	Rumput paitan	11,95	20,58
G	<i>Agrenatum conyzoides</i>	Babandotan	4,29	7,61
H	<i>Chromolaena odorata</i>	Kirinyuh	4,98	7,06
I	<i>Synedrella nodiflora</i>	Jotang kuda	0,98	1,46
j	<i>Eleusine indica</i>	Rumput belulang	2,83	3,34
k	<i>Cyperus kyllingia</i>	Rumput kenop	2,32	-
l	<i>Calopogonium mucunoides</i>	Kacang asu	11,25	0,30
m	<i>Acalypha australis</i>	Anting-anting	0,70	-
n	<i>Cleome rutidosperma</i>	Maman ungu	0,29	-
o	<i>Digitaria sanguinalis</i>	Genjoran	7,25	-
p	<i>Mimosa pudica</i>	Putri malu	0,70	3,47
q	<i>Cyperus rotundus</i>	Teki lading	4,00	-
r	<i>Oxalis barrelieri</i>	Belimbing tanah	2,43	-
s	<i>Eclipta prostrate</i>	Urang-aring	3,30	-
t	<i>Conyza sumatrensis</i>	Jalantir	2,32	-
u	<i>Lantana camara</i>	Saliara	-	0,61
v	<i>Imperata cylindrical</i>	Alang-alang	-	0,73
w	<i>Ipomoea triloba</i>	Katang-katang	-	5,17