

PAPER • OPEN ACCESS

International Conference on Agriculture, Environment, and Food Security 2018

To cite this article: 2019 *IOP Conf. Ser.: Earth Environ. Sci.* **260** 011001

View the [article online](#) for updates and enhancements.

INTRODUCTION

First of all let us praise and thank the presence of Allah Almighty, for the abundance of grace and joy, so that all of us can still gather in this place in good health. We would like to take this opportunity to tell you that this is our honour and privilege to welcome you here.

The honorable:

- Rector of Universitas Sumatera Utara, Prof. Dr. Runtung, M.Hum
- Vice Rector III (Research, community services, and Cooperation) of Universitas Sumatera Utara, Drs. Mahyuddin K.M. Nasution, M.I.T., Ph.D
- Dean of Faculty of Agriculture, Universitas Sumatera Utara: Dr. Ir. Hasanuddin, M.S.
- Dean of Faculty of Engineering Czech University of Life Science : Doc. Ing. Jiří Mašek, Ph.D.
- Prof. Dr. Ing. Frantisek Kumhala (Czech University of Life Science, Prague)
- Keynote Speakers:
 1. Prof. Nilda Roma Burgos, Ph.D (University of Arkansas, USA)
 2. Prof. David Herak, Ph.D (Czech University of Life Science, Prague)
 3. Prof. Bhesh Bhandari, Ph.D (University of Queensland, Australia)
 4. Prof. Dr. Ir. Hermanto Siregar, M.Ec (Institut Pertanian Bogor, Indonesia)
- The distinguished guests from all around the world

I am greatly honored to welcome you to the second International Conference on Agriculture, Environment and Food Security (AEFS) 2018. AEFS conference aims to offer the opportunity for knowledge sharing, networking, and collaboration between engineers, scientists, and technologists as well as academician and researchers working in the specific areas of agriculture, social economics, biosystems engineering and food technology. For this year the committee has chosen “Prospect and Challenges of Sustainable Agriculture to Improve Food Security and Environment” as the main theme, with 6 selected tracks including Agricultural Engineering, Agricultural Economics, Plant Science (Agronomy and Plantation, Plant Breeding, Biotechnology, Integrated Pest Management and Soil Science), Animal Science, Food Science and Technology, Marine and Fisheries Sciences. This conference is organized by The Faculty of Agriculture, Universitas Sumatera Utara (USU) as an annual event to celebrate the faculty anniversary and fully supported by Czech University of Life Sciences, Prague (CULS), The Institution of Engineers Indonesia (IEI/PII), Indonesian Society of Agricultural Economics (ISAE/PERHEPI), Komisariat Daerah Sumatera Utara, Indonesian Association of Nutrition and Feed Science (AINI) and Indonesian Association of Food Technologist (IAFT/PATPI). The AEFS 2018 program consists of the interactive presentation sessions, keynote speaking and social events including networking dinner and poster presentations. The conference 2018 papers that have been submitted to AEFS’ committee, but after the reviewing process there are 184 papers which have been approved. International seminar has been held in one day, i.e. October 24th 2018 in Aryaduta Hotel with various important agenda.

I would like to express my appreciation to the presenters who are coming from the universities in Indonesia, Czech Republic (Czech University of Life Science Prague),



Chongqing, China (Southwest University), Malaysia (University Putra Malaysia & Universiti Sains Malaysia), Turkey (Ondokuz Mayıs University), Denmark (University of Copenhagen), Norway (Norwegian Institute of Bioeconomic Research (NIBIO)), Wildlife Conservation Society, Wilmar Group Indonesia, Indonesia Institute of Science (LIPI), Research Centre of PT Bumitama Guna Jaya Agro, PT Great Giant Pineapple and Laboratory of Biomolecular of PT Socfin Indonesia. You deserve it and I think we would all agree that the quality of the presentations and the papers for this conference have been of a very high standard.

I hope you will have a pleasant post-conference tour and journey to your home countries. I look forward to seeing you on the Third ICAEFS 2019.

My personal respect and thanks goes out to all of you,

Chair of the Organizing Committee of ICAEFS 2017
Dr. Ir. Tavi Supriana, MS







PAPER • OPEN ACCESS

Conference Information

To cite this article: 2019 *IOP Conf. Ser.: Earth Environ. Sci.* **260** 011002

View the [article online](#) for updates and enhancements.

Conference Information

- Dates : October 24th, 2018
- Organizer : Faculty of Agriculture, Universitas Sumatera Utara
- Venue : Arya Duta Hotel Medan
Kapten Maulana Lubis Street No. 8, Medan, Sumatera Utara, Indonesia
Phone: +62 61 4572999
- Web : <http://www.aryaduta.com>
- Official Language : English
- Secretariat : Faculty of Agriculture Universitas Sumatera Utara
Prof. Dr. A. Sofyan Street No. 3, Kampus USU Medan Sumatera Utara,
Indonesia
- Email : aeefs@usu.ac.id
icaefs@gmail.com
- Conference Website : <https://ocs.usu.ac.id/AEFS/aeefs2018/index>

Conference Committee

- Chairman : Dr. Ir. Tavi Supriana, MS
- Co-chair : Irda Safni, SP, MCP, Ph.D
- Secretary : Riswanti Sigalingging, STP, M.Si, Ph.D
- Honorary Board : Prof. Dr. Runtung, SH, M. Hum
Drs. Mahyuddin K.M. Nasution, M.I.T., Ph.D
Dr. Ir. Hasanuddin, MS
Doc. Ing. Jiří Mašek, Ph.D.
Prof. Dr. Ing. Frantisek Kumhala
- Scientific Committee (Reviewer) : Ing. Abraham Kabutey, Ph. D (Czech)
Prof. Edison (Indonesia)
Prof. Carolee T Bull (USA)
Dr. Honest Madziva (Australia)
Dr. Hayclary A Ahmed (USA)
Prof. David B Weaver (USA)
Prof. Dr. Erman Munir, M. Sc (Indonesia)
Riswanti Sigalingging, STP, M.Si, Ph.D (Indonesia)



Local Committee

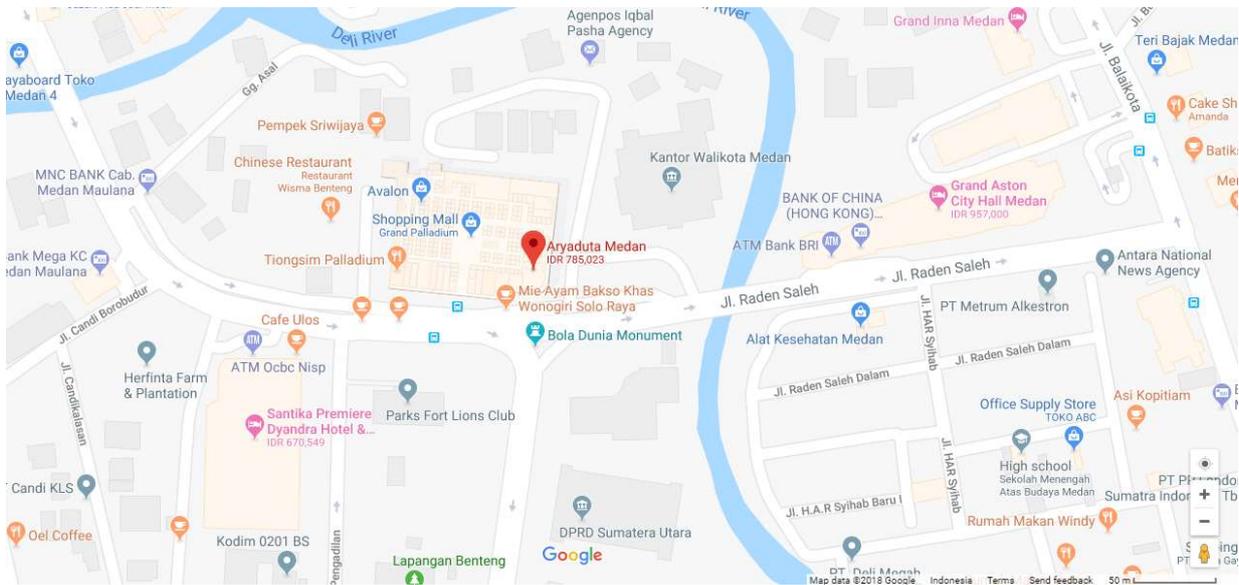
: Prof. Dr. Ir. Darma Bakti, MS
Prof. Dr. Ir. T. Sabrina, M. Si
Prof. Ir. Edison Purba, Ph. D
Dr. Lisnawita, S. P., M. Si
Dr. Eri Yusni, M. Si
Dr. Ir. Yaya Hasanah, M. Si
Prof. Dr. Ir. Elisa Julianti, M. Si
Dr. Ir. Ma'ruf Tafsir, M. Si
Dr. Khairunnisa, S. P., M. P
Ir. Revandy I. M. Damanik, M. Sc., Ph. D
Irda Safni, S. P., MCP, Ph. D
Ir. Diana Chalil, M. Si., Ph. D
Era Yusraini, S. TP., M. Si
Ir. Hotnida Sinaga, M. Phil, Ph. D
Mohammad Basyuni, S. Hut., M. Si., Ph. D
Rulianda P. Wibowo, S. P., M. Ec., Ph. D
Delima Lailan S. Nasution, S. TP., M. Sc.
Achmad Sadeli, S. Pt., M. Sc
Fuad Hasan, S. Pt., M. Si.
Tati Vidiana, S. Pt., M. S
Raju, S. TP., M. Si
Putri Chandra Ayu Lubis, S. TP., M. Si
Uswatun Hasanah, S. Pt., M. Si
Peni Patriani, S. Pt., M. P
Muhammad Khaliqi, S. P, M. Si
Tasya Chairuna Pane, S. P, M. P
R. B. M. Ibrahim Fatoni, S. Pi, M. P
Astrid Fauziah Dewinta, S. St. Pi., M. Si
Mai Suriani, S. Kel., M. Si

Venue Map

Arya Duta Hotel Medan

Kapten Maulana Lubis Street, No. 8 Medan, Sumatera Utara, Indonesia

Phone: +62 61 4572999



PAPER • OPEN ACCESS

Peer review statement

To cite this article: 2019 *IOP Conf. Ser.: Earth Environ. Sci.* **260** 011005

View the [article online](#) for updates and enhancements.

Peer review statement

All papers published in this volume of *IOP Conference Series: Earth and Environmental Science* have been peer reviewed through processes administered by the proceedings Editors. Reviews were conducted by expert referees to the professional and scientific standards expected of a proceedings journal published by IOP Publishing.



This site uses cookies. By continuing to use this site you agree to our use of cookies. To find out more, see our [Privacy and Cookies policy](#).



Table of contents

Volume 260

2019

[◀ Previous issue](#) [Next issue ▶](#)

**International Conference on Agriculture, Environment, and Food Security 2018
24–25 October 2018, Medan, Indonesia**

[View all abstracts](#)

Accepted papers received: 19 March 2019

Published online: 7 June 2019

Preface

OPEN ACCESS	011001
International Conference on Agriculture, Environment, and Food Security 2018	
+ View abstract View article PDF	
OPEN ACCESS	011002
Conference Information	
+ View abstract View article PDF	
OPEN ACCESS	011003
Conference Poster	
+ View abstract View article PDF	
OPEN ACCESS	011004
Conference Leaflet	
+ View abstract View article PDF	
OPEN ACCESS	011005
Peer review statement	
+ View abstract View article PDF	

Papers

-
- OPEN ACCESS** 012001
The implementation of a profit-sharing system between beef cattle farmers and the Maiwa Breeding Centre in Enrekang, South Sulawesi, Indonesia
S N Sirajuddin, Hastang, V S Lestari and Rosmawaty
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012002
The attitude of beef cattle farmers to biosecurity adoption
V S Lestari, D P Rahardja, P Mappigau, St Rohani and S N Sirajuddin
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012003
Factors influencing the soybean import volume in North Sumatera Province
T Supriana, M A Harahap and S K H Nasution
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012004
Analysis of probability value of risk and its influence on agribusiness of citrus cultivators (case: Parbuluan IV Village, Parbuluan Subdistrict, Dairi District)
T Supriana, S R Putri and L Sihombing
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012005
Short-run and long-run demand elasticity of shallot in North Sumatera Province
T C Pane, T Supriana and M Khaliqi
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012006
Comparing farming income prospects for cocoa and oil palm in Asahan District of North Sumatera
S K H Nasution, T Supriana, T C Pane and S S Hanum
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012007
Factors affecting the production of arabica coffee of smallholder plantations in Dairi District
Rahmanta, S Purba and T Supriana
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012008
Interrelated model of farmer behaviour and agricultural resources in the development of ginger agribusiness at the on-farm level
W Widayati, W G Abdullah, W I Romantiaulia and E S Mihrad
[+](#) View abstract [View article](#) [PDF](#)

-
- OPEN ACCESS** 012009
Economic valuation of mangrove forests at Secanggang, Langkat
H M Jelita, R Ginting and S F Ayu
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012010
The impacts of harvest on price index of producer (Case study: Hamparan Perak Subdistrict, Deli Serdang Regency, Indonesia)
Salmiah, Herawati and M Khaliqi
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012011
Exploration of the potential of upland rice agribusiness development in South Konawe District, Southeast Sulawesi
S A A Taridala, W G Abdullah, M A Tuwo, A Bafadal, I Fausayana, I Salam, S Wahyuni and Suaib
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012012
Participation in empowering institutions and influencing factors of rural household income
I Zulfida and L Lindawati
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012013
Analysis of UPSUS PAJALE program influence toward the decision of farmers in planting soybean commodity (case study: Sumberejo Village, Pagar Merbau Subdistrict, Deli Serdang District)
T Supriana, P R Nasution and R P Wibowo
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012014
The influence of price of pesticide to its application
S F Ayu and D Aulia
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012015
Factors affecting revenue of cocoa farmers in Biru-biru District, Deli Serdang Regency, North Sumatra
N F Pinem and R Rambey
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012016
The impact of fluctuation of the price of food commodity on inflation in North Sumatera Province
D J Irawati, R P Wibowo and S F Ayu
[+](#) View abstract [View article](#) [PDF](#)

OPEN ACCESS	012017
Economic analysis of using duckweed as feed supplement in the commercial rations of native chickens	
A Syampurnomo, Y Prayoga, M Sembiring, D Fajar, R Rosaldi, R Ginting, A Pratama, U Sayed, J Ginting and Y L Henuk	
+ View abstract	View article
PDF	
OPEN ACCESS	012018
Measuring technology sustainability status of local beef cattle under extensive rearing systems in the dryland area, Indonesia	
M M J Kapa, Hasnudi and Y L Henuk	
+ View abstract	View article
PDF	
OPEN ACCESS	012019
Is irrigated farm more efficient than non-irrigated no-tillage farm and non-irrigated conventional farm for a sample of Kansas corn farmer?	
R P Wibowo	
+ View abstract	View article
PDF	
OPEN ACCESS	012020
Climate Change Adaptation Strategies for In-field Conservation Practices by Irrigated Farm	
R P Wibowo	
+ View abstract	View article
PDF	
OPEN ACCESS	012021
Deficit irrigation for rice farming with production risk due to weather variability	
R P Wibowo, Sumono and T Rizaldi	
+ View abstract	View article
PDF	
OPEN ACCESS	012022
The Effect of Capital Expenditure and Gross Fixed Capital Formation on Income Disparity in West Coast Region of North Sumatera	
B Purba, R Masbar, I Maipita and A Jamal	
+ View abstract	View article
PDF	
OPEN ACCESS	012023
Concentration of beef market in East Nusa Tenggara (ENT) Province, Indonesia	
D R Nendissa, R Anindita, N Hanani, A W Muhaimin and Y L Henuk	
+ View abstract	View article
PDF	
OPEN ACCESS	012024
Indonesian tuna position in the international market	
M Khaliqi, T C Pane and R B M I Fatoni	
+ View abstract	View article
PDF	
OPEN ACCESS	

- The Implementation of government rice reserve policy: based on presidential instruction on rice policy 012025
S A Sembiring and P Sibuea
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012026
Supply chain analysis of papaya in Central Market, Medan Tuntungan Subdistrict, Medan City
S P Nasution, T Supriana and Z Lubis
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012027
Diversification of products derived from maize for the sustainable welfare of the people in Gorontalo province, Indonesia
A M Hasan, A Halid, L Ahmad, Hasdiana and R. Ilato
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012028
Comparing energy demand of densified briquettes of ground and unground hazelnut husks under compression loading
C Demirel, G A K Gurdil, A Kabutey and M Wasserbauer
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012029
A rating-curve method for determining debit for dry season in micro-scale watersheds
E Susanto, N Hatta and Sumono
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012030
Development of conceptual design and simulation of dapog system rice seed seedling machine for production scale
T Rizaldi, S Panggabean, P C Ayu and A O Jeremy
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012031
Design of filler and compactor for oyster mushroom growing medium (baglog)
T Rizaldi, Raju and M R Piliang
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012032
Design of curcuma chips dryer by utilizing the waste heat of commercial refrigerator condenser
S Panggabean, D M Sibarani, R Sigalingging and A Rindang
[+](#) View abstract [View article](#) [PDF](#)

-
- OPEN ACCESS** 012033
Repetitive loading of unroasted bulk palm kernels using UCTM for analysing optimum percentage kernel oil recovery and energy demand
A Kabutey, D Herak, A Brunerova and R Sigalingging
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012034
Model of Mechanization Implementation on the Handling of Oil Palm Fronds (OPF) Waste into Compost and Mulch in Aceh Province, Indonesia
R Bulan, Raju, Safrizal, M Yasar and A Sitorus
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012035
Application of elementary hydrology model for the assesment of watershed health at Progo Hulu watershed
D L S Nasution, S Susanto and A Sadeli
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012036
Effect of Packaging Fillers Materials on the Quality of Papaya Fruit (*Carica papaya* L.)
R Sigalingging, H A Nasution, A Rindang and P C Ayu
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012037
Drying characteristic of unhulled rice in biomass energy and combination rotary dryer
A Rindang, S Panggabean, A Sukoco and P C Ayu
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012038
Utilization of solar power as DC water pump movement in hydroponic plants
R Sigalingging and P Honora
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012039
Effect of bamboo strand length on oriented strand board
A H Iswanto, M Idris and T Sucipto
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012040
Oil Palm Water Balance; a tools for Analysing Oil Palm Water Footprint and Root Water Uptake Distribution in Root Zone
L Safitri, Hermantoro, S Purboseno, V Kautsar, S K Saptomo and A Ardiyanto
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012041

Crop coefficient and water requirement for oil palm (*Elaeis guineensis* Jacq.) on the nursery based on radiation evaporation method

N Ichwan, A M Fajra, S M Marbun and Sumono

[+](#) [View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012042

Study on the convective drying of potato cube

N D M Romauli and H Ambarita

[+](#) [View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012043

Experimental study on candleberry shell and areca palm fibre as a solid fuel for boiler

A Saragih, T Sitepu, N D M Romauli and H Ambarita

[+](#) [View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012044

Content of fibre fraction complete feed silage based waste corn (*Zea mays*) in the fermentation process with local microorganism "Probiotic MOIYL"

E S Yanti, Y L Henuk, J Ginting, Yunilas, M Tafsini and Hamdan

[+](#) [View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012045

Potency and strategy of cattle development based on feed resources in Tanjungbalai North Sumatera Regency

Muslim, M Tafsini and S Umar

[+](#) [View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012046

Physical, chemical and in vitro digestibility quality of oil palm midrib fermented by *Phanerochaete chrysosporium*

K C Desnamrina, M Tafsini and N D Hanafi

[+](#) [View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012047

Effect of bio activator use on corn cobs as a complete feed on performance and digestibility of local sheep

Arwinsyah, M Tafsini and Yunilas

[+](#) [View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012048

Farmer's decision in selecting the bull semen for artificial insemination in Central Java

R Agustine, S Bintara, S Andarwati, T S M Widi and A R S Putra

[+](#) [View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012049

The effect of giving mannan extract from palm kernel cake to pathology and histopathology liver and intestine chicken which infected by *Salmonella thypimurium*

T J Adawiyah, M Tafsir, N D Hanafi and T V Sari

[+](#) View abstract [View article](#) [PDF](#)

OPEN ACCESS

012050

Nutrient quality of oil palm frond fermented by local microorganism (MOL) with different dosage and incubation time

M Tafsir, N D Hanafi, Yunilas and R Mulianda

[+](#) View abstract [View article](#) [PDF](#)

OPEN ACCESS

012051

Effect of fasting time before slaughtering on body weight loss and carcass percentage of Bali cattle

H Hafid, Hasnudi, H A Bain, F Nasiru, Inderawati, P Patriani and S H Ananda

[+](#) View abstract [View article](#) [PDF](#)

OPEN ACCESS

012052

Implementation of palm kernel cake complete feed wafers based on weaning Ongole crossbreed

Y Sukaryana, Zairiful, Y Priabudiman and I Panjaitan

[+](#) View abstract [View article](#) [PDF](#)

OPEN ACCESS

012053

Biogas slurry application on *Sesbania grandiflora*: A microbial transportation to improve plant quality

Nurzainah Ginting, Hasnudi and Yunilas

[+](#) View abstract [View article](#) [PDF](#)

OPEN ACCESS

012054

Reproductive and morphological performances of stallions in District of Karo, North Sumatera, Indonesia

S L Ginting, Hamdan, Y L Henuk, R E Mirwandhono and T H Wahyuni

[+](#) View abstract [View article](#) [PDF](#)

OPEN ACCESS

012055

Carcass composition of fat tailed sheep at different slaughter weight

U Hasanah, Hasnudi, E Mirwandhono, N Ginting, P Patriani and M Baihaqi

[+](#) View abstract [View article](#) [PDF](#)

OPEN ACCESS

012056

The effect of fed maggot meal as a supplement in the commercial diets on the performance of finisher broiler chickens

S Y F G Dillak, N P F Suryatni, H T Handayani, S T Temu, H P Nastiti, D B Osa, R Ginting, Yunilas and Y L Henuk

[+](#) View abstract [View article](#) [PDF](#)

-
- OPEN ACCESS** 012057
Reproductive performance of buffalo-cows with various synchronization protocols in kampar regency of Riau province
Yendraliza, J Handoko and M Rodiallah
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012058
Growth performance of weaner rabbits fed dried *Moringa oleifera* leaf meal
D P Zendrato, R Ginting, Warisman, D J S Siregar, A Putra, I Sembiring, Hamdan, J Ginting and Y L Henuk
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012059
Spermatozoa separation method with different percoll composition on motility, abnormalities, and mortality of local goat sperm
P Patriani, Hasnudi, E Mirwandhono, Nurzainah Ginting and U Hasanah
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012060
Addition of andaliman to shelf life of beef nugget
Hasnudi, R E Mirwandhono and G A W Siregar
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012061
Causing factors of declining trend on samosir panorusan goat population as endangered species in Samosir Island
Nurzainah Ginting, A Manik, Hasnudi, N Ginting, D N Aulia, B O Marpaung, N V Rahman and U Hasanah
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012062
The effect of Panorusan Samosir goat characteristics on its selling price in Sub-district Pangururan, Samosir Regency
E Mirwandhono, A K Hakim, Nurzainah Ginting, I Sembiring, Yunilas, Hamdan and P Patriani
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012063
Synergism of cellulolytic bacteria in consortium as starter culture agent "MOIYL" for fiber feed
T H Wahyuni, Yunilas and Nurzainah Ginting
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012064
Chemical Composition of *Pennisetum purpureum* and *Panicum maximum* on Silvopastoral System in Jambula, Ternate, Indonesia
B Suwignyo, A Guntur, N Umami, R Utomo, P Suryanto and G Pawening
[+](#) View abstract [View article](#) [PDF](#)

-
- OPEN ACCESS** 012065
Effect of various feed additives administration on performance and hematological parameters of local chickens (*Gallus domesticus*)
Samadi, M Delima and Herawati
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012066
Physicochemical and organoleptic characteristics of Aceh Beef and brahman cross beef in cold temperature storage of 4°C
M Firdaus, Hasnudi and H Rusmalirin
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012067
The durability of OSB composite plywood with avocado, mahogany, and pine wood veneers against drywood and subterranean termites
T D Cahyono, H Yanti, M Y Massijaya, A H Iswanto and M R Uluputty
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012068
Diversity of plant community at Gunung Ledang, Malaysia
O Onrizal, S N Ismail and M Mansor
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012069
Diversity of understorey at Singkil Swamp Wildlife Reserve
O Onrizal
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012070
Study of the biogas technology adoption as a livestock waste management among smallholder farmers in Indonesia
A R S Putra, T G Czekaj and M Lund
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012071
Community's characteristics and participation in the urban parks' preservation in Makassar, Indonesia
S Rahbiah, Nurliani and Irmayani
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012072
The role of forest restoration in conserving mangrove plant at the eastern coast of North Sumatra
O Onrizal, R Amelia, M Arif, R Agustini, K Amri, G N Simamora, J M Saragih, R K Saragih, N Sulistiyono and M Mansor
[+](#) View abstract [View article](#) [PDF](#)

-
- OPEN ACCESS** 012073
Mapping of actual and potential land suitability for oil palm in several land unit using geographic information system
Rahmawaty, A Rauf and S Frastika
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012074
Effect of zeolite, volcanic sand and sea water on bulk density of peat soil and growth of rice
Sarifuddin
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012075
Profiles of temperature, salinity, dissolved oxygen, and pH in Tidal Lakes
R Leidonald, A Muhtadi, I Lesmana, Z A Harahap and A Rahmadya
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012076
Productivity of oyster mushrooms (*Pleurotus ostreatus*) on media corncobs mixed with sawdust
R Rambey, I D B Sitepu and E B M Siregar
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012077
Layer interaction adsorption isotherms model of mango seed as biosorbent in reducing free fatty acid and peroxyde value in crude palm oil refining
S Pandia, A Setiawan, N Sanjaya and B Haryanto
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012078
Model distribution of poisonous plants as conservation biopesticides sources in Batang Gadis National Park, Mandailing Natal, North Sumatera
Y Afifuddin, P Patana, J Rangkuti, P Pulungan and S Lubis
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012079
The effect of glue spreads and adhesive type on quality of laminated board from oil palm trunk
R Hartono, A H Iswanto, T Sucipto, T D Cahyono, W Dwianto and T Darmawan
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012080
The diversity of tree species as feed sources of Sumatran orangutan in Bukit Lawang of Gunung Leuser National Park
O Onrizal and N L Auliah

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012081

Environmental performance, voluntary disclosure, and corporate value

R B Bukit and Nurlaila

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012082

Preferences of Sumatran orangutan nesting tree at Bukit Lawang Forests of Gunung Leuser National Park

O Onrizal and M Bahar

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012083

Soil respiration and microbial population in tropical peat under oil palm plantation

S F Batubara, F Agus, A Rauf and D Elfiati

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012084

Effect of ratio of andaliman (*Zanthoxylum acanthopodium*) with garlic and aging time on the quality of sambal tuk tuk

M Sonangda, H Sinaga and L N Limbong

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012085

Organoleptic properties of functional powdered drink products based on palm sugar

I S Rianse, U Rianse, S Wahyuni, W Gusmiarty, RH F Faradilla, Zulfikar, W K Baka, Tamrin, K Fatmala, Sarbia, Nofiana, K Astuti, Erawati and A Ramadhan

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012086

The effectiveness of lactic acid bacteria level on syneresis and acidity of fermented milk added carrot (*Daucus carota* L) porridge

Yurliasni, Z Hanum and R Jannah

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012087

The utilization of nutmeg seed (*Myristica fragrans* Houtt) extract as an antimicrobial on tempeh sausage

K A Panggabean, H Rusmarilin and D Suryanto

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012088

Modified cassava flour (MOCAF) content of cassava (*Manihot esculenta* CRANTZ) in North Sumatera

E H Kardhinata, E Purba, D Suryanto and H Rusmarilin

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012089

Aloe vera and lemon juice capability in decreasing formaldehyde content in tofu sumedang with cold storing

C Daniela, H Rusmarilin and H Sinaga

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012090

Effect of pre-treatment in the making of purple-fleshed sweet potato flour towards cake characteristics

K Chuango, E Julianti and S Ginting

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012091

A comparison studies on the chemical characteristics of pumpkin seed oil with extra virgin olive oil and palm olein

N A Agustina, J Elisabeth and E Julianti

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012092

The effect of pre-treatment in orange-fleshed sweet potato (OFSP) flour manufacturing process on cake's quality

S Azzahra, E Julianti and T Karo-Karo

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012093

The influence of solid and liquid palate cleansers toward the neutralization effectiveness of chili's spicy sensation

K Fibrianto, K Nurdiani, N T Puanda and E S Wulandari

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012094

Glycerolysis-interesterification of chicken-palm stearin blend: effect of solvent and chicken stearin to palm stearin ratio

D A Sari, D S Ningsih, B P Nusantoro, W Setyaningsih and C Hidayat

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012095

Effect of pre-treatment in the production of purple-fleshed sweet potato flour on cookies quality

Z Ulfa, E Julianti and M Nurminah

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012096

Physicochemical characterization of water-soluble polysaccharide of *Pachyrhizus erosus* L. with fermentation assisted extraction method

H Rusmarilin and A Hilman

[+](#) View abstract [View article](#) [PDF](#)

OPEN ACCESS

012097

Potential of natural antioxidants of black cumin seed (*Nigella sativa*) and sesame seed (*Sesamum indicum*) extract by microencapsulation methods

H Rusmarilin, Z Lubis, L M Lubis and Y A P Barutu

[+](#) View abstract [View article](#) [PDF](#)

OPEN ACCESS

012098

The influence of coagulants and cooking period on the quality of *dali ni horbo*

M B Pratiwi, H Sinaga and E Julianti

[+](#) View abstract [View article](#) [PDF](#)

OPEN ACCESS

012099

The effect of addition of andaliman (*Zanthoxylum acanthopodium* DC) on the quality of andaliman condiment

E T Pa, H Sinaga and Ridwansyah

[+](#) View abstract [View article](#) [PDF](#)

OPEN ACCESS

012100

Formulation of instant porridge based on moringa leaves as a functional food for nursing mother

D Pranowo, S A Mustaniroh and A Ihwah

[+](#) View abstract [View article](#) [PDF](#)

OPEN ACCESS

012101

Phytochemical and antioxidant activity of gaharu leaf tea (*Aquilaria malaccensis* Lamk) as raw material of tea from middle Tapanuli Regency, North Sumatera Province

Surjanto, R Batubara, T I Hanum and W Pulungan

[+](#) View abstract [View article](#) [PDF](#)

OPEN ACCESS

012102

Diversity and habitat condition of Tor Fish (*Torspp.*) in the upstream of Wampu Waters, North Sumatra, Indonesia

Desrita, I S Tamba, A Muhtadi, J Ariyanti and R Leidonald

[+](#) View abstract [View article](#) [PDF](#)

OPEN ACCESS

012103

Proximate carcass composition with different CaHPO₄ and body conformation of Red Tilapia

E Yusni

[+](#) View abstract [View article](#) [PDF](#)

-
- OPEN ACCESS** 012104
The gonad maturity level of Tor Fish (*Tor spp.*) in upstream Wampu Watershed Langkat Regency of North Sumatera
Desrita, J Ariyanti, A Muhtadi, I S Tamba, E Yusni, I Lesmana, O R Dhuha and E Santoso
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012105
Biodiversity flora and fauna in tropical tidal lake
R Leidonald, I Lesmana, A Muhtadi and Desrita
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012106
Developing detoxification and purification technologies of ponds with pesticide residue for organic tiger shrimp farming development
M H Fattah and S Rahbiah
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012107
Community structure of echinoderms in seagrass ecosystem of Pandaratan Beach, Tapanuli Tengah Regency, North Sumatera
I E Susetya, S Wahyuni, A Fadhilah, Z A Harahap, E Yusni and S A Saridu
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012108
Biology and growth of Asiatic Hard Clam (*Meretrix meretrix*) population in Tanjung Balai, North Sumatera
Desrita, I E Susetya, M Suriani and A Rahman
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012109
Elasmobranch catch composition of North Sumatera Fishers
A Fadhilah, I E Susetya and B M Simeon
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012110
Identification of ectoparasites in Fry Tilapia (*Oreochromis Niloticus*) in Aquaculture Pond
E Yusni and N Rambe
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012111
Characteristics of surimi gelfrom *Oreochromis mossambicus* in different aquaculture areas
R A Kurniasih, Y S Darmanto and V E Herawati
[+](#) View abstract [View article](#) [PDF](#)

-
- OPEN ACCESS** 012112
CPUE analysis of skipjack tuna (*Katsuwonus pelamis*) at the Sibolga Nusantara Fishery Port
A Fadhilah, A Pulungan, Y Soemaryono, E Yusni and A F Dewinta
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012113
Relationship between coral reef ecosystem and coral fish communities in Unggeh Island Central Tapanuli Regency
Z A Harahap, Y H Gea and I E Susetya
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012114
Assessment of one-year mangrove reforestation using *Rhizophora apiculata* seedlings in Lubuk Kertang village, North Sumatra
M Basyuni, A Al Habib, B Slamet, N Sulistiyono, L A P Putri, Y Bimantara, E Yusraini and I Lesmana
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012115
Introducing of a silvofishery pond on sapling and seedling density based in Lubuk Kertang Village, North Sumatera
M Basyuni, K S Nasution, B Slamet, N Sulistiyono, Y Bimantara, L A P Putri, E Yusraini, R Hayati and I Lesmana
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012116
Land suitability evaluation for oil palm plantations (*Elaeisguenensis* jacq) on Sitellu Tali Urang Julu, Pakpak Bharat District
F S Harahap, R Sitompul, A Rauf, Rahmawaty, D E Harahap and H Walida
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012117
The evaluation of soil chemistry and soil physic on understudied of camphor trees (*Dryobalanops aromatica* Colebr)
H Prasetyo, A Rauf, T Sabrina, B Hidayat and F S Harahap
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012118
Screening for disease resistance in rice varieties against bacterial panicle blight disease (*Burkholderia glumae*) in Northern Sumatra of Indonesia
Weny, I Safni, Lisnawita and K Lubis
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012119
Suppression of Fusarium wilt of banana with an application of *Trichoderma asperellum* inoculants
N A Izzati M Z, S S Maryam S A R and N Azwady A A

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012120

Phenotypic and genotypic correlation among taste attributes and weight of green bean in Arabica coffee (*Coffea arabica* L.)

S Malau

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012121

Exploration and identification of aren plant (*Arengapinnatamerr*) in district of South Tapanuli

M Khairiyah and P Harahap

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012122

The radio sensitivity of mature callus and selection of irradiated 40 Gy lamtoro (*Leucaena leucocephala*) callus on acid stress through tissue culture

P D M H Karti, S J Manpaki and I Prihantoro

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012123

Partial isolation of distal promoter sequence of the *NPR1* gene from local chilli Pepper [*Capsicum annum* L.] genotype berangkai

M Oktavioni, IA Candra, B Nova, L Syukrini, A Asben and J Jamsari

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012124

Effect of salinity on spore germination, hyphal length and root colonization of the Arbuscular Mycorrhizal Fungi

Delvian and R Rambey

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012125

Identification of the Morphophysiological Characteristics of Cassava (*Manihot esculenta* Crantz) Based on Altitude

A Setiawan, Rosmayati and N Rahmawati

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012126

Rattan root morphology under different inorganic nitrogen fertilization

L I Bangkele, M Basir-cyio, A Tjoa and A T Tellu

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012127

Sequence approach of *Elaeis guineensis* for early detection of *Ganoderma boninense* resistance

OPEN ACCESS

012128

Appearance of Agronomic Characters and Genetic Parameters Estimation on M₃ Population of Roselle [*Hibiscus sabdariffa* L.]

D S Hanafiah, G Rakasiwi, M Fahreza, Rosmayati, L A M Siregar and Meiriani

OPEN ACCESS

012129

Growth response and N uptake of two soybean varieties on inoculation of *Bradyrhizobium* sp. in Ultisol Binjai, Sumatera Utara

I N Selvia, A Sahar and Y Hasanah

OPEN ACCESS

012130

The effects of potassium, nitrogen and straw compost giving to increase organic material levels and k-exchangeable rice fields and rice growth

S Aminah, H Hanum and Sarifuddin

OPEN ACCESS

012131

Response of tomato (*Lycopersicon esculentum* Mill) infected by *Phytophthora infestans* (Mont.) De Bary with the treatment of copper and potassium phosphate on plant development

Astini, Lisnawita and H Hanum

OPEN ACCESS

012132

Rice husk biochar application and the planting times effects on dry weight and water use efficiency of upland rice varieties

S Mayly, A Rauf, C Hanum and H Hanum

OPEN ACCESS

012133

Bacillus stratosphericus from *Oryctes rhinoceros* larvae as decomposer of oil palm empty fruit bunches

Marheni

OPEN ACCESS

012134

The effect of giving electric field to the metabolism of andaliman (*Zanthoxylum acanthopodium* DC) seeds which contributes to accelerating germination

S E Panggabean, W Kamson, A P Simanjuntak and N Rahmawati

OPEN ACCESS

- Resistance test of several sweet potato genotypes against sweetpotato weevil *Cylas formicarius* Fabricus (Coleoptera: Curculionidae) in the lowlands 012135
F Syahnas, D Bakti, L Lubis, Rosmayati and N Rahmawati
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012136
In vitro test of endophytic antagonist activity for *Colletotrichum gloeosporioides*, causal agent of antracnose in cocoa
A Khaeruni, M Zulkifli, T Wijayanto, G A K Sutariati, L O S Bande and R Arini
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012137
Spodoptera litura as a main pest in oil palm peat plantation
D Bakti, M D S Saragih, I Safni and S H Pasaribu
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012138
Insect management with refugia plant in upland rice (*Oryza sativa* L.)
Sutriyono, E Purba and Marheni
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012139
Growth pattern of fifteen upland rice varieties in shading stress
Khairunnisa, Rosmayati and C Hanum
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012140
The influence of attractant from coffee bean and outer skin of coffee to imago of coffee berry borer *Hypothenemus hampei* Ferr. (Coleoptera: Curculionidae) on the field
N Ramli, M C Tobing and D Bakti
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012141
Transmission of virus by whitefly *Bemisia tabaci* from dutch eggplant *Solanum betaceum* cav. for cucurbitaceae plants in greenhouse
R Sirait, M I Pinem and Hasanuddin
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012142
Potential uses of Marine Bean (*Vigna marina* Burm.) as salt tolerant Legume in coastal salty land, Southeast Sulawesi, Indonesia
A Septiana and Analuddin
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012143

Growth and production of soybean (*Glycine max* L. Merrill) varieties in response to waterlogging at vegetative (V₅) growth phase by application of gibberellic acid and salicylic acid

Calvin, R I Damanik and L A M Siregar

[+](#) View abstract [View article](#) [PDF](#)

OPEN ACCESS

012144

Seed biopriming with indigenous endophytic bacteria isolated from Wakatobi rocky soil to promote the growth of onion (*Allium ascalonicum* L.)

G A K Sutariati, A Khaeruni, Muhidin, A Madiki, TC Rakian, L Mudi and N Fadillah

[+](#) View abstract [View article](#) [PDF](#)

OPEN ACCESS

012145

Growth performance of two superior line of local upland rice (*Oryza sativa* L.) from SE Sulawesi on the low light intensity

G R Sadimantara, T Alawyah, N W S Suliartini, E Febrianti and Muhidin

[+](#) View abstract [View article](#) [PDF](#)

OPEN ACCESS

012146

The effectiveness of cover crop and rhizobacteria as amelioration on ex-nickel mine soil southeast Sulawesi

S Leomo, M Tufaila, R Adawiyah, T C Rakian, Muhidin, S Alam, L Mudi and G A K Sutariati

[+](#) View abstract [View article](#) [PDF](#)

OPEN ACCESS

012147

Morphological characters and N uptake of Mint (*Mentha piperita*) with the growing media composition treatment

Y Hasanah, F E Sitepu and R R Butar Butar

[+](#) View abstract [View article](#) [PDF](#)

OPEN ACCESS

012148

Online library database from national center for information on biotechnology (NCBI) regarding *Ganoderma boninense*

R Hayati, M Basyuni, D Chalil and Y Bimantara

[+](#) View abstract [View article](#) [PDF](#)

OPEN ACCESS

012149

Utilization of *Trichoderma viride* as organic fertilizer to induce the resistance of banana seeds on *Fusarium oxysporum* f.sp *cubense* (FOC)

S H Wahyuni and D P Y Nasution

[+](#) View abstract [View article](#) [PDF](#)

OPEN ACCESS

012150

Analysis of changes in morphological characteristics of leaves and stems in some sweet potato cultivars (*Ipomoea batatas* L.) from Simalungun and Dairi highlands planting in the lowlands

M Irwan, Rosmayati, D S Hanafiah, N Rahmawati and D Bakti

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012151

Changes in some characters of soybean leaves inoculated with mycorrhiza in salinity stress

N Rahmawati, Rosmayati, Delvian and M Basyuni

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012152

Growth and production responses of local sweet potatoes (*Ipomoea batatas* L.) genotypes on paddy straw biochar application in the paddy fields

M Y Andika, N Rahmawati and F E T Sitepu

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012153

Effect of benzyl amino purin (BAP) and gibberellin acid (GA₃) to chlorophyll and antioxidant enzymes of soybean (*Glycine max* (L) Merrill.) genotypes in response to inundation conditions

R I Damanik, L D Lumbangaol, N Rahmawaty and R Sipayung

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012154

Normal distribution of agronomic characters and plant heritability of soybean F2 population hybridization between salt resistance genotype and Anjasmoro variety

N Rahmawati, Rosmayati and R P Astari

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012155

Evaluation of land suitability on arabica coffee plantation by parametric method in Lintongnihuta District

P Marbun, Z Nasution, H Hanum and A Karim

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012156

The growth and yield of sweet corn (*Zea mays saccharata* Sturt.) with anorganic and organo-bio fertilizer

R R Lahay, R Sipayung and T Sabrina

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012157

The effect of nitrogen fertilizer, zeolite and fresh straw to increase total-N, cation exchange capacity (CEC) of rice crop

R Wulandari, H Hanum and Y Hasanah

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

Composition and structure community of arthropods in organic and conventional arabica coffee plantation 012158

Husni, Jauharlina and Saifullah

[+](#) View abstract [View article](#) [PDF](#)

OPEN ACCESS 012159

Application of phosphate solubilizing fungi and various sources of P-Fertilizers toward P-Available and P Nutrient content of soybean (*Glycine max* L. Merrill) in andisol soil

N Silitonga, M Sembiring, P Marbun and Rosneli

[+](#) View abstract [View article](#) [PDF](#)

OPEN ACCESS 012160

The effect of phosphate solubilizing microbes and chicken manure in increasing the P availability and growth of Green Beans (*Phaseolus radiatus* L.) on Andisol

S R Siswana, M Sembiring, H Hanum and Rosneli

[+](#) View abstract [View article](#) [PDF](#)

OPEN ACCESS 012161

The use of polyethylene glycol as simulating media of drought stress on viability of seeds varieties of Cacao (*Theobroma Cacao* L.) on germination stadia

R Yuningsih, L A M Siregar and R I M Damanik

[+](#) View abstract [View article](#) [PDF](#)

OPEN ACCESS 012162

Choosing plus tree of Salagundi (*Roudholia teysmanii*) at Salib Kasih Tourism Area

K S Hartini and B Ompusunggu

[+](#) View abstract [View article](#) [PDF](#)

OPEN ACCESS 012163

The efficacy indaziflam on weed seedbank vertically on the ultisol soil on palm oil plantations

P K Tampubolon, E Purba and Mukhlis

[+](#) View abstract [View article](#) [PDF](#)

OPEN ACCESS 012164

Seed morphology and germination of Macadamia (*Macadamia integrifolia*) from North Sumatra

A Susilowati, Y S Kusuma and C R Kholibrina

[+](#) View abstract [View article](#) [PDF](#)

OPEN ACCESS 012165

Chlorophyll content and stomatal density of soybean varieties on technological packages application under dry land conditions

Y Hasanah, H Hanum and A S Hidayat

[+](#) View abstract [View article](#) [PDF](#)

-
- OPEN ACCESS** 012166
The increasing of phosphorus availability and corn growth (*Zea mays* L.) With the application of phosphate solubilizing microbes and some sources of organic materials on andisol
Masdariah, M Sembiring, Mukhlis and Rosneli
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012167
Performance of some populations of maize (*Zea mays* L.) on peat soil applied *Sludge* and ash of oil palm
K Lubis, S S Siddik and H Setiado
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012168
Changes in biochemical characteristics in shade soybean plants
L Mawarni, T Nisa and Karyudi
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012169
Relationship pattern and morphological characterization of brown rice in Munte and Payung Subdistrict, Karo
E S Bayu, W Winarti and R I M Damanik
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012170
Growth and yield of Tomato (*Lycopersicum esculantum* Mill.) as influenced by the combination of liquid organic fertilizer concentration and branch pruning
L M Mooy, A Hasan and R Onsili
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012171
National Center for Biotechnology Information (NCBI) database search for rubber plant *Hevea brasiliensis*
M Basyuni, R Hayati, B Pratomo and Lisnawita
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012172
Sequence analysis of *Ganoderma boninense* isolates from oil palm
A Purba, M Basyuni, L A P Putri, D Chalil, R Hayati, D Arifiyanto and I Syahputra
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012173
Germination seed of cacao (*Theobroma cacao* L.) on some osmotic solutions
Haryati
[+](#) View abstract [View article](#) [PDF](#)

-
- OPEN ACCESS** 012174
Effect of trichoderma and organic fertilizers on vegetatif growth of black Pepper (*Piper nigrum* L.) under field condition
N Syam, A Boceng, N Jufri and Suharman
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012175
Characterizing the vegetative and fruit of local dwarf banana cavendish from SE Sulawesi
Muhidin, G R Sadimantara, S Leomo, D N Yusuf and T C Rakian
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012176
Effect of soil tillage methods and cattle fertilizer of cow on increasing sweet corn (*Zea mays saccharate sturt*) production
J Ginting
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012177
Effect of liquid organic fertilizer on the rice varieties field production
J Ginting
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012178
Flower morphology and inflorescence of Andaliman (*Zanthoxylum acanthopodium* DC.) from Dairi, North Sumatera
B L Siregar, L A M Siregar, T C Nisa and L A P Putri
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012179
Application of fertilizer type and dosage toward brown planthopper (*Nilaparvata lugens* Stall.) attack level on several paddy (*Oryza sativa* L.) varieties
A B Tarigan, Marheni and J Ginting
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012180
Effect of K-carrageenan concentration on physical and Mechanical properties of vegetable leather based on *kelor* leaves (*Moringa oleifera* L.)
S Wahyuni, Holilah, Asranudin, M I K Rianse and M S Sadimantara
[+](#) View abstract [View article](#) [PDF](#)
-
- OPEN ACCESS** 012181
The effect of sulfur and *Rhizobium sp* application to the growth and nodulation of *Mucuna bracteata*
M Wahyuni, M Sembiring, Wagino and H G Sihite
[+](#) View abstract [View article](#) [PDF](#)

OPEN ACCESS

012182

Provision of micoriza arbuscula in some types of grass to the degree of infection and phosporus uptake

E Kurniawati, N Diana and Delvian

[+ View abstract](#)

[View article](#)

[PDF](#)

OPEN ACCESS

012183

Palm oil plantation oriented agrosilvopastoral system development for enhancing the economy

C Hanum

[+ View abstract](#)

[View article](#)

[PDF](#)

JOURNAL LINKS

[Journal home](#)

[Information for organizers](#)

[Information for authors](#)

[Search for published proceedings](#)

[Contact us](#)

[Reprint services from Curran Associates](#)





PAPER • OPEN ACCESS

Diversification of products derived from maize for the sustainable welfare of the people in Gorontalo province, Indonesia

A M Hasan¹, A Halid², L Ahmad², Hasdiana³ and R. Ilato⁴

Published under licence by IOP Publishing Ltd

IOP Conference Series: Earth and Environmental Science, Volume 260, conference 1

animhasan@ung.ac.id

¹ Department of Biology, Faculty of Mathematics and Natural Sciences, Universitas Negeri Gorontalo, Indonesia

² Majoring in agribusiness, Faculty of Agriculture, Universitas Negeri Gorontalo, Indonesia

³ Department of Agricultural Technology, Faculty of Agriculture, Universitas Negeri Gorontalo, Indonesia

⁴ Faculty of Engineering, Universitas Negeri Gorontalo, Indonesia

Department of Administration and Public Policy, Faculty of Economy and business Universitas Negeri Gorontalo, Indonesia

A M Hasan *et al* 2019 *IOP Conf. Ser.: Earth Environ. Sci.* **260** 012027

<https://doi.org/10.1088/1755-1315/260/1/012027>

Buy this article in print

Abstract

Processing industry contribution in each commodity can add value for forward linkages and backward linkages. The economic condition of Gorontalo province is as follow: contribution of regional GDP in education service is 9%, financial and insurance services' contribution is 8%, and agricultural sector's contribution is 4%. This shows an economic growth anomaly, where the agricultural sector as a leading sector has yet significantly

contributed toward the gross regional domestic product of Gorontalo province. Our gross regional domestic product per capita is only IDR. 9,544,583 with 17.30% of poor population workforce productivity are in the 30th rank. Maize is a commodity potential to be developed into various derivative products with high economic value. This study is expected to contribute to the local government in increasing the competitive advantages and economic motor for the community in the region, as well as contribute to the private sector in developing various derivative products from maize commodity. This study uses quantitative descriptive method which constitute of desk study and secondary data analysis, workshop, and meeting with related stakeholders, development of study design for value chain actors, presentation, and result discussion to formulate the master plan and development model for various maize commodity products.

Export citation and abstract

[BibTeX](#)

[RIS](#)



Content from this work may be used under the terms of the Creative Commons Attribution 3.0 licence. Any further distribution of this work must maintain attribution to the author(s) and the title of the work, journal citation and DOI.

References

- [1] Fadel M 2012 Indonesia efforts towards the leading of maize agribusiness and agroindustry in the world by 2025 Int. Maize Conf (Gorontalo) available at <http://pangan.litbang.pertanian.go.id/files/IMC-PDF/02-FadelMuhamad.pdf>
Google Scholar
- [2] Hasan A M 2011 *Aktualisasi Program Pemberdayaan Masyarakat Pedesaan Guna Peningkatan Pertumbuhan Ekonomi Daerah Dalam Rangka Ketahanan Nasional [Actualization of Rural Community Empowerment Programs to Increase Regional Economic Growth in the Framework of National Resilience] [Research report]* (Gorontalo,Indonesia: UNG)
Google Scholar
- [3] Ahmad L 2011 *Analisis sifat Fisiokimia dan Respon Konsumen terhadap Tepung Pudding Instan Hasil Formula Siteping Jagung dan Karagenan [Physicochemical Analysis and Consumer Response to Instant Pudding Flour from Corn and Carrageenan Formula Results] [Research report]* (Gorontalo,Indonesia: UNG)
Google Scholar

- [4] Halid and Amir 2010 *Dampak Agropolitan Jagung Terhadap Penurunan Angka Kemiskinan di Kabupaten Gorontalo [Impact of Agropolitan Corn on Decreasing Poverty in Gorontalo District] [Research report]* (Gorontalo,Indonesia: UNG)
Google Scholar
- [5] Hasan A M, Ilato R, Halid A and Ahmad L 2016 Farmer empowerment through processing of maize and each waste in to productive economic commodity in Boalemo Regency of Gorontalo *IJOARBMA* **1** 53-64
Google Scholar
- [6] Halid A 2014 *Pengembangan Profitabilitas Jagung [Development of Corn Profitability]* (Gorontalo, Indonesia: Idaes Publishing)
Google Scholar
- [7] Ilato R and Bahua M I 2013 *Analisis Rantai Nilai Komoditas Jagung serta Strategi Peningkatan Pendapatan Petani Jagung di Propinsi Gorontalo [Corn Commodity Value Chain Analysis and Strategy to Increase Corn Farmers' Revenues in Gorontalo Province] [Research report]* (Gorontalo,Indonesia: Universitas Negeri Gorontalo) available at <http://repository.ung.ac.id/riset/show/2/989/analisis-rantai-nilai-komoditas-jagung-serta-strategi-peningkatan-pendapatanpetani-jagung-di-provinsi-gorontalo.html>
Google Scholar

Export references:

[BibTeX](#)

[RIS](#)



PAPER • OPEN ACCESS

Diversification of products derived from maize for the sustainable welfare of the people in Gorontalo province, Indonesia

To cite this article: A M Hasan *et al* 2019 *IOP Conf. Ser.: Earth Environ. Sci.* **260** 012027

View the [article online](#) for updates and enhancements.

Diversification of products derived from maize for the sustainable welfare of the people in Gorontalo province, Indonesia

A M Hasan^{1*}, A Halid², L Ahmad³, Hasdiana⁴ and R Ilato⁵

¹ Department of Biology, Faculty of Mathematics and Natural Sciences, Universitas Negeri Gorontalo, Indonesia

² Majoring in agribusiness, Faculty of Agriculture, Universitas Negeri Gorontalo, Indonesia

³ Department of Agricultural Technology, Faculty of Agriculture, Universitas Negeri Gorontalo, Indonesia

⁴ Faculty of Engineering, Universitas Negeri Gorontalo, Indonesia

⁵ Department of Administration and Public Policy, Faculty of Economy and business Universitas Negeri Gorontalo, Indonesia

Email: *animhasan@ung.ac.id

Abstract. Processing industry contribution in each commodity can add value for forward linkages and backward linkages. The economic condition of Gorontalo province is as follow: contribution of regional GDP in education service is 9%, financial and insurance services' contribution is 8%, and agricultural sector's contribution is 4%. This shows an economic growth anomaly, where the agricultural sector as a leading sector has yet significantly contributed toward the gross regional domestic product of Gorontalo province. Our gross regional domestic product per capita is only IDR. 9,544,583 with 17.30% of poor population workforce productivity are in the 30th rank. Maize is a commodity potential to be developed into various derivative products with high economic value. This is study expected to contribute to the local government in increasing the competitive advantages and economic motor for the community in the region, as well as contribute to the private sector in developing various derivative products from maize commodity. This study uses quantitative descriptive method which constitute of desk study and secondary data analysis, workshop, and meeting with related stakeholders, development of study design for value chain actors, presentation, and result discussion to formulate the master plan and development model for various maize commodity products.

1. Introduction

The only way to win the tight competition today is by producing competitive advantage products. Economic welfare growth depends on the capacity to innovate, to produce sustainably high value-added products which cannot be easily imitated by others. This should be supported by the progressing target, implementation of appropriate technology, developing better quality products and better production process as the foundation for the regional even international economy in this modern era.

Agriculture sector plays significant role in the country's economic development, as Indonesia is an agricultural country. Economic development heavily relied on agricultural and agricultural-based



industry or agroindustry. Within the agribusiness system, agroindustry is one of the sub-systems which together with other sub-systems shaped the agribusiness. One of the efforts to develop the production from agricultural sector is by increasing the added value of its products. This can be done by linking the agriculture with industry/processing industry or services in economic sector [1, 2].

Gorontalo province is currently trying to boost its maize commodity, from cultivation to development of its processed products. The maize production in Gorontalo province increases by 7.58% in 2014 compared to the previous year which was only 719, 787 tons [3]. As the featured product from Gorontalo, the added value of maize into various processed products is needed through involvement of small and medium scale industries. Processing industries of agricultural product will increase the economic value of the products.

One of the popular agricultural product processing industries is corn-based processing industry. There are quite several small-scale corn-based processing industries, such as corn chips, corn flour, popcorn, corn crackers, and fried corn. This corn processing industry process locally produced corn with limited market coverage. In addition, there are also several large companies which produce the maize flour, corn-based noodle, and corn-based snacks such as corn flakes, tortilla chips, and popcorn [4, 5].

The result of economic development in Gorontalo compared to other six provinces in Sulawesi can be described as follow: 1) the gross regional domestic product is the smallest among six other provinces by 3.25% of the total gross regional domestic products of the six provinces combined, 2) the gross regional domestic product per capita based on the basic implemented pricing is only IDR. 9,562,694 compared to the average national which is 29.9 million rupiah and even among the smallest (PDRB Gorontalo Province, 2013), 3) the proportion of poor population is 17.30% to the total population (Gorontalo in Figures, 2013), 4) economic development is only 7.71%, the lowest among the six provinces; 5) productivity of workforce is only 0.513 (unproductive) even the percentage is the lowest among other 5 provinces in Sulawesi [6, 7].

The contribution of nine economic sectors toward the regional GDP of Gorontalo province is widely dominated by farming sector (food plants, horticulture, plantation, animal husbandry, fisheries) of 28.95%. Meanwhile, the contribution of the processing industry is among the smallest three by only 4.89%. Thus, this leading commodity's contribution toward the regional GDP needs to be maximized as well as increasing the income and welfare of the people. Here, the role of higher education through its empirical and scientific research is needed.

2. Method and Transfer of Technology Mechanism/Social intervention

2.1. Method

The method used in this study is quantitative descriptive method which encompasses desk study, secondary data analysis, workshop and meeting with related stakeholders, develop the design of the study for each value chain actor, field visit and in-depth interview, focus group discussion, presentation and findings discussion to formulate the master plan and the model for the development of corn commodity.

2.2. Institutionalization of industrialized strategy to build nation's character

The characteristics of industrialization or social intervention in an effort to strengthen and build character through this study are: 1) the existence of development of innovation and technology through acknowledgement of local culture, corn commodity, as hereditary job that has been passed down for generations among the people of Gorontalo, thus, it is often said as the cultural commodity, as there is a local variety of corn called *Motoko Kiki* (the best option for various corn-processing products); 2) maximum utilization of locally available resources based on the local wisdom in increasing the income and welfare of the people of Gorontalo province; 3) the characteristic of the developed industrialization or social intervention are the development and processing-industry for corn-based products in Gorontalo and Pohuwato regencies in partnership with regional and national industry based in Manado and Makassar; 4) the main component to be developed in this cluster is through diagnostic study to collect

the scattered knowledge and fragmented socio-economic condition of this cluster through development of the available potentials.

3. Results and Discussion

3.1. Cost analysis and break even point

3.1.1. *Cost and benefit calculation of corn chips production.* The chips are produced an average of 8 times a month, with 80 kgs of raw corn machine capacity, which produce 48 kg of products, divided into five types of packaging based on (package A price Rp. 1,800, package B price Rp. 5,000, package C price Rp. 10,000, package D price 18,500 and package E price is Rp. 75,000).

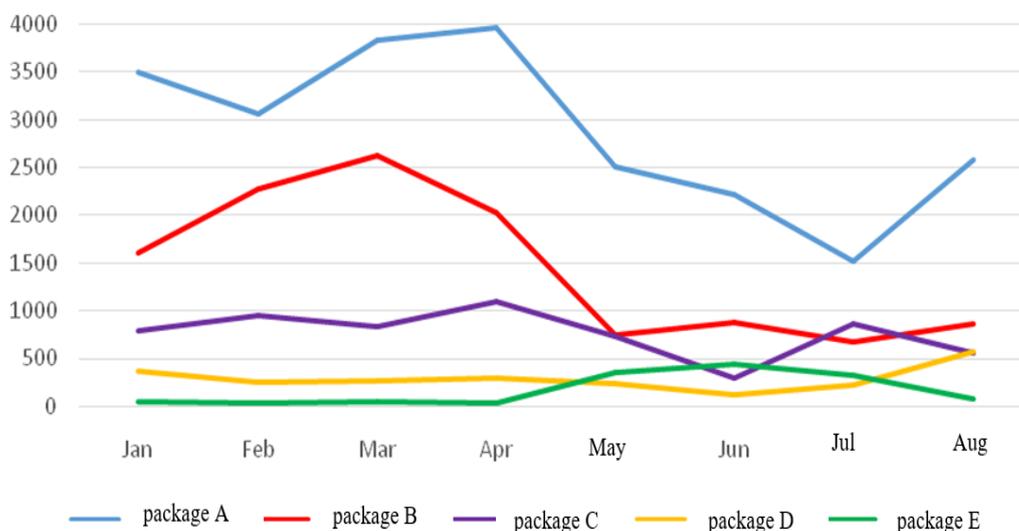


Figure 1. Corn Chips Sales based on types of package (2018)

Based on the graphic above, demand for package A is higher than other packages. The demand for this package reaches 4000 demands. This graphic also shows that demand for package E, the bottled package also increases in July, which may due to Id Al-Fitri, the highly celebrated festivity in the Islamic population.

This cost analysis shows that corn chips products sales increases on the first month of production, however, the demand significantly dropped on the third month (April). Several suspected factors for this decrease on demand are:

- Lack of labors.
- Product esthetic.
- Promotion.

Regardless to the described things above, this corn chips production has yield high profits. This can be seen in the detail of production cost and the BEP presented in Table 1. Further, to gain information on the profit and Break Even Point (BEP) for each packaging, the fixed cost and variable cost are calculated to see the profit for this sale, and on what month of the production process will gain profit and the BEP for each packaging of different price.

Table 1. Production cost, sales price and gross profit of the corn chips from January to August 2018

Month	Production cost	Sales price	Gross profit
January	18,466,744.00	32,739,200.00	14,272,456.00
February	18,867,400.00	33,230,900.00	14,363,500.00
March	21,107,202.00	36,769,400.00	15,662,198.00
April	20,925,688.00	36,385,900.00	15,460,212.00
May	21,628,328.00	49,969,800.00	28,341,472.00
June	20,770,981.00	42,975,400.00	22,204,419.00
July	19,551,148.00	43,311,900.00	23,760,752.00
August	15,993,138.00	30,285,600.00	14,292,462.00
TOTAL	157,310,629.00	305,668,100.00	148,357,471.00
Average	19,663,828.63	38,208,512.50	18,544,683.88

Table 2. Fixed Cost of Corn Chips

Type of cost	Unit	Total price	Total
BOX	6	175,000.00	
Storage Rack	4	1,950,000.00	
STEAMER	4	340,000.00	
STOVE	4	625,000.00	
COOLING RACK	4	1,000,000.00	
NAPKIN	12	15,000.00	
LIME STRAINER	1	10,000.00	
DUST STRAINER	4	10,000.00	
HAMMERMILL	1	29,350,000.00	
FRYING MACHINE	1	5,225,000.00	
OVEN	1	2,565,000.00	
SEALER MACHINE	1	8,100,000.00	
ADDITIONAL EQUIPMENT	1	2,000,000.00	
BUILDING	1	62,000,000.00	148,365,000.00

Table 3. Variable Cost of Corn Chips

Month	Production cost	Sales price	Gross profit
January	18,466,744.00	32,739,200.00	14,272,456.00
February	18,867,400.00	33,230,900.00	14,363,500.00
March	21,107,202.00	36,769,400.00	15,662,198.00
April	20,925,688.00	36,385,900.00	15,460,212.00
May	21,628,328.00	49,969,800.00	28,341,472.00
June	18,928,850.00	39,926,400.00	20,997,550.00
July	19,551,148.00	43,311,900.00	23,760,752.00
August	15,993,138.00	30,285,600.00	14,292,462.00
TOTAL	155,468,498.00	302,619,100.00	147,150,602.00
Average	19,433,562.25	37,827,387.50	18,393,825.25

From the production and sales data above, the average monthly production cost is 19,433,829 IDR with the sales price of 37,827,387 IDR. This result indicates that on the 9th month based on the production cost of the corn chips and its sales, the net profit will be of 18,393,825 IDR.

This calculation shows that during the production process of these corn chips, on the initial months, just like other industry, the profit has yet to be reached as it has to be deducted by production cost and other costs. Thus, the corn chips production will gain profit on its 9th month. In detail the profit calculation is presented in Table 4 below:

Table 4. Description of the gap between fixed cost and variable cost and sales price

1 st Month	FIX COST	148,365,000	
	VARIABLE COST	19,433,562	
		167,798,562	
	SALES PRICE	37,827,388	
		129,971,175	(-)
2 ND Month	FIX COST	129,971,175	
	VARIABLE COST	19,433,562	
		149,404,737	
	SALES PRICE	37,827,388	
		111,577,350	(-)
3 RD Month	FIX COST	111,577,350	
	VARIABLE COST	19,433,562	
		131,010,912	
	SALES PRICE	37,827,388	
		93,183,524	(-)
4 th Month	FIX COST	93,183,524	
	VARIABLE COST	19,433,562	
		112,617,087	
	SALES PRICE	37,827,388	
		74,789,699	(-)
5 th Month	FIX COST	74,789,699	
	VARIABLE COS	19,433,562	
		94,223,261	
	SALES PRICE	37,827,388	
		56,395,874	(-)
6 th Month	FIX COST	56,395,874	
	VARIABLE COST	19,433,562	
		75,829,436	
	SALES PRICE	37,827,388	
		38,002,049	(-)
7 th Month	FIX COST	38,002,049	
	VARIABLE COST	19,433,562	
		57,435,611	
	SALES PRICE	37,827,388	
		19,608,223	(-)
8 th Month	FIX COST	19,608,223	
	VARIABLE COST	19,433,562	
		39,041,786	
	SALES PRICE	37,827,388	
		1,214,398	(-)
9 th Month	FIX COST	1,214,398	
	VARIABLE COST	19,433,562	
		20,647,960	
	SALES PRICE	37,827,388	
		(17,179,427)	(+) profit

The gap between the fixed cost and variable cost with the sales price on the 9th month shows that the corn chips production process yields the benefit of 17,179,427 IDR. This means that the corn chips industry can increase the people's economy. The profit value on this 9th month can increase on the following months. This profit is obtained from the corn chips sales of various packages types. The Break Event Point (BEP) for each type of packaging is obtained in certain sales number. In detail the BEP for each packaging types of corn chips is presented in Table 5.

Table 5. Break Even Point (BEP) calculation of Corn chips for each packaging types

1.	1,800 IDR each package with the production cost of 1,638 IDR
BEP UNIT	FIXED COST
	Sales price – production cost
	915,833.33
	Unit or packages
2.	5,000 IDR each package with the production cost of 2,768 IDR
BEP UNIT	FIXED COST
	Sales price – production cost
	66,471.77
	Units or packages
3.	10,000 IDR each package with the production cost of 4,929 IDR
BEP UNIT	FIXED COST
	Sales price – production cost
	29,257.54
	Units or packages
4.	18,500 IDR each package with the production cost of 8,236 IDR
BEP UNIT	FIXED COST
	Sales price – production cost
	14,454.89
	Units or packages
5.	75,000 IDR each package with the production cost of 28,024 IDR
BEP UNIT	FIXED COST
	Sales price – production cost
	3,158.31
	Units or packages

From the BE P description for each unit of packaging above, it shows that the higher the sales price per unit package sold, the lower the number that should be sold to achieve the BEP. For instance, for the 1,800 IDR each unit, it needs 915,833 packages to attain the BEP value, whereas for the 75,000 IDR each unit, it only needs 3,158 packages to be sold to achieve BEP value. This should be considered that each package unit has their own consumers, hence this BEP value should be adjusted with the target market and production target.

3.1.2. Analysis of production cost correlation with the sales of corn chips product. Correlational analysis is carried out to investigate whether there is a correlation between the production test and the level of sales of these corn chips product. This test is administered using the Pearson *product moment* correlation test, where different annual financial data are used. This test is to ensure the significant correlation between production cost and sales of the corn chips product. The result of this test is presented in Table 6.

Table 6. Average value and Deviation Standard

Variables	Total	Average	Std. deviation
Production cost	36	8425112.97	3856708.430
Sales	36	7.1399	0.32043

The average value of production cost for corn chips product is compared against the deviation standard value. As seen in Table 6, the average value 8425112.97; whereas the standard deviation value is 3856708.430. This average value is higher than the standard deviation value, hence, it can be said that the data is appropriate to be analyzed. Similarly, the average value of sales variable is 7.1399 with the standard deviation value of 0.32043. The average value is larger than the deviation standard value, thus, worthy of analysis.

Table 7. Summary of the Correlational test result

	r-count ($t_{table} = \pm 1,975$)	Sig. (<i>p-value</i>)	Notes
Production cost* sales	0.775	0.000	Significant

The result of correlation test of the production cost and the sales yields the r-count of 0.775 with the significance level of 0.000. The r-count 0.775 describes that there is a strong and positive correlation between the production cost and sales of corn chips product. This increase on corn chips production is also followed by the positive increase of sales. This is statistically proven that there is a significant correlation between production cost and sales, where the *p-value* 0.000 is smaller than alpha 0.05. Therefore, it also indicates that the production cost of corn chips also influences the increase of sales of the product, and impacts on the increase of income. This result indicates that production cost and the sales of the corn chips are promising for the community to utilize this corn commodity and turn it into corn chips. The corn commodity as the leading commodity in Gorontalo can be utilized into corn chips, which have been done by these small-scale industries to increase their economic welfare.

3.1.3. *Normality data test of the production cost and sales variables of corn chips.* Normality test is to test whether data or the investigated variables or the developed model has normal or abnormal distribution. In linear correlation, the data distribution is expected to have to have normal distribution. The normality test is conducted using the *Kolmogorov-Smirnov* test, where the test is carried out and proven with the *asymptotic significance*. *Asymptotic significance* value which larger than 0.05, shows that the variables or observed data have normal distribution, and vice versa. The *Kolmogorov-Smirnov* test result is presented in Table 8 below.

Table 8. The result of data normality test

Variables	<i>Asymptotic Sig.</i>	Alpha (α)	Notes
Production cost	0.200	0.05	Normal
Sales	0.200		Normal

Table 10 above shows that the *asymptotic significance* value of production cost and marketing is more than alpha 0.05 (> 5%). Therefore, it can be said that the variables used in correlation model meet the normal assumption and appropriate to be used.

3.1.4. *Linearity test of production test variable and sales price of corn chips product.* The linearity test is conducted to see whether there is a linear correlation pattern between the variable or insignificant. The test is carried out using the *Test for Linearity* with the significance level of 0.05. Two variables can be said to have linear correlation when the significance level is less than 0.05. the linearity test of the variable is shown in Table 9 below.

Table 9. Linearity test of the variable

	<i>Linearity</i>		Alpha (α)	Notes
Production cost * sales price	0.000	<	0.05	Linier

From Table 9 above on the linearity test result above, it is known that the significance value on the linearity is 0.000. The significance value of test for linearity is smaller than the alpha value (0.000 < 0.05). Therefore, it can be concluded that there is a linearity correlation between the production cost and sales price.

3.1.5. Correlation analysis

Table 10. Correlations

		Production cost	Log_ sales price
Production cost	Pearson Correlation	1	.775**
	Sig. (2-tailed)		.000
	N	36	36
Log_ Sales price	Pearson Correlation	.775**	1
	Sig. (2-tailed)	.000	
	N	36	36

** . Correlation is significant at the 0.01 level (2-tailed).

4. Conclusions

The conclusion of this study are benefit of chips very depending on the type of packaging; the advantages of chips are increasingly increasing; based on the results of the organoleptic test seen from the aroma, taste, texture and the most preferred color is Balado.

References

- [1] Fadel M 2012 Indonesia efforts towards the leading of maize agribusiness and agroindustry in the world by 2025 *Int. Maize Conf (Gorontalo)* available at <http://pangan.litbang.pertanian.go.id/files/IMC-PDF/02-FadelMuhamad.pdf>
- [2] Hasan A M, 2011 *Aktualisasi Program Pemberdayaan Masyarakat Pedesaan Guna Peningkatan Pertumbuhan Ekonomi Daerah Dalam Rangka Ketahanan Nasional [Actualization of Rural Community Empowerment Programs to Increase Regional Economic Growth in the Framework of National Resilience]* [Research report] (Gorontalo,Indonesia: UNG)
- [3] Ahmad L 2011 *Analisis sifat Fisiokimia dan Respon Konsumen terhadap Tepung Pudding Instan Hasil Formula Sitemap Jagung dan Karagenan [Physicochemical Analysis and Consumer Response to Instant Pudding Flour from Corn and Carrageenan Formula Results]* [Research report] (Gorontalo,Indonesia: UNG)
- [4] Halid, Amir. 2010. *Dampak Agropolitan Jagung Terhadap Penurunan Angka Kemiskinan di Kabupaten Gorontalo [Impact of Agropolitan Corn on Decreasing Poverty in Gorontalo District]* [Research report] (Gorontalo,Indonesia: UNG)
- [5] Hasan A M, Ilato R, Halid A and Ahmad L 2016 Farmer empowerment through processing of maize and each waste in to productive economic commodity in Boalemo Regency of Gorontalo. *IJOARBMA* **1** 3 pp 53-64
- [6] Halid A 2014 *Pengembangan Profitabilitas Jagung [Development of Corn Profitability]*, (Gorontalo, Indonesia: Idaes Publishing)
- [7] Ilato R and Bahua M I 2013 *Analisis Rantai Nilai Komoditas Jagung serta Strategi Peningkatan Pendapatan Petani Jagung di Propinsi Gorontalo [Corn Commodity Value Chain Analysis and Strategy to Increase Corn Farmers' Revenues in Gorontalo Province]* [Research report] (Gorontalo,Indonesia: Universitas Negeri Gorontalo) available at <http://repository.ung.ac.id/riset/show/2/989/analisis-rantai-nilai-komoditas-jagung-serta-strategi-peningkatan-pendapatan-petani-jagung-di-provinsi-gorontalo.html>

Acknowledgments

Researchers would like to thank the parties who have funded this research which are Directorate General of Strengthening Research and Development of the Ministry of Research and Technology in Jakarta, contract PUSN 2018 number: 249/UN47.D/PL/2018 at 19th February 2018; Pohuwato Regency Industry and Trade Service, Recommendation number: 518/DPPK&UKM-PHWT/256/2017 and Gorontalo Regency Industry and Trade Service, Recommendation number: 800/DPP/VI/215/2017.