

**SFRN** 2019

# PROCEEDING

Security in  
food,  
renewable  
resources,  
and  
natural  
medicines



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**3rd INTERNATIONAL CONFER-  
ENCE ON SECURITY IN FOOD,  
RENEWABLE RESOURCES, AND  
NATURAL MEDICINES 2019  
(SFRN 2019)**

Convention Hall Politeknik Pertanian Negeri Payakumbuh  
INDONESIA



hosted by,  
Politeknik Pertanian  
Negeri Payakumbuh



co-Hosted by,  
Universitas Andalas  
(UNAND)

## **QUANTUM-LEAP OF AGRI-FOOD SYSTEM 4.0 AND DELIVERY OF SUSTAINABLE DE- VELOPMENTS GOALS (SDGS)**

September 25-26, 2019



**PROCEEDING**  
**3rd INTERNATIONAL CONFERENCE ON SECURITY IN**  
**FOOD, RENEWABLE RESOURCES, AND NATURAL**  
**MEDICINES 2019 (SFRN 2019)**

**September 25-26, 2019**  
**Convention Hall Politeknik Pertanian Negeri Payakumbuh**  
**INDONESIA**

*Theme:*  
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*Theme:*  
**“QUANTUM-LEAP OF AGRI-FOOD SYSTEM 4.0 AND DELIVERY OF  
SUSTAINABLE DEVELOPMENTS GOALS (SDGS)”**

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**Welcome Message**  
**Executive Chairman of The 3rd International Conference on Security in Food,  
Renewable resources, and Natural Medicines (SFRN) 2019**



Dear Honorable ladies and gentlemen,

Good Morning and Assalamu'alaikum wr.wb

On behalf of the SFRN 2019 organizing committee, I am really honoured and delighted to welcome all of you to the 3rd International Conference on Security in Food, Renewable resources, and Natural Medicines (SFRN) 2019 at the State Polytechnic of Agriculture Payakumbuh, West Sumatra Indonesia

Our technical program is rich and varied with 8 keynote speeches and 4 invited talks and more than 170 technical papers split between 8 parallel oral sessions and 1 poster sessions. The speakers and participants came from 8 different countries, consist of Academicians, Scientists, Researchers, Practitioners, Professionals, and Government Officials in multidiscipline branch of knowledge, who gathered here today to share and discuss new findings and applications of innovations for promoting Food Security, Renewable Energy, Sustainable Resources and HealthCare Free for All, in particular for those who in needs. As the chairman of conference 2019 SFRN, I know that the success of the conference depends ultimately on the how many people who have worked in planning and organizing both the technical program and supporting social arrangements. This year, the conference is jointly organized by the Payakumbuh State Agricultural Polytechnic and Andalas University. We also thank to the steering committee for their wise and brilliant advice on organizing the technical program; and also to the the Program Committee, both from the Payakumbuh State Agricultural Polytechnic and Andalas University, for their thorough and timely reviewing of the papers and to the Director of Payakumbuh State Agricultural Polytechnic and the rector of Andalas University, and the Head of the Institute for Research and Community Service of Andalas University, and Payakumbuh State Agricultural Polytechnic. Our recognition should go to the Organizing Committee members who have all worked really hard for the details of the important aspects of the conference programs and social activities, and then we extend our gratitude to our students who bore the arduous burden for preparing this event.

We hope this event is also a good step in gaining strengthened cooperation between our universities as we know that the State Agricultural Polytechnic of Payakumbuh is part of the Andalas University previously, of course the psychological relationship between the State Agricultural Polytechnic and the Andalas University is really close.

Finally on behalf of the committee, we apologize profusely for all the shortcomings and everything that is not properly in organizing this event and hopefully AES-Network contributes significantly to the research and technology for the good of humanity.

Thank you

**Fithra Herdian, S.TP, MP**

**Message from Afro-Eurasia Scientific (AES) Network  
3<sup>rd</sup>International Conference on Security in Food, Renewable resources, and  
Natural Medicines (SFRN) 2019**



Dear Honorable and Distinguished guests,  
Ladies and gentlemen,

Assalamu'alaikum Warahmatullahi Wabarakatuh and Good Morning

On behalf of the AES Network, I am honored and delighted to welcome you to the 3<sup>rd</sup>International Conference on Security in Food, Renewable resources, and Natural Medicines (SFRN) 2019 at the Agricultural State Poly Technique of Payakumbuh, Indonesia. I believe we have chosen a venue that guarantees a successful technical conference amid the culture, delicacy and scenery of Payakumbuh, the city of “Rendang”.

The AES-Network aims to Promote Livelihood Through Food Security, Promote Future Smart and Green Mobility by Using Renewable Energy, Promote Prosperity by Equally Managing and Distributing the Sustainable Resources and Promoting Enjoyable Long-Life by using Natural Medicines With Free Health Care For All. The AES-Network was established in 2018 and already have memberships from 12 countries. Our members consist of Academicians, Scientists, Researchers, practitioners, professionals, and government officials from multidiscipline branch of knowledge, who gathered and contributed their expertise to share and discuss new findings and applications of innovations for promoting Food Security, Renewable Energy, Sustainable Resources and Free Health Care for All. In particular, the network aims to alleviate the condition of those who in dire needs. In the future, we also expect to provide technical demonstrations, and numerous opportunities for informal networking for Promoting Food Security, Renewable Energy, Sustainable Resources and Free Health Care for All. In this opportunity, we invited you to become our members and join our efforts for a better life to all of mankind.

As a team, we acknowledge the existence of mutual interest among university and college educators, researchers, activists, business sector, entrepreneurs, policy

makers, and all society members. We must promote the need to strengthen cooperation for establishing Security in Food, Renewable Resources, and Natural Medicines in Africa, Europe, and Asia.

The AES-Network believe, a firm foundation for mutual collaboration with the spirit of equality and partnership and thereby contribute towards sustainable development in these three regions.

Therefore, through networking, friendships, and joint efforts, the capacity of our network can be enhanced to address major challenges in securing the Food, Renewable Resources, and Natural Medicines in Africa, Europa, and Asia. Our Network goals are to increase the awareness of educators, researchers, scientific community, business sector, entrepreneurs, and policy makers in Africa, Europa, and Asia, that the future of a better world, lies within their responsibilities, and to improve the networking, mobility and mutual collaboration of scientific community, business sector, entrepreneurs, and policy makers in Africa, Europe, and Asia to energize the delivery of Sustainable Development Goals.

Finally, I hope that, by registering our network, you will be provided a common platform and support the exchange of knowledge, while at the same time, we offer constructive dialogue across and within the various interest and stakeholder groups, including the intended beneficiaries, and arrived at the best solutions to our terminal goal, Promoting Food Security, Renewable Energy, Sustainable Resources and Free Health Care based on scientific evidence in Africa, Europa, and Asian region.

Thank You for Joining us!

**President**

**Assoc. Prof. Dr. Eng. Muhammad Makky**



**Welcome Message**  
**Head of Institute for Research and Community Service**  
**Universitas Andalas**



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 SFRN 2019 in Payakumbuh, the city of “Rendang”, the prime of Indonesian delicacy.

In this esteem event, we share the knowledges, and imparted it 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 become a platform to gather and disseminate the latest knowledge which can be adopted for securing the food, resources, and health for mankind, in Asian, European and African region.

Academics, Scientists, 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. Therefore, we urge to all participants, to establish a scientific network that will voice the needs

Researchers in the multi sectoral aspects related to the benefit of mankind have been progressing worldwide. Food is a basic right, while energy drive the world. Human need a lot of resources so the civilization can be flourished. But human is not immune, and thus, ones need to take care of their health regularly. Modern Agri-food systems is the foundations of a decent life, a sound education and the achievement of

the Sustainable Development Goals. Over the past decade, 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. Unsustainable plantation management induced forest fire and posed haze hazard to the whole Sumatra island and our neighboring countries.

The human cost of the food and energy crisis has been enormous. Millions of families have been pushed into poverty and hunger. Thousands more suffering from the collateral effects. Over the past year, 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, or energy, nor even a health service. We must transform agricultural development, markets and how resources 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 Sustainable Development.

Thank You,

**Assoc. Prof. Dr.-Ing. Uyung Gatot S. Dinata,MT.**

**Opening Ceremony  
Rector 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 3<sup>rd</sup> Conference on "Security in Food, Renewable resources, and Natural Medicines (SFRN)" 2019. 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 our most respected and distinguished guest “The ministry of Agriculture of the Republic of Indonesia”. We also welcome the mayor of Payakumbuh and the Regent of Lima Puluh Kota. We extend our welcome to the 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 the security for all as an 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 Access to medicines - a fundamental element of the right to health. Health is a fundamental human right, indispensable for the exercise of many other rights in particular the right to development, and necessary for living a life in dignity. Moreover, human rights principles and language are being used to support resource access claims as rights-based approaches empower individuals and groups to gain or maintain access to natural resources

Much progress has been made during the last decades but much more needs to be done. Millions of people are Insecure worldwide, meaning that they either starve or they do not know from where their next meal, health care or resources will come.

Much of the progress on 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, and health will deteriorate significantly. Without available resources to seek, mankind will become endanger species in a very short time.

Solutions to the security 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 security for all and back it up with action, the world may not achieve the goal by 2030. 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 “3<sup>rd</sup> International Conference on Security in Food, Renewable resources, and Natural Medicines (SFRN) 2019” in Payakumbuh.

Thank you.

**Rector,**  
**Prof. Tafdil Husni, SE, MBA, PhD**

**Welcome Message**  
**Director of Politeknik Pertanian Negeri Payakumbuh**



Dear Honorable ladies and gentlemen,

Good Morning and Assalamu'alaikumwr.wb

I congratulate to all participants on the invitation and participate at our beloved campus Payakumbuh State Agricultural Polytechnic. I feel really honoured to welcome all of you at our event, the 3rd International Conference on Security in Food, Renewable Resources, and Natural Medicines (SFRN) 2019 at the Payakumbuh State Agricultural Polytechnic, Indonesia.

Food security is a very important aspect in a country's sovereignty. Food also determines the future direction of a nation. Many social and political fluctuation can also occur if food security is disrupted. Food availability that is smaller than its needs can create economic instability. This critical food condition can even endanger economic and national stability. In the current situation, there are many challenges in exteriorize food security, such as climate change, population, limited natural resources and other challenges both locally, regionally and globally.

Renewable resources are also our starting point to start sustainable development. Research on renewable resources is also very important as the solution in meeting the principles of sustainable development. As we know that Sustainable development is the development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Sustainability is the foundation for today's leading global framework for international cooperation - the 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SDGs)

The discovery of treatment based on local culture also contributes greatly to the good of humanity. Unfortunately, there are still many treatments that have not been carried out by scientific research. So, through this conference we hope it can be a trigger to increase in traditional plant-based treatments that not go through complex

chemical processes, so that the effectiveness of the pillars can be further suppressed and also contribute to the community's economy.

Finally, I would like to express my gratitude to all people who involved in organizing this event and to all of stakeholders who have helped to make this event go on successfully. Please accept my apologize for any shortage, Assalamu'alaikumwr.wb.

Thank you

**Ir. Elvin Hasman, MP**

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Donard Games <sup>\*1)</sup>, Hanalde Andre<sup>2)</sup>, Amri Syahardi<sup>3)</sup>

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**Abstract.** Innovation and commercialization have become important terms in universities in emerging market economies. This paper uses conceptualization from innovation readiness level and incubator-science Technopark relation in the context of Andalas University. It was found that innovation performance needs to focus on marketing aspects such as positioning and branding. The role incubation with the new approach is also needed. In terms of commercialization, Science Technopark needs to promote collaboration and clarity in terms of university-industry relations. This paper can provide a greater understanding regarding the innovation performance and commercialization in a university in an emerging market economy (i.e., Indonesia) and how Andalas University may play a greater role in innovation in Indonesia.

**Keywords:** academic entrepreneurship, Andalas University, business incubator, science technopark,

### INTRODUCTION

While universities have been regarded as primary sources of innovation, they may need to improve their innovation performance. For a long time, universities in Indonesia were heavily focusing on teaching and research. Recent trends and development in higher education institution evaluation performance have required universities to innovate. Lasi et al. (2014) have identified a revolution in technological development and implementation has required appropriate strategies. Kementerian Perindustrian (2018) has identified that Indonesia needs to adopt technological innovation that is in line with rapid changes in technology and society. As such, as suggested by Guimon (2013), universities in developing countries, in general, are having difficulties in promoting university-industry collaboration. In this case, universities need to transform their inventions and research into products or prototypes which are one step closer to commercialization (Games and Rendi, 2019). It is not easy to change the academic culture into the business culture. However, it is expected that academic entrepreneurship will prevail as universities can be fast learners due to their nature. This paper's objective is to investigate leading factors to enhance the level of innovation performance in universities in Indonesia. This is conducted through the case of Andalas University which is in the process of

enhancing its innovation performance. It is a top eleven universities in Indonesia, which is ranked 7<sup>th</sup> in terms of innovation by the Ministry of Research and Higher Education in 2018. Despite its progress, Andalas University is still behind major universities in Indonesia, which are predominantly located in Java.

Universities need a strategic path, which is an effective way to enhance their innovative performance. University's innovation performance indeed has been evaluated as one of the key university performance indicators by the Ministry of research and higher education. The ministry has also used innovation readiness level which evaluates each product that comes from researcher's invention. In general, the government expects academic entrepreneurship will prevail if universities can maximize their resources especially their human resources which is logical as universities are rich in talented people (Hewick, 2006). As such, universities cannot rely on individual talents. Rather they need to strengthen institutions that manage startup teams and commercialization.

## **METHOD**

The present study uses a case study method by analyzing the case of innovation and commercialization in the context of Andalas University, the university in West Sumatra, Indonesia that has the initiative to accelerate its innovation performance. The present study evaluates the university's innovation performance, mainly from the performance of the business incubator and science technopark. Data were gathered from business incubator and science technopark performances and from interviews with the Head of Research and Community Services of Andalas University, who is responsible for enhancing innovation performance in Andalas University. It would have given some insight from both existing conditions and future strategic innovation for Andalas University.

## **RESULTS**

Innovation essentially is about how to transform an invention into products that would be accepted by markets. In this case, universities need to have a supported system that ensures they can innovate. In terms of business incubation, it was found that Andalas University tends to focus on particular products that have been taken for granted as representatives of Andalas University. Here inventors have played a more significant role in enhance their products. For example, Gambir based products have become a flagship for the university's product. It is because Gambir based products are considered to have a sustainable competitive advantage as they are regarded to have VRIN (Valuable, Rare, Inimitability, and Non-Substitutable). As suggested by Talaja (2012), VRIN can be a source of competitive advantage, and natural resources can be useful to enhance economic development as long as it is carefully managed by stakeholders (Wu, Li, and Li, 2018). West Sumatra indeed is the main producer of Gambir in the world, and Andalas University has capable researchers that focus on Gambir. However, gambir based product is still unable to enter a wider market successfully. It is unfortunate, but logical explanations can be provided as follows:

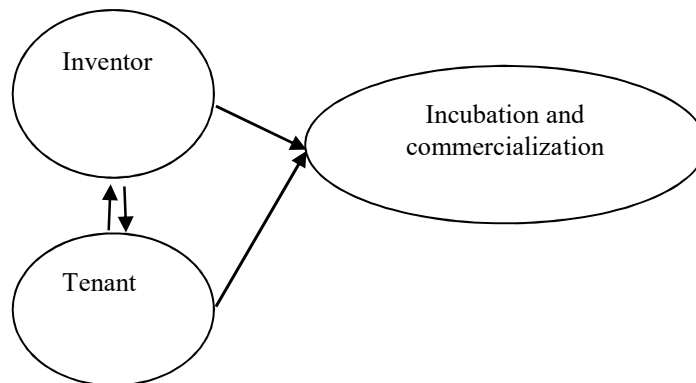


Figure 1. Inventor, Tenant, and Incubation and Commercialization in Andalas University

As can be seen from figure 1, there is a strong link between inventors and tenants. It is expected that incubation and commercialization will involve tenant as incubated, while inventors are expected to let their tenants or partners carry on their innovation projects. What happens was inventors tend to significantly influence tenants in many ways as they perhaps do not trust them. As a result, incubation and commercialization may not be able to assist tenants as they are still dealing with the inventor's expectation.

Innovation readiness level for some products such as gambir and mangosteen based products shows that these products are having difficulties in terms of marketing and innovation-related aspects. In terms of marketing, most of the products have no market survey that captures the essence of what markets need and want. Furthermore, there is still no research that identifies customers' perceptions regarding these products. It is important because VRIN does not guarantee that products will be automatically accepted by the markets. In terms of technological innovation, it seems that products from Andalas University need to implement technological innovation that can enhance innovation and organizational performance as a whole. For example, tenants need to focus on new product development that characteristically will change the end products. It is possible that their difficulties in marketing and sales are caused by their lack of new product development that is meaningful.

In a broader sense, marketing and technological innovation issues are related to the role of incubator and science Technopark. Incubators will strengthen startup and new product development that is market driven, while science Technopark will enhance the phase of commercialization. Our interviewee confirmed the importance of these two institutions. He also emphasized the importance of a new approach in how they are dealing with innovation in Andalas University. Firstly, it is important to implement a voucher system for incubation. It is a different approach compared to what has happened in the past. Previously, Andalas University provides incentives such as seed funding and working capital to particular products. In the current voucher system, the incubator will focus on some actual needs from tenants. For example, if a tenant or startup has a lack of financial and tax knowledge, the incubator will provide training in this regard. It is in line with a study by Cooper,

Hamel, and Connaughton (2012) that emphasized the importance of incubation that is based on tenants' needs. It is expected that this mechanism will provide an effective way to enhance the tenant's performance.

Science Technopark Andalas University, which was established since 2018, also needs to have a different approach. It needs to focus on commercialization. It means that science Technopark needs to focus on the commercialization of innovative products and intellectual properties from Andalas University. How to sell the intellectual property and how to approach industry to invest in the university's products and hands-on industrial training would be the main task for Science Technopark Andalas University. In addition, as suggested by Romanelli and Khessina (2005), clusters development can be useful for industrial development and, university can play a greater role in this regard by providing technological innovation. In brief, there should be a close relationship between incubator, science Technopark, and industry.

It is hard to manage university-industry collaboration, which may have different interests. Therefore, as suggested by Bruneel, d'Este, and Salter (2010), it is important to build trust among university and industry by focusing on the costs and benefits of management and monitoring efforts. It means that Science Technopark Andalas University is required to have a strategic plan that can indicate the way to achieve a better university's innovation performance. It also requires the university's capability to adapt to new situations or changes.. Halibas, Sibayan, and Maata (2017) have identified that Penta Helix model may enhance innovative collaboration. In this case, Andalas University should need to proactively promote collaboration among stakeholders such as the government, media, and community.

## **CONCLUSIONS**

It was found that incubator and STP can have a greater role in enhancing the university's innovation performance in Andalas University. It is a moment for the university to enhance commercialization through incubator and science Technopark. The voucher system in incubator represents the willingness of Andalas University to fulfill their tenant's needs and wants. University and industry collaboration through trust and proper strategies is a key point in enhancing innovation performance in Andalas University. All in all, Andalas University needs to facilitate and nurture knowledge as it is a source of innovation in Sumatra, Indonesia.

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