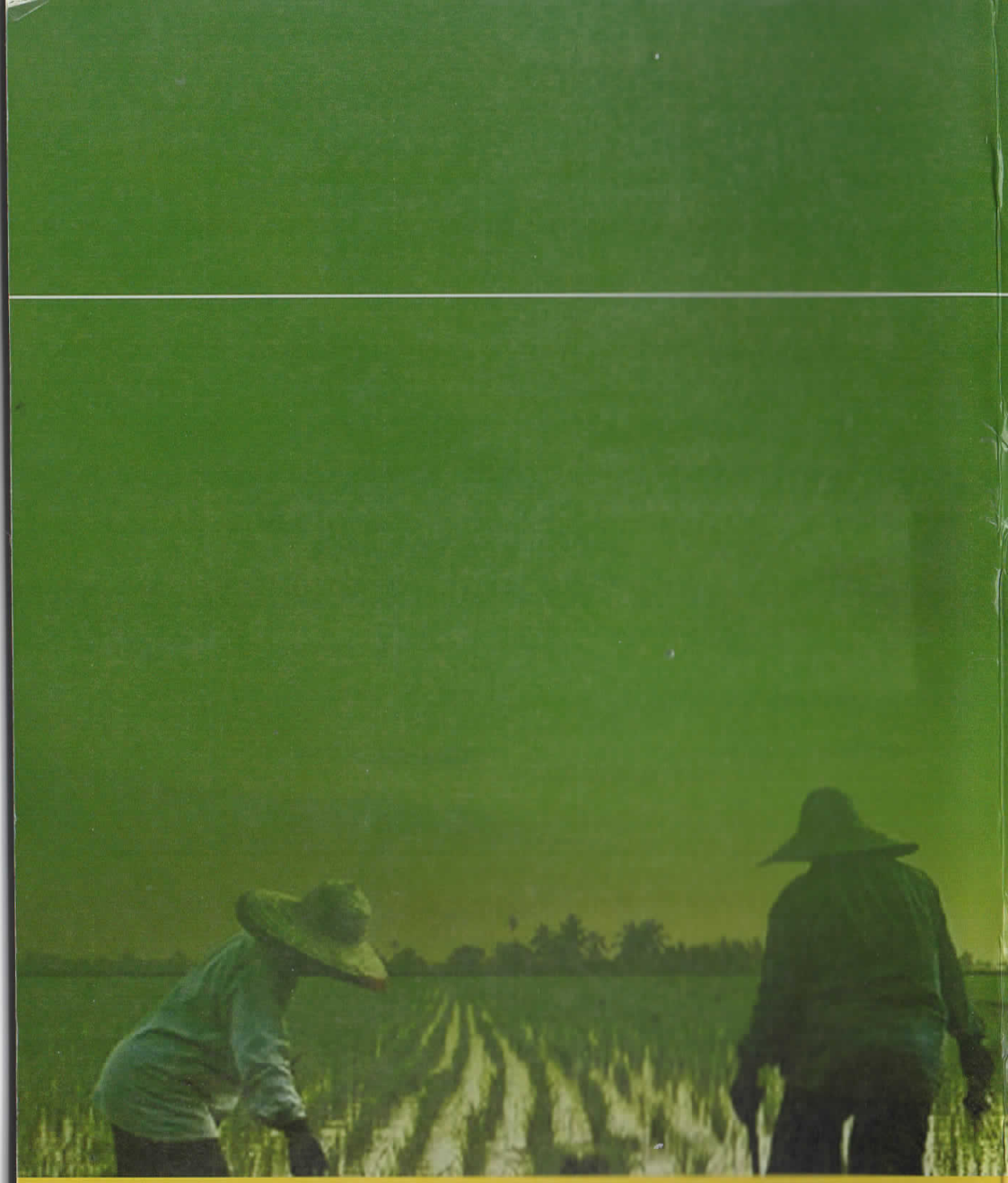

INTERNATIONAL CONFERENCE ON INTERDISCIPLINARY FOOD SECURITY (ICIFS 2017)

October 19 - 20th, 2017
Universitas Andalas
Padang, West Sumatra - Indonesia

INTERNATIONAL CONFERENCE ON INTERDISCIPLINARY FOOD SECURITY

(ICIFS 2017)

OCTOBER, 19-20th, 2017

UNIVERSITAS ANDALAS

PADANG, WEST SUMATERA, INDONESIA

ICIFS 2017
Universitas Andalas,
19 – 20 October 2017

UNIVERSITAS ANDALAS

RISTEKDIKTI

Welcome Message from the Conference Chair
International Conference on Interdisciplinary Food Security (ICIFS) 2017

Dear Honorable and Distinguished guests,
Ladies and gentlemen,

Assalamu'alaikum Warahmatullahi
Wabarakatuh and Good Morning

On behalf of the ICIFS 2017 organizing committee, I am honored and delighted to welcome you to the International Conference on Interdisciplinary Food Security at Andalas University, Padang, Indonesia. I believe we have chosen a venue that guarantees a successful technical conference amid the culture and scenery of Padang.

Our technical program is rich and varied with 5 keynote speeches and 3 invited talks and more than 80 technical papers split between 5 parallel oral sessions and 1 poster sessions. The speakers and participants came from different countries, consist of Academicians, Scientist, Researchers, practitioners, professionals, and government officials from multidiscipline branch of knowledges, who gathered here today to share and discuss new findings and applications of innovations for ensuring food security, in particular for those who in dire needs. We also expect to provide technical demonstrations, and numerous opportunities for informal networking.

As a conference chair of ICIFS 2017, I know that the success of the conference depends ultimately on the many people who have worked with us in planning and organizing both the technical program and supporting social arrangements. In particular, we thank the steering committee for their wise advice and brilliant suggestion on organizing the technical program; the Program Committee for their thorough and timely reviewing of the papers, and to the Rector of Andalas University as well as the Head of Institute for Research and Community Service of Andalas University who have helped us to share the costs of ICIFS 2017 for all

participants. Recognition should go to the all Organizing Committee members who have all worked extremely hard for the details of important aspects of the conference programs and social activities.

Finally, I hope that this forum will provide common platform and support the exchange of knowledge, while at the same time offer constructive dialogue across and within the various interest and stakeholder groups, including the intended beneficiaries, and arrive at the best solutions to our terminal goal, securing the food for all mankind.

Thank You,

Dr. Eng. Muhammad Makky

Welcome SpeechHead of Institute for Research and Community Service

Dear Honorable and Distinguished guests,
Ladies and gentlemen,

Assalamu'alaikum Warahmatullahi Wabarakatuh and Good Morning

It is with great pleasure that I welcome the participants of the "International Conference on Interdisciplinary Food Security 2017". Knowledge should be acquired and imparted to the people. The quest for knowledge has been from the beginning of time but knowledge only becomes valuable when it is disseminated and applied to benefit humankind. It is hoped that this conference will be a platform to gather and disseminate the latest knowledge which can be adopt for securing the food for mankind. Academicians, Scientist, Researchers and practitioners from multidiscipline branch of knowledge who gathered here today will be able to share and discuss new findings and applications of innovations for ensuring food security, in particular for those who reside in developing countries. It is envisaged that the intellectual discourse will result in future collaborations between universities, research institutions and industry both locally and internationally. In particular it is expected that focus will be given to issues on environmental and sustainability.

Researchers in the multi sectoral aspects related to food security have been progressing worldwide. Food is a basic right. Food security are the foundations of a decent life, a sound education and the achievement of the Millennium and Sustainable Development Goals. Over the past year, we have witnessed a chain reaction that threatens the very foundations of life for millions of the world's people. Rising energy prices drove up the cost of food and ate away the savings that people otherwise would have spent on health care or education.

The human cost of the food crisis has been enormous. Millions of families have been pushed into poverty and hunger. Over the past year and a half, food insecurity led to political unrest in some 30 countries. Yet because the underlying problems persist, we will continue to experience such crises, again and again -- unless we act now. That is why we are here today.

We must make significant changes to feed ourselves, and most especially, to safeguard the poorest and most vulnerable. We must ensure safety nets for those who cannot afford food. We must transform agricultural development, markets and how food is distributed. We must do so based on a thorough understanding of the issues. That is the only possible way we can meet the Goals of Food Security.

Thank You,

Dr.Ing. Uyung Gatot S. Dinata,MT

Opening CeremonyRector of Andalas University

Dear Honorable and Distinguished guests,
Ladies and gentlemen,

Assalamu'alaikum Warahmatullahi
Wabarakatuh and Good Morning

I welcome the opportunity to address you at this important event.

It gives me great pleasure in welcoming you to this ICIFS 2017 Conference on "Interdisciplinary Food Security ". I am delighted that so many have accepted our invitation. I am particularly happy that we have in this room, dedicated individuals from so many stakeholder groups — including government; civil society, the private sector, international organizations; the science community; and others dedicated to help create an environment in which people can escape food insecurity. Imagine what we can do together if we make food security for all our top priority and pull in the same direction. We can make a difference in the lives of millions.

Food is a basic right. Food security are the foundations of a decent life, a sound education and the achievement of the Sustainable Development Goals.

Much progress has been made during the last decades but much more needs to be done. Millions of people are food Insecure worldwide, meaning that they either starve or they do not know from where their next meal will come. Much of the progress on food security has occurred at the expense of our environment. With business as usual, we foresee that the production improvements during the next decade will be less than the last one, while the environmental degradation will continue.

Solutions to the food problems need to be designed and implemented within a new and rapidly changing environment. Globalization and sweeping technological changes offer new opportunities for solving these

problems. A number driving forces or trends must be taken into account in developing appropriate action. Some of the action needed, such as appropriate technology for small farms, is not new but it must be cast in the new and changing global and national environment, taking into account new opportunities and risks. I hope that by providing a forum for knowledge exchange, this conference will help identify the action to be taken. Furthermore, this conference will help to provide constructive dialogue across and within the various interest and stakeholder groups, including the intended beneficiaries, and arrive at the best solutions.

In conclusion, even if those responsible give high priority to achieving sustainable food security for all and back it up with action, the world may not achieve the goal by 2020. But we will be much closer than with business as usual. I urge all of us to provide the strongest support for this event, to enable securing the food for all in the closest time possible. It is my sincere optimism that through the accomplishment of the objectives of this event, we will come to an important step nearer to secure the food for all.

Finally, I would like to thank the organizing committee who have spent their utmost efforts to prepare and manage this event successfully. Let me conclude my remarks by wishing our guests happiness, good luck and great success in the conference.

May I announce now the opening of the "International Conference on Interdisciplinary Food Security 2017".

Thank you.

Prof. Tafdil Husni, SE, MBA, PhD

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Table of Contents

Conference Programs

International Conference on Interdisciplinary Food Security (ICIFS) 2017
Andalas University, 19October 2017

No	Time	Activities
1	07.30-08.30	Registration
08.30-09.00		**Opening Ceremony** **Venue: Seminar Room, Building E, Andalas University**
2	08.30-08.40	Welcome Message from the Conference Chair **(Dr. Eng. Muhammad Makky)**
3	08.40-08.50	Welcome Speech from Head of Institute for Research and Community Services Andalas University **(Dr.-Ing. Uyung Gatot S. Dinata)**
4	08.50-09.00	Opening Ceremony by Rector of Andalas University **(Prof. Tafdil Husni, SE. MBA. Ph.D)**
09.00-12.00		**Plenary Session** **Venue: Seminar Room, Building E, Andalas University**
6	**Session Chair: Dr. Eng. Muhammad Makky**	
	09.00 - 09.30	**Dr. Ir. Muhammad Prama Yufdy, M.Sc.** Indonesian Agency for Agricultural Research and Development Ministry of Agricultural, INDONESIA **"The Role of Agricultural Innovation in Supporting Indonesia Food Security Program".**
	09.30 - 10.00	**Prof. Dr. Mikio Umeda** Kyoto University, JAPAN Secretary Gen. of CIGR (Intl. Commission of Agric. and Biosystems Eng.), BELGIUM **"Smart Farming in Japan, Past, Present and Future".**
	10.00 - 10.30	**Prof. Dr. Abdul Rashid Mohamed Shariff** Smart farming Technology Research Center, MALAYSIA Universiti Putra Malaysia, MALAYSIA **"Multidiciplinary Efforts in the Advancement and**

No	Time	Activities
		Applications of Modern Technology in Addressing Concerns of Food Security"
	10.30 - 11.00	**Prof. Dr. Helmi** Andalas University, INDONESIA **"Sustainability Science Perspective to Support Interdisciplinary Initiatives in Food Security and Delivery of SGDs"**
	11.00 - 11.30	**Assoc. Prof. Dam Sao Mai** Biotechnology & Food Technology Institute, VIETNAM **"The Role of Rice Producing in Ensuring Food Security"**
	11.30 -12.15	**Q & A**
12.15 – 13.30		**Lunch Break**
13.30 – 17.00		**Parallel Sessions** **Venue: Convention Hall, Parallel Rooms No. 1-5, Andalas University**
17.00 – 17.30		**Best Presentation Award** **Closing Ceremony** **Venue: Ball Room, Convention Hall, Andalas University**

Parallel 1: Room 1, Convention Hall, Andalas University

(Topics: Business-science cooperation to advance food security, Complexity and tools for decision making for food security, Consumer behavior, nutritional security and food assistance programs, Environmental and social sustainability, Global and local analyses of food security and its drivers)

No	Name	Code	Time	Title
Session Chair: Prof. Dr. Rudi Febrimansyah (Andalas University)				
Business-science cooperation to advance food security				
1	Herwenita	ABS-7	13.30-13.42	Swamp Land Optimization in Supporting Food Security and Enhancing Farmers Welfare in South Sumatra Indonesia
2	Adrizal	ABS-12	13.42-13.54	The development of entrepreneurship culture for supporting beef self-sufficiency in West Sumatra
3	Edison	ABS-18	13.54-14.06	Financial Feasibility Study Of Smallholders Palm Oil In Muaro Jambi District Jambi Province
4	Amir Halid	ABS-38	14.06-14.18	Distribution development strategy of corn processed (corn stick and corn dodol) production to achieve corn competitive product market in Gorontalo province
Complexity and tools for decision making for Food Security				
5	Ediset	ABS-5	14.18-14.30	Socio-economic Factors of Farmers Affecting Innovation Implementation on Livestock of Enterprises in West Sumatra
6	Lisa Nesti	ABS-39	14.30-14.42	Competitive Analysis Of Crude Palm Oil In West Sumatera Province To Other Province In Sumatera Island In Domestic Market
Consumer behavior, nutritional security and food assistance programs				
7	Peggy Awanti Nila Krisna	ABS-4	14.42-14.54	The perception and attitude of consumers towards venison from captive breeding as an alternative source of protein
8	Ismed	ABS-11	14.54-15.06	Effects of Temperature and Storage Time on Film with Natural Dye of senduduk Fruit Extract as Smart Packaging in Detecting Spoilage on Chicken Meat

No	Name	Code	Time	Title
Environmental and social sustainability				
9	Rudi Febriamansyah	ABS-62	15.06-15.18	Livelihood Profile and Problem Identification of Upstream Communities in the Upper Catchment of Batang Kuranji Padang-West Sumatra, Indonesia
10	Fitrimawati	ABS-63	15.18-15.30	Bridging social capital of beef cattle farmer's based on farmer s household welfare
11	Nuning Setyowati	ABS-68	15.30-15.42	Internet adoption by young generation as farming education media in indonesia
Global and local analyses of food security and its drivers				
12	Widia Dara	ABS-9	15.42-15.54	Physico-chemical properties and Antioxidant Activities of Karamuntiang (Rhodomytustomentosa) syrup
13	Dwi Yuzaria	ABS-23	15.54-16.06	Analysis of animal protein food security in west sumatra

Parallel 2: Room 2, Convention Hall, Andalas University
(Topics: Environmental and social sustainability)

No	Name	Code	Time	Title
Session Chair: Prof. Azwar Rasyidin (Andalas University)				
1	Azwar Rasyidin	ABS-10	13.30-13.42	Land evaluation productivity of riced field on different physiography system and parent rocks
2	Triesha Retno Astari	ABS-25	13.42-13.54	X-ray exposure effect of micronucleus of lympocyte cells frequency for biological dosimeter development
3	Inkreswari Retno Hardini	ABS-27	13.54-14.06	The Recommendation Application of Hotel Location Using VIKOR and Entropy Method in Mobile Access
4	Taufiq Ihsan	ABS-29	14.06-14.18	Behavioural Responses of Nile Tilapia (Oreochromis niloticus) by Sublethal Exposure to Chlorpyrifos (Case Study: Lake Kembar West Sumatra)
5	Yenny Oktavia	ABS-33	14.18-14.30	Communication Strategy in Developing the Capacity of Aquaculture Agribusiness Actors
6	Yusriani Nasution	ABS-36	14.30-14.42	Comparison of Sediment Trap in the Water Catchment Area of Salak and Non-Salak Land at the East AngkolaSubdistrict
7	Yetty Septiani Mustar	ABS-44	14.42-14.54	An analysis of Food Safety: A Challenge and Opportunity to Protect Children from Hazardous Additive Substances
8	Erizal Mukhtar	ABS-46	14.54-15.06	Aboveground biomass and tree diversity in forest conservation of palm oil plantation, West Sumatra, Indonesia
9	Tertia Delia Nova	ABS-49	15.06-15.18	The Effect of Plant Utilization Salviniamolesta (Kiambang) as an Environmentally Friendly Duck Feed
10	Tivany Edwin	ABS-52	15.18-15.30	Effect of chlorpyrifos exposure on gill tissue of tilapia
11	Lucky Zamzami	ABS-58	15.30-15.42	The local wisdom in marine resource conservation for sustainable food security in indonesia

Parallel 3: Room 3, Convention Hall, Andalas University

(Topics: Governance (including science and technology) for food security, Nutrition and public health in food security)

No	Name	Code	Time	Title
Session Chair: Prof. Nalwida Rozen (Andalas University)				
Governance (including science and technology) for food Security				
1	Afdhol Dzikri	ABS-3	13.30-13.42	Application of food and drinking based on android with fcfs method
2	Nalwida Rozen	ABS-17	13.42-13.54	Minapadi-sri pattern on rice cultivation of ir42 variety
3	Dwi Ely Kurniawan	ABS-20	13.54-14.06	Sale Applications of Fishermans Catch with C2C Marketplace Model Using SMS Gateway
4	Yuerlita	ABS-61	14.06-14.18	Farmers Participation in Irrigation Management in NagariPaninggahan, Solok Sub-District, West Sumatra
5	Ellina Mansyah	ABS-73	14.18-14.30	TROPICAL FRUIT RESEARCH AND DEVELOPMENT PROGRAMMES OF ITFRI
Nutrition and public health in Food Security				
6	Afriani Sandra	ABS-72	14.30-14.42	ISOLATION AND IDENTIFICATION OF LACTIC ACID BACTERIA FROM TEMPOYAK AS STARTER OF FERMENTED MILK
7	Khalil	ABS-8	14.42-14.54	Physical Properties and Nutritive Values of Oyster Shells as Mineral Sources for Feeding of Poultry
8	Salomo Hutahaean	ABS-13	14.54-15.06	Antidiabetic Effect of SaurauiavulcaniKorth. Leaves Extracts on Type II Diabetic Mice Model
9	Salomo Hutahaean	ABS-14	15.06-15.18	Epitope Prediction of Mn-SOD protein of Ganodermaboninense Pat for Antibody Production
10	Sahadi Didi Ismanto	ABS-21	15.30-15.42	The Influence of Drying Temperature on Chemical Components of Herbal Tea Leaves (SpondiasDulcis, Soland)
11	I Ketut Budaraga	ABS-43	15.42-15.54	Estimating Shelf life of Drinking Corens with Arrhenius Method
12	Ferawati	ABS-69	15.54-16.06	The Potential of Lactic Acid Bacteria Isolated From Arenga Pinnata Merr Liquid as a Probiotics

Parallel 4: Room 4, Convention Hall, Andalas University

(Topics: Wisdom Agriculture for Food Security, Reducing risks to food production and distribution from climate change, Social justice and Food Security)

No	Name	Code	Time	Title
Session Chair: Renny Eka Putri PhD (Andalas University)				
Wisdom Agriculture for Food Security				
1	Renny Eka Putri	ABS-42	13.30-13.42	Online Measuring Of Grain Flowrates and Its Measurement Sensitivities with Pitch and Roll Angles
2	Jusuf Wahyudi	ABS-41	13.42-13.54	The concept of erradication of plant pests and diseases for agriculture extension
3	Muhammad Makky	ABS-54	13.54-14.06	Nondestructive evaluation for Moisture Content Determination of Local Rice
4	Muhammad Makky	ABS-55	14.06-14.18	Thermal Influence on CPO Storage
5	Kesuma Sayuti	ABS-60	14.18-14.30	Antioxidant activity of Kolangkaling Jam added with juice of Syzygiumoleana (Pucukmerah) Fruit
Reducing risks to food production and distribution from climate change				
6	Benni Satria	ABS-51	14.30-14.42	Dosage use fungi mycorrhiza arbuscular (fma) on the growth of three genotipe agar wood(aquilariaspp. l.) to ready release and applications field
7	Armansyah	ABS-53	14.42-14.54	Diversity of Arbuscular Mycorrhizae Fungi (AMF) indigenous in rhizosphere of of Citronella (Andropogonnardus L.) in the dry West Sumatra
8	Rusfidra	ABS-70	14.54-15.06	Estimation of Inbreeding Rate of Pitalah Duck as Germ Plasm at West Sumatra Province
9	Rusfidra	ABS-71	15.06-15.18	A review of west Sumatra local ducks as poultry genetic resources in Indonesia
Social justice and Food Security				
10	Alfian Zein	ABS-15	15.18-15.30	Food security status of fishermen households in the coastal areas of west Sumatra, Indonesia
11	Hasan Ibrahim	ABS-37	15.30-15.42	Empowerment of women farmers in sustainable food management based on local wisdom (Nagari Koto Tuo,

No	Name	Code	Time	Title
				Harau district, Lima Puluh Kota regency, West Sumatra)
12	Gunarif Taib	ABS-22	15.42-15.54	Production Factor Analysis Affecting the Improvement of Local Food Industry Marketing in West Sumatera
13	Yesi Puspita	ABS-74	15.18-15.30	Preserving The Food Security Of Minangkabau Cultures On Asean Economic Community Era : An Semiotic Study Of "Rangkiang" As A Symbolic Representation Of Food Saving
14	Uyung Gatot S	ABS-75	15.54-16.06	Wind Tunnel Experiment On A Propeller Wind Tunnel Model Using Winglets
15	Rahmi Wati	ABS-76	15.06-15.18	Competitiveness Assesment Of Industrial Commodities Of Livestock In Payakumbuh City, West Sumatra

Parallel 5: Room 5, Convention Hall, Andalas University

(*Topics: Food production and supply*)

No	Name	Code	Time	Title
Session Chair: Prof. Dr. Fauzan Azima (Andalas University)				
1	Yurnalis	ABS-2	13.30-13.42	New Single Nucleotide Polymorphisms Detected in Exon 5 of the Bovine Growth Hormone Gene in Local Cattle Breeds in West Sumatera Province of Indonesia
2	Neswati	ABS-16	13.42-13.54	Encapsulation of Caesalpiniasappan, L. Heartwood with Several of Maltodextrin Concentrations and Drying Techniques on Antioxidant Activity and Antibacterial Activity
3	Dharia Renate	ABS-19	13.54-14.06	Developing technology of natural color: The effect of peel extract of melinjo (Gnetumgnemon L.) on quality of red chili puree
4	Wenny Surya Murtius	ABS-24	14.06-14.18	Isolation and Characterization of Lipid Degraded Bacteria from Galamai Leftovers
5	Irawati Chaniago	ABS-26	14.18-14.30	Weeds associated with wheat crop at alahan panjang, west sumatra
6	Vioni Derosya	ABS-28	14.30-14.42	Effect of Low Temperature Storage for Uncooked Sala Lauak
7	Kusumiyati	ABS-32	14.42-14.54	Non-destructive Detection of Two Cucumber Cultivars Fruit Quality using NIR Spectroscopy
8	Tuty Anggraini	ABS-34	14.54-15.06	The Effect of Boiling Time on Polyphenol Compounds and Antioxidant Activity of Ciplukan (PhysalisAngulata .L)
9	Ani Nuraisyah	ABS-40	15.06-15.18	Effect of glutamine and lysine amino acid crosslinking by transglutaminase in rice bread production
10	Anna Noordia	ABS-45	15.18-15.30	Foam Mat Drying of Banana Juice: Experimental Analysis of Banana varieties and Egg Albumen Foam
11	Fauzan Azima	ABS-47	15.30-15.42	Physicochemical and Functional Properties of Tubers Starches
12	Aronal Arief Putra	ABS-65	15.42-15.54	Profile comparison between traditional buffalo fermented milk collected from two farmers in West Sumatra: A Preliminary Study
13	Riry Prihatini	ABS-48	15.54-16.06	Research on banana (musa spp.) in vitro culture

Table of Abstracts

Abstracts of Keynote Speakers

THE ROLE OF AGRICULTURAL INNOVATION IN SUPPORTING INDONESIAN FOOD SECURITY PROGRAM

Muhammad Syakir

Indonesian Agency for Agricultural Research and Development, INDONESIA

Abstract

Indonesia has now entered the era of global economy, so the concept of agricultural industrialization needs to be enforced, as it is one of the keys to free trade in the global era. The competitiveness of agricultural products must be strengthened, so that Indonesia is not flooded with outer products and only becomes a market or consumer. In this regard, agricultural innovation becomes a very important part that cannot be separated to support the realization of sustainable food security. Indonesian Agency for Agricultural Research and Development (IAARD) has shown its real role in supporting the Indonesia's food security program by producing various agricultural innovation that have been utilized by the community, such as varieties and superior seeds, fertilizers, biopesticides, processing technology as well as agricultural tools and machinery. In order to support sustainable food security, IAARD was developed strategic agriculture innovation. Innovation of research results support the required food security program are the innovation of land resources, water and climate management, seed innovation, cultivation, pest and disease of plant controlling processing of agricultural products for each commodity, and thematic innovations related to somatic embryogenesis, Nano technology, transgenic, and bioindustry farming based on agroecology.

Keywords:food security, agricultural innovation, sustainable agriculture

ABS-38

DISTRIBUTION DEVELOPMENT STRATEGY OF CORN PROCESSED (CORN STICK AND CORN DODOL) PRODUCTION TO ACHIEVE CORN COMPETITIVE PRODUCT MARKET IN GORONTALO PROVINCE

Amir Halid [a*], Mohammad Ikbal Bahua [b], Zainudin Antuli [c], Irawati Abdul [d]

[a] *Agribussiness Department, Postgraduate, State University of Gorontalo*
Taman Surya Street, Gorontalo 96128, Indonesia
**amirhalid_ung@yahoo.com*
[b] *Faculty of Agriculture, State University of Gorontalo*
Sudirman Street, No 6 Gorontalo City, Indonesia
[c] *Faculty of Agriculture, State University of Gorontalo*
Sudirman Street, No 6 Gorontalo City, Indonesia
[d] *Economic Development Department, Faculty of Economic, State University of GorontaloSudirman Street, No 6 Gorontalo City, Indonesia*

Abstract

Research object is; 1) to know about the profile of maize farmer enterprise in Gorontalo regency; 2) to know the people characteristics at home industry group in Toyidito village at Pulubala sub-district; 3) Economics analysis for Sweat Maize Dodol with used survey method. This research conducted since august until september 2016 with used descriptive, SWOT and economics analysis. The result of this research is 1) Groups of farmers enterprise, the more much of members and land is worked on by maize farmer found at Dunggala village in Batudaa sub-district is 8 gorups, 187 members, and the land worked on for maize about 157,3 Ha. Therefore at Pulubala Sub-district the more much of gorups of farmer enterprise at Puncak Village about 32 groups, and the members is more much found at Toyidito about 705 members, but the largest land worked on by maize farmer is at Puncak village about 701,21 Ha; 2) Production analysis for home industry for Maize Stick with tasted by Shrimp from limboto Lake will get profit if the in-come above of break event is Rp 120.000,- if production is over of break even point is 11,975 gram and will follow of the price over of break even point about Rp 52.500; 3) Production analysis analysis for home industry for Dodol sweat maize will get profit if the in-come earned over of break even point is Rp 170,174, if production is earned over of break even point 6,90 basket and if the price is over of break even point is about 19.550; 4) Analysis distribution development strategy of corn stick and corn dodol, the weakness of the factors and strategies for developing corn distribution product, increased the volume of production, to reach the market target, and increased the promotion of product and price information.

DISTRIBUTION DEVELOPMENT STRATEGY OF CORN PROSSECED (CORN STICK AND CORN DODOL) PRODUCTIONTO ACHIEVE CORN COMPETITIVE PRODUCT MARKET IN GORONTALO PROVINCE

Coordinator Team: Amir Halid. Team Members: Mohammad Ikbal Bahuwa, Zainudin Antuli, and Irawati Abdul.

ABSTRACT

Reseach object is; 1) to know about the profile *of maize farmer enterprise in Gorontalo regency;* 2) to know the people characteristic at home industry group in Toyidito village at Pulubala sub-district; 3) Economics analysis for Sweat Maize *Dodol with used survey method. This research* conducted since august till september 2016 with used descrifritive, SWOT and economics analysis. The result of this research is 1) Groups of farmers enterprise, the more much of members and land is worked on by maize farmer found at Dunggala village in Batudaa sub-district is 8 gorups, 187 members, and the land worked on for maize about 157,3 Ha. There fore at Pulubala Sub-district the more much of gorups of farmer enterprise at Puncak Village about 32 groups, and the members is more much found at Toidito about 705 members, but the largest land worked on by maize farmer is at Puncak village about 701,21 Ha; 2) Production analysis for home industry for Maize Stict with tasted by Shrimp from limboto Lake will get profit if the in-come above of break event is Rp 120.000,- if production is over of break even point is 11,975 gram and will follow of the price over of break even point about Rp 52.500; 3) Production analysis analysis for home industry for Dodol sweat maize will get profit if the in-come earned over of break even point is Rp 170,174, if production is earned over of break even point 6,90 basket and if the price is over of break even point is about 19.550; 4) Analysis distribution development strategy of corn stik and corn dodol, the weakness of the factors and strategies for developing corn distribution product, increased the volume of production, to reach the market target, and increased the promotion of product and price information.

Key words: *Corn Production, Distribution Development Strategy*

I. Introduction

Since Gorontalo became a Province on February 12nd 2000, the government has put the position of agriculture as the entry point of corn that prospected for export but has not been cultivated optimally by using technological inputs, without ignore the aspects of sustainable corn farming.

Corn has many advantages beside as people daily needs and also can be process to some products such as corn sticks, corn oil, corn starch, poultry feed, fish feed, and other function as food. In addition, corn grain can process for a variety of products, corn waste can make variety of products such as corn

waste into ruminant feed, corn waste into organic fertilizer, corncob into charcoal, and corn husk can process become flower, pad dodol, the basic material of clothes, tablecloth and someof unique products.

Based on the survey that the cornseed (yield) in Gorontalo only used for daily meal also sold to other places like export to another city in Indonesia or to another countries. Seed corn (yield) is not process into processed products that enhance the economic value of products. The price comparison corn kernels 1 kg Rp. 3,200 if it has been processed into animal feed prices reached 5 times from the original price when unprocessed. Processing the kernels into a basic ingredient of animal feed will increase the economic value of the product.

The role of the agricultural sector contributed most (28%) to the GDP of Gorontalo District, together with the services sector (23%). Because most people in Gorontalodistrictworked in the agricultural sector of food crops (rice and corn), plantation crops (coconut) and fisheries. The developing of agribusiness corn in Gorontalo district need to improved because of the potential for development is big enough and has wide land. The steps to solved problem ofmaize plantations must be in accordance with local characteristics, social, economic and institutional capacities in the community because almost 90% of corn plantation is smallholder agriculture.

Baruwadi (2009), suggest that household contribution income farmers from maize farming in Gorontalo Province is 64.03%, which proved the high dependence of farmers on corn as a source of household income. In Anonymous (2012) explained that in the last five years, the national corn demand for industrial materials feed, food and beverages increased by ± 10% -15% / year. In 2010 corn in Gorontalo mostly exported to several countries such as Malaysia, South Korea, Japan, and Philippines amount of 34,200 tons. To export, Gorontalo corn production is also absorbed by the local market through between regionsamount 104,810 tons of which 88,225 tons Surabaya and Jakarta 16,858 tons.

Friedmann (1990), showed that empowerment is a believed to be a " alternative development" on the model of development center to growth. At the first the development of alternative put forward some trusts: first, country is the problem of development showed development of alternatives to eject even against the country; second, people could did no wrong and the public is an independent association; Third, community actions had capable and sufficient to realize the alternative development without state interference.

Kartasasmita, 2009 suggested that community empowerment: The development concept is rooted in the community, said that the concept of community empowerment includes the notion of community development (community development) and development focused on the community (community based development).

II Methodology

This research donein the district and sub district Bongomeme Tibawa Gorontalo regency and to the research start from January 1 to December 2016. Furthermore, the method of selecting respondents was conducted using different methods in the two groups of respondents (group home and organization groups). For households, the method used is simple random sampling method, while the agency unit used purposive method. Total sample of households take 200 respondents consist of 40 respondents from each sample location. While the organization groups interviewed unit adapted to the number of units existing organization in each country, it is estimated the number of units of organization interviewed about 15-20 organization for each sample location.

The research method will used in the program, activities and output produced for each year of implementation of activities. In the first year of 2016 because the output are: 1) Potential socio-economic household profile, institutional corn farmer. 2) Formulation Hierarchical strategy and on the development of government policy on product development ofcorn processed. 3) Output products and their sales outlets in refined product sales. Meanwhile output in 2017: 1) Control the use of tools / technology products processing corn. 2) Increased insight and institutional work team development. 3) Developing the ability to access the market. And output in 2018: 1) Products Processed competitive. 2) Model of Institutional Agribusiness Corn. 3) Skills to access market information.

1. Observation

Observation techniques used to obtain data and information on the resource potential of agriculture to research data and other relevant information.

2. Interview

Interview techniques used to obtain data and information, formulate strategies and corn farmer empowerment activities to increase the income of corn farmers data and other relevant information.

3. Questionnaire

Mechanical questionnaire used to obtain data and information on the resource potential analysis of maize agriculture based on comparative advantage,competitive and influence to empower farmers through

processing corn maize and corn waste into productive economic commodity corn to increase farmers income.

4. Focus Group Discussion (FGD).

Techniques Focus Group Discussion (FGD) was used to complete the data and research information, during the conduct data collection and information the draft of research reports.

III. Result and Discussion

A. Maize Farmer Profile in Gorontalo District

1. Data of Group, Member Total, and Land Area in Subdistrict of Batudaa, Gorontalo District

Table 1. Data of Group, Member Total, and Land Area in Subdistrict of Batudaa, Gorontalo District

Number.	Village Name	Total Group of Village	Total of members in Group	Land Area (Ha)
1	Barakati	3	69	62
2	Iluta	2	49	41.5
3	Bua	2	53	40.1
4	Huntu	5	101	103.6
5	Pilobuhuta	5	112	105.9
6	Payunga	3	47	39.75
7	Dunggala	8	187	157.3
8	Ilohungayo	4	75	65.5
Total		32	693	615.65
Average		4	87	76.96

Table 1 showed that the number of groups in each village is different, there are composed of two groups of farmers of corn, even up to 8 groups of farmers of corn, with an average of 4 groups of crop farmers to every village in the Batudaa village. The groups that exist in each of these villages have the members of the group which is quite diverse and numerous, ranging from 49 members of the group, up to 187 members of the group to the village. Dunggala village district.Batudaa has a number of groups, include 8 corn farmer groups and also the number of group members, include 187 members of farmers of maize compared with other villages in the district Batudaa. Total corn farmer groups contained in the smallest villages and the village Bua and Iluta which only consisted of two corn farmer groups, while the number of group members at least are in the village Payunga the 49 members of the group. On average, the number of members of maize farmer groups in 8 villages in the district Batudaa is reached 87 people, with total members is 693.

Beside number of groups and group members the high total compared to other villages in the district Batudaa, corn farmers Dunggala, Pilobuhuta, and Huntu which the corn cultivated is the most wide reached 157.3 Ha; 105.9 Ha; and 103.6 Ha. The smallest corn crop in Bua Village area of 40.1 hectares.The total area of cultivated corn crop in the district.Batudaa can be reached 615.65 Ha; with an average area of arable corn crop is 76.96 hectares for every village in the district Batudaa.

2. Data of Group, Member Total, and Land Area in Subdistrict of Pulubala, Gorontalo District.

Table 2. Data of Group, Member Total, and Land Area in Subdistrict of Pulubala, Gorontalo District

Number.	Village Name	Total Group of Village	Total of members in Group	Land Area (Ha)
1	Pulubala	20	400	427.5
2	Tridarma	13	295	300.93
3	Molalahu	13	318	276
4	Toyidito	25	705	579.5
5	Molamahu	30	584	624.71
6	Bakti	28	529	640.5
7	Pongongaila	21	495	504.5
8	Mulyonegoro	20	405	439
9	Puncak	32	563	701.21
10	Ayumolingo	21	406	435.25
11	Bukit Aren	20	377	391
Total		**243**	**5077**	**5320.1**
Average		**22**	**462**	**483.65**

Table 2 showed that the villages in Pulubala district have a lot corn farmer, from 13 to 32 groups in the village. This indicates that the majority of people work in Pulubala District are corn farming. The members in each group in each village to approximately 300 members of the group, even some villages has 500 more members of the group. The high of the village in the district. Pulubala has a number of groups, include 30 maize farmer groups with a total membership of the second largest group after the 563 members of the village Molamahu corn farmer groups. Corn farmer groups premises smallest number in a neighboring village and village Tridarna and Molalahu, each consisting of 13 corn farmer groups, while the number of members of each group 295 group members and 318 members of the group. The average number of members of cornfarmer groups in 11 villages in Pulubala district are 462 people, with total members are 5077 members.

The village which has the largest corn crop cultivated in the district is located in the village Pulubala with the land area is 701.21 hectares. Bakti and Molamahu with corn crop the second largest and third, respectively in the amount of 640.5 Ha; and 624.71 Ha. The average area of cultivated corn crops in villages in the district Pulubala is 483.65 Ha; with the total area cultivated corn crop reached 5320.1 hectares.

C. Production Analysis of Limboto lake Shrimp Corn Stik

1. Break Event Point (BEP) Analysis

$$\text{BEP Revenue (Rp)} = \frac{FC}{1 - \frac{VC}{TR}}$$

$$= \frac{96.000}{1 - \frac{61.500}{300.000}}$$

$$= \frac{96.000}{1 - 0{,}20}$$

$$= \frac{96.000}{0,80}$$

BEP Revenue (Rp) = 120.000

$$\text{BEP production (gram)} = \frac{FC}{P - \frac{VC}{Q}}$$

$$= \frac{119.500}{10.000 - \frac{61.500}{3.000}}$$

$$= \frac{119.500}{10.000 - 20,5}$$

$$= \frac{119.500}{9.979,5}$$

BEP production (gram) = 11.975

$$\text{BEP}_{\text{Harga}}(\text{Rp}) = \frac{TC}{Q}$$

$$= \frac{157.500}{3.000}$$

$$\text{BEP}_{\text{price}}(\text{Rp}) = 52.500$$

$$\text{BEP}_{\text{price}}(\text{Rp}) = \frac{TC}{Q}$$

$$= \frac{157.500}{3.000}$$

$$\text{BEP}_{\text{price}}(\text{Rp}) = 52.500$$

a. $BEP_{penerimaan}$= Rp 120.000

The domestic industry would benefit if acceptance is obtained exceeds the limit of USD 120,000 of the BEP, otherwise households industry will losses if the receipts obtained less than the BEP.

b. $BEP_{production}$ = 11.975 Gram

The domestic industry would benefit if production were obtained exceeds the limit BEP is 11.975 Gram on the other hand domestic industry would losses if production gained less than the BEP.

c. BEP_{price}= Rp. 52.500

The domestic industry would benefit if the price obtained exceeds the limit BEP is Rp. Conversely 52,500 domestic industry would losses if prices gained less than the BEP. The break event point corn stick curve taste shrimp Limboto Lake, below:

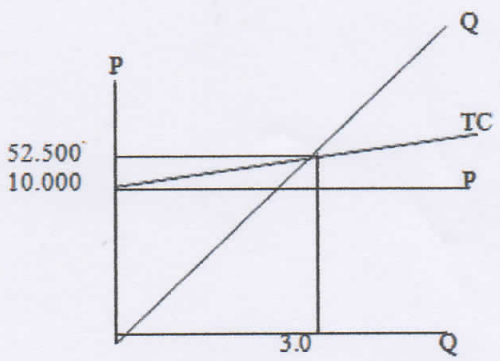


Figure 2. Break Event Point Curve of Limboto Lake Shirmp Corn Stick

2. **Table 3. Limboto Lake Shirmp Corn Stick Variabel Cost**

Variabel Cost	Total (Rp)
1 Kg Lokal Corn/Motorokiki	12.000
1 Kg Lake Shrimp	15.000
500 Gr Tapioca Flour	9.000
100 Gr Garlic	5.000
1 Sdm salt	500
250 Gr Sugar	4.000
2 Kg Fried Oil	26.000
Total	61.500

Variable cost is change in proportion to the business activity or the amount of the marginal cost of all units produced. Based on the above table it can be seen that the number of variable limboto lake shirmp corn stick is Rp. 61,500 with a raw material that is 1 Kg of local corn for Rp. 12,000.

Tabel 4.Shrimp Corn Stick Fixed Cost.

Fix Cost	Total(Rp)
plastic packaging	11.000
Labor	50.000
Gas	10.000
rental equipment for a grinders /hour	15.000
Electric/hour	10.000
total	96.000

Fixed Cost are the costs that does not depend on the level of goods or services output that produced by the business. The table shows that the total of fixed costs of shrimp corn is Rp. 96,000 which consists of the cost of plastic packaging, labor, gas, rental equipment for a grinders and electric.

Tabel 5.Shrimp Corn Stick Total Cost

Biaya Total	Total(Rp)
Variabel Cost	61.500
Fix Cost	96.000
Total Cost	157.500

The total cost was the the amount of variable costs and fixed costs. Based on the table the shrimp corn stick total costs is Rp. 157 500.

Tabel 6.Shrimp Corn Stick Revenue

Description	Production	Price	Total
Revenue	3.000 gr	10.000/ 100 gr	300.000

The Revenue is all income received from economic activities without deducting the total production expenditure. Based on the table the shrimp corn stick total revenue is Rp. 300,000

Tabel 7.Shrimp Corn Stick Profit

Description	Total
Revenue	300.000
Total Cost	157.500
Revenue (1-2)	142.500

Profit is the total revenue after deducting the total cost of production. Based on the table, the shrimp corn stick profit isRp. 142 500.

D. Production Analysis of Sweet Corn Dodol

1. *Break Event Point (BEP)Analysis*

$$\text{BEP Revenue(Rp)} = \frac{FC}{1-\frac{VC}{TR}} = \frac{119.500}{1-\frac{76.000}{250.000}}$$

$$= \frac{119.500}{1-0{,}30}$$

$$= \frac{119.500}{0{,}70}$$

BEP Revenue (Rp) = 170.714

$$\text{BEP production (bucket)} = \frac{FC}{P - \frac{VC}{Q}}$$

$$= \frac{119.500}{25.000 - \frac{76.000}{10}}$$

$$= \frac{119.500}{25.000 - 7.600}$$

$$= \frac{119.500}{17.300}$$

BEP production (bucket) = 6.90

$$\text{BEP}_{\text{Harga}}(\text{Rp}) = \frac{TC}{Q}$$

$$= \frac{195.500}{10}$$

$$\text{BEP}_{\text{price}}(\text{Rp}) = \frac{TC}{Q}$$

$$= \frac{195.500}{10}$$

BEP price (Rp) = 19.550

d. $\text{BEP}_{\text{revenue}}$= Rp 170.174

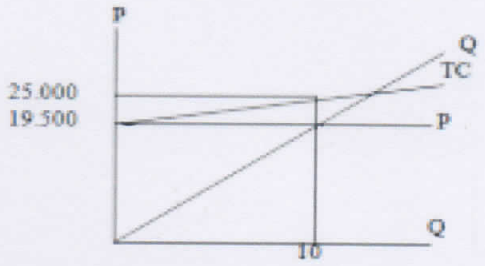
The home industry will get a profit when the revenue more than break event point value Rp. 170.174 otherwise home industry would suffer losses if the revenue obtained less than the break-even point

e. $\text{BEP}_{\text{production}}$ = 6.90 bucket

The home industry will get a profit when the production is more than break event point value 6.90 bucket, otherwise home industry would suffer losses if the production obtained less than the break-even point

f. $\text{BEP}_{\text{price}}$= Rp. 19.550

The home industrywill get a profit when the price is more than break event point value Rp.19.550, otherwise home industrywould suffer losses if the price obtained less than the break-even point. Here is a corn dodol break event point curve



picture3. *Corn Dodol break event point curve*

Tabel 8.Variabel Cost Corn Dodol

Variabel Cost	Total (Rp)
1 Kg Sweet Corn	20.000
500 ml coconut milk	8.000
650 Gr sugar	12.500
300 Gr brown sugar	5.000
2 pack Full Cream milk	7.000
125 Gr butter	4.000
250 Gr Sticky Rice	5.000
1 packFoodColour	500
50 Gr rice	2.000
3 pack Vanila	2.000
Gas	10.000
Total	76.000

Variable costs is the costs that change proportionally to the business activity or the amount of the marginal cost of all units

produced. The table above shows that the number of variables corn dodol is Rp. 76,000 based on the main material is 1 kg of sweet corn for Rp. 20,000.

Tabel 9.*Corn Dodol Fixed Cost*

Fix Cost	Total(Rp)
Plastic packaging	10.000
Plastic binding	7.500
Labor	50.000
15 Bucket	52.500
Jumlah	119.500

Fixed Cost are the costs that does not depend on the level of goods or services output that produced by the business. The table shows that the total of fixed costs of corn dodol is Rp. 96,000 which consists of the cost of plastic packaging, Plastic Binding, labor and bucket.

Tabel 10.Total Cost MaizeDodol

Biaya Total	Total(Rp)
Variabel Cost	76.000
Fix Cost	119.500
Total	195.500

The total cost was the the amount of variable costs and fixed costs. Based on the table the corn dodol total costs is Rp. 195.500

Tabel 11.Tabel MaizeDodol Revenue

Description	Production	Price	Total
Revenue	10 Bucket	25.000/ Bucket	250.000

The Revenue is all income received from economic activities without deducting the total production expenditure. Based on the table the corn dodol total revenue is Rp. 250.000

Tabel 12.MaizeDodol Profit

Description	Total
Revenue	250.000
Total Cost	119.500
Profit (1-2)	130.500

Profit is the total revenue after deducting the total cost of production. Based on the table, the corn dodol profit isRp. 130.500

E. Factors and Distribution Development Strategy of Maize Products

The way to find out more about the Distribution Development Strategy of Corn Products are identify alternative method how an organizations can use the strength or to use the opportunity to avoid threats and overcome weaknesses. SWOT matrix illustrates how the corn product can match opportunities and threats faced by its internal strengths and weaknesses. This can be seen in the following explanation:

1. Strength

   Based on analysis of data, the Strength that can be used for the product development strategy are:

   a. Fresh and high quality raw materials

such Local Maize (Motoro Kiki) and Limboto Lake Shrimp, Sweet Maize, Brown Sugar and Coconut Milk

b. Having a good business prospect and environmentallyfriend

c. Build a good working atmosphere between the home industry and managerial team

d. Characteristically taste and quality of products

2. Weakness

Based on analysis of data, the weaknesses that can be used for product development strategy are:

a. Production Volume / supplies

b. The ineffective of information media

c. Small area product distribution

3. Opportunity

Based on analysis of data, the opportunities that can be used for the product development strategy are:

a. Good consumer responses

b. The wide market target for all people

c. The possibility to develop new product

4. Threats

Based on analysis of data, the threats that can be used for the product development strategy are:

a. New competitor

b. Unstable market taste

Tabel13.Internal Factors OfMaize Product

No	Internal Factor	Scale	Rating	Score	Description
Kekuatan					
1	Having a good business prospect and environmentally support	0.20	4	0.80	There is good business prospect
2	high quality raw materials of corn product	0.20	4	0.80	Using high quality raw materials
3	Build a good working atmosphere between the home industryand managerial team	0.15	3	0.45	Good teamwork
4	Characteristically taste and quality of products	0.15	3	0.45	having Characteristic products
	Nilai Skor = 2.50				
Kelemahan					
1	Production Volume / supplies	0.10	2	0.20	Limited supplies volume
2	Ineffective of product information and price product information	0.10	2	0.20	Ineffective promotion
3	Small area product distribution	0.10	2	0.20	Small area product distribution
	Score = 0.60				
Total		**1**	**20**	**3.10**	

Source: Primary Data After processed, 2016.

The table above shows that total strength value = 2.50 are bigger than total weakness value = 0.60, this situation indicates that the

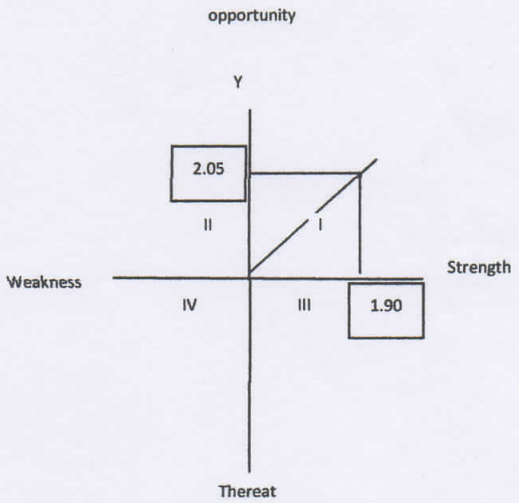
strength factor for the distribution product development strategy is greater than a factor of weakness as an inhibitor of the distribution product development strategy

Tabel14.External Factors Of Corn Product

No	External factor	Scale	Rating	Score	Description
Opportunity					
1	The wide market target for all people	0.30	4	1.20	Accessible to all levels of consumer
2	Good consumer responses	0.23	3	0.69	consumer has a good responses
3	The possibility to develop new product	0.22	3	0.66	There is a . The possibility to develop new product
	Nilai Skor = 2.55				
Threat					
1	New competitor	0.13	2	0.24	There are New competitors
2	Unstable market taste	0.12	2	0.26	unstability of consumers taste
	Score = 0.50				
Total		1	14	3.05	

Source: Primary Data After processed, 2016.

The table above shows that total opportunity value = 2.55 are bigger than total threat value = 0.50, this situation indicates that the opportunity factor for the distribution product development strategy is greater than a factor of threat as an inhibitor of the distribution product development strategy. To determine the distribution product development strategy by using SWOT analysis diagram, it can be seen in the figure below:



Picture 21. SWOT analysis diagramof distribution product development strategy

Based on the results of the analysis contained in the picture, it is known that the strength is greater than weakness and generates the X axis in the diagram SWOT. Likewise, an opportunity that will be faced greater than the threat and generates the Y axis SWOT diagram.These values shown that the difference between opportunity and threat is 2:05 while the difference between strength and weakness is 1.90.

1. Strenght – Opportunity Strategy

   Fresh and high quality raw materials such a Local Corn (Motoro Kiki) and LimbotoLake Shrimp and the other

additional raw material produced a good corn stick product and accepted by the various levels of the consumer. Similarly, raw material such as sweet corn and Palm Sugar and Coconut Milk used is still in a fresh and qualified that is processed into becoming Dodol sweet corn. Therefore, have good business prospects and environmentally friend generates the possibility of new product development as well as produced taste and quality products that have characteristics, thus the market target of all level consumer can be completed

2. Weakness – Opportunity Strategy

An improvement in volume of production / supply of shrimp corn stick and corn dodol is important to fulfill the market target. increased the effectiveness of product and price information, and open market distribution are required to push the product be accepted by all level of consumers

3. Strength- Treat Strategy

Keep the fresh and high quality raw materials such a Local Corn (Motoro Kiki) and Limboto Lake Shrimp and the other additional raw material produces a unique corn stick taste so the product is hard to defeated by new competitors and can make the public taste remained stable

Strategi (W-T). Similarly, raw materials and Palm Sugar Sweet Corn and Coconut Milk used is still in a state of quality fresh and processed into becoming Dodo Sweet Corn with characteristic flavor and chewy softness is the main attraction for this processing product

4. Weakness –Treat Strategy

An increasing of product and price information of shrimp corn stick and sweet corn dodol are necessary to do to know market taste development. Increasing product distribution are important to face the competitor.

These factors and the development strategy of product distribution of shrimp corn stick either Sweet Corn dodol is very important. In the distribution will occur or appear several factors, both threats or weakness while development strategy is necessary for the distribution of cornpeoduct in order to improve further the quality and distribution of refined products kuanititas of the corn itself.

Based on the analysis SWOT matrix, the factors and strategies for developing distrbusion corn product, namely 1)The high quality of material used are received well by the public, (2) has a good business prospects and environmentally friend, generates the

possibility of new product development 3) flavor and quality of products that have characteristics reach the market target in all societies level

In the other hand the weakness of the factors and strategies for developing distrbusi corn product, namely (1)increased the volume of production / inventory to reach the market target (2) increased the promotion of product and price information, and open market distribution are required to push the product be accepted by all level of consumers

IV. Conclusion

1. Maize Farming Profile in the district of Gorontalo

Data group, the number of members and the largest corn crop cultivated area in the district are in the village BatudaaDunggalais by 8 groups, 187 the number of members of the group, and 157.3 ha of arable area corn crop. As for the District Pulubala amount of data contained in the largest group, namely PuncakDesa some 32 groups, for the highest number of members in the village Toyidito there is a number of 705 members and the largest corn crop cultivated area located at Peak Village is an area of 701.21 ha.

2. Production analysis of Corn shrimp stick

Home industry of shrimp corn stick will be gained profit whene the revenue larger than the break event point value is Rp. 120.000, if the production obtained exceeds the limit break-even point is 11 975 grams and if the price obtained exceeds the limit break-even point is Rp. 52,500.

3. Production analysis of Dodol sweet corn

Home industry of corn dodol will be gained profit when the revenue larger than the break event point value Rp 170.174, if the production obtained exceeds the limit break-even point is 6.90 bucket and if the price obtained exceeds the limit break-even point is Rp. 19.550.

4. Factors and Distribution Development Strategy of Maize Products

Based on the analysis SWOT matrix, the factors and strategies for developing distrbusion corn product, namely 1)The high quality of material used are received well by the public, (2) has a good business prospects and environmentally friend, generates the possibility of new product development 3) flavor and quality of products that have characteristics reach the market target in all societies level

In the other hand the weakness of the factors and strategies for developing distrbutionMaize product, namely (1)increased the volume of production / inventory to reach the market target (2) increased the promotion of product and price information, and open market distribution are required to push the product be accepted by all level of consumers

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