

SFRN 2019

Security in
food,
renewable
resources,
and
natural
medicines



PROCEEDING

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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



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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
3rd 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 3rd 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 3rd 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 “3rd 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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Determining Factors and The Elasticity of Demand Chicken Eggs Household Consumer in Sijunjung Regency

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Abstract. This research was motivated by the importance of increasing animal food consumption households to form a healthy, smart, productive, and quality society. Chicken egg is one of the protein sources from the animal, which is essential for daily consumption. The objective of this research was to determine: (1) The level of chicken egg consumption in household consumer in Sijunjung Regency. (2) The factors that influence the level of chicken egg consumption in household consumer in Sijunjung Regency and (3) The elasticity value of chicken egg consumption in household consumer in Sijunjung Regency. This research used an econometrics approach by developing a model of the demand function for chicken egg commodity by using primary data, the data is cross-section data. The number of samples is 100 households. The analysis is using the multiple regression equation. The estimating of model parameters is using the ordinary least squares method. The results of the research showed that the level of chicken egg consumption in household consumer in Sijunjung has been over the national nutrient norm standard. Household demand in Sijunjung Regency for chicken egg aggregate was influenced by the price of a commodity, the price of a substitute good (chicken meat) and household income. The value of chicken egg price elasticity is 2,08 (elastic) and the elasticity of income is 0,52 (inelastic). The variable of substitute reasonable price that influences to chicken egg consumption in Sijunjung District is the price of chicken meat with the value of the cross-price is 1,70 (elastic).

Keywords: Demand, Elasticity, Chicken Egg, HouseHold Consumer.

INTRODUCTION

Protein is one of the most important nutrients in resource development. UNICEF acknowledges that nutritional improvement based on fulfillment protein needs have contribution around 50% in the economic growth of developing countries. Animal protein worth considered as an agent of development for the growth of the nation both for the present and the future (Ariningsih, 2004). Food is part of human rights. The level of food consumption is an indicator of welfare.

The SDGs (Sustainable Development Goals) target in objective 2.1 states that in 2030 the government will eliminate hunger and ensure access for all people to safe, nutritious and sufficient food. The importance of increasing animal food consumption households to form a healthy, smart, productive and quality society.

Chicken egg is one of the protein sources from the animal which is essential for daily consumption. From several animal protein sources, chicken eggs are very easily obtained by the consumer to meet the needs of animal protein. This is because the price of chicken eggs is relatively cheaper than other animal protein sources.

Consumption of animal food in the Sijunjung Regency is still low, which is 51 gr/cap/day (BPS Kabupaten Sijunjung, 2017). The level of animal food consumption recommended by the National Nutrition Norm is 57 gr/cap/day. The contribution of broiler eggs in the fulfillment of animal food in the Sijunjung Regency is still low, which is 2,07 kg/cap/year. While the level of chicken egg consumption recommended by the National Nutrition Norm is 4 kg/cap/year.

We need comprehensive information about the factors that influence the demand for animal protein. According to economic theory, the factors are affecting the level of consumption of a commodity is the price of the goods, the prices of other goods that are closely related to the goods household income, style of income distribution in society, people's taste, population increase and the prediction of the state of the future (Sukirno, 2005). It has suspected that there are other variables determine the level of consumption population of livestock commodities. That is the social variable include: housewife education, housewife's job, community awareness of nutrition and age. Based on that problem, The objective of this research was to determine: (1) The level of chicken egg consumption in household consumer in Sijunjung Regency. (2) The factors that influence the level of chicken egg consumption in household consumer in Sijunjung Regency and (3) The elasticity value of chicken egg consumption in household consumer in Sijunjung Regency.

MATERIALS AND METHODS

This research conducted at Sijunjung Regency. This research conducted for 5 months (April–August 2019). This research uses the survey method. This research uses an econometrics approach by developing a model of the demand function for chicken egg commodities by using primary data. The data is cross-section data.

Research variable: 1) Characteristics of the household: age of housewife (years), number of household members, housewife education, household income and housewife knowledge about nutrition, 2) Chicken egg consumption rate (kg/week/RT) and 3) Purchase price (Rp/kg): chicken egg prices and the prices of other goods (substitute/complementary good)

Population and sample. The population of the research is all households that consume egg chicken at 3 chosen districts. The number of samples is 100 households. The analysis is using the multiple regression equation. The estimating of model parameters is using the ordinary least squares method.

Household demand function for chicken egg:

$$Q = b_0 + b_1P_{tar} + b_2P_{bsk} + b_3I + b_4U_{ibu} + b_5N + b_6D_1 + b_7D_2 + b_8D_3 + U_i$$

Q = the total of chicken egg consumption (kg/week/RT)

P_{tar} = chicken egg prices (Rp/kg)

P_{bsk} = substitute/complementary goods prices (Rp/kg)

I = income (Rp/months)

U_{ibu} = housewife age (years)

N = the number of household members (people)

D_1 = 1; housewife education graduated from high school

0; did not graduate high school

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D2 = 1; housewife knowledge about nutrition is high
0; housewife knowledge about nutrition is low

D3 = 1; working housewife
0; unworking housewife

b_0, b_1, \dots, b_8 = parameter which states the absolute increase in the independent variable if the independent variable changes to one unit.

U_i = error factor in the i -th observation.

Data analysis. Estimating the parameters of the model is done by the ordinary least square. With the SPSS program (Statistical Package for Social Science).

Model Evaluation:

- Statistic test: F test (analysis model of variance/ANOVA) and t-test
- Econometrics criteria: satisfy the classic assumption that is free from cases of multicollinearity, autocorrelation, and heteroscedasticity.

Calculation of elasticity values: a) Price elasticity, b) Income elasticity and c) Cross elasticity.

RESULT AND DISCUSSION

1 Food Consume Pattern in Sijunjung Regency

Information about the structure of household expenditure for food and non-food items can indicate how vital food expenditure is in the structure of household expenditure. This is beneficial for policymakers in the food and nutrition sector because the share of expenditure can be used as an indicator of household welfare (BPS Sumbar, 2018). In this case the higher the share of household expenditure on food, the lower the welfare of the household concerned. The monthly household expenditure of the population of Sijunjung Regency is shown in the following Table 1.

Table 1. Average Total Expenditure, Food and non-food Expenditures to Total Household Expenditure a Month based on Income Level at Sijunjung Regency

Income group	Expenditure Average (Rp/month)			Share of Expenditure (%)	
	Total	Food	Non Food	Pangan	Non-Pangan
Low	1.835.100	1.316.000	519.100	72	28
Medium	3.032.737	2.037.700	995.038	68	32
High	5.416.175	2.979.300	2.436.875	56	44
Sijunjung Regency	3.011.400	1.945.900	1.065.500	68	32

From Table 1 above it is shown that the share of expenditure on food is higher in low-income households. The higher the income strata, the smaller the share of expenditure for food, and conversely the share of expenditure for non-food is higher in high-income households. In these high-income strata households, the need for food is fulfilled so that these households turn to other needs for lifestyle and pleasure, for example, to buy luxury goods to improve living standards or social status in front of others. Even non-food needs can be spent on the education costs of

their children to a higher level. This also shows that the higher the income strata, the greater the share of non-food expenditure will be.

The high share of food expenditure in low-income households justifies the assumption that low-income households have a more significant share of food expenditure. This fact is consistent with Engel's Law that when income is low, the share of food production increases and decreases as income increases.

In aggregate the share of household food expenditure to total expenditure was 68%. this means more than half of the household expenditure is spent on food consumption. This figure categorizes that household welfare in Sijunjung Regency is still relatively low because more than half of the income is spent on food consumption.

The table also shows the total income gap between low-income and high-income households, where the total expenditure for high-income households is approximately three times the total expenditure for low-income households. This gap is lower than the findings of Ariningsih (2004) who state that the income gap in high-income households reaches more than four times the expenditure of low-income households in Java. This indicates that the gap in Java Island is larger than in Sijunjung Regency.

2 The Level of Chicken Egg Consumption in Household Consumer in Sijunjung Regency

The chicken egg acts as a commodity source of animal protein from the people of the Sijunjung Regency. Where the average household consumption level per week is 0,99 (kg/Rt/week), while the average per capita consumption per week is 0,227 kg/capita/week. When viewed based on household consumption, the level of consumption increases with increasing income. By following economic theory, the higher the income the higher the level of consumption. As seen in Table 2 below.

Table 2. The Consumption Average Level of Household Chicken Egg on Income Strata at Sijunjung Regency

Income group	Chicken Egg Consumption	
	Kg/Rt/Week	Kg/Cap/week
Low	0,79	0,21
Medium	1,01	0,22
High	1,36	0,29
Sijunjung Regency	0,99	0,23

From Table 2 it can be seen that the average household consumption level varies between income groups. This is by following the opinion of Prasetyo and Ihalauw (2005) explaining that the level of income reflects purchasing power. The higher the level of income, the stronger purchasing power so that the demand for commodity increases.

3 The Factors that Influence the Level of Chicken Egg Consumption in Household Consumer in Sijunjung Regency

Variables that are expected to influence household demand for chicken egg in the Sijunjung Regency are the prices of chicken egg, household income, number of households, prices of other goods that are closely related to chicken egg, level

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housewife education, housewife's knowledge of nutrition and housewife's age, averaged (mean) for each variable, which can be found in Table 3.

Table 3. Results of Estimation of household Demand Model for Chicken Egg in Sijunjung Regency

Variable	Mean	unit
Total consumption of household chicken egg	0,99	(kg/Rt/week)
Chicken egg price	21.918	(Rp/kg)
Chicken meat price	32.369	(Rp/kg)
Household income	3.011.400	(Rp/month)
Housewife's age	45	(years)
Number of household members	4	(people)
Housewife's education	50	(%)
Housewife's job	30	(%)
Knowledge of housewife nutrition	44	(%)

Based on the results of the study also obtained information that the average price of a chicken egg is Rp21.918,-/ kg and the price chicken meat which are substitutes for chicken egg an average of Rp32.369,-/ kg. Judging from the average price of the chicken egg above, it can be concluded that the price of chicken egg commodities has continued to increase from year to year. This can be seen from the list of chicken egg prices from 2016-2019 in Table 4 below.

Table 4. Chicken Egg Price 2016-2019

Year	Chicken Egg Price (Rp/kg)
2016	22.350 – 24.200
2017	18.000 – 22.600
2018	21.000 – 25.000
2019	21.900 – 23.400

Based on National Food Price Information data, the increasing chicken egg price from year to year will have an impact on people's purchasing power of chicken egg in meeting the demand for protein from livestock, this condition will complicate the realization of a food security program. Based on the results of the study also obtained information that the average household income in Sijunjung Regency is Rp 3.011.400,- /month, this shows that the average household in this region is classified as a household that has a level income above Regional Minimum Wage (RMW).

For the condition of the characteristics of the household, consumers obtained information that the average number of household members in this region is 4 people/Rt. Furthermore, housewives in Sijunjung Regency have an average age of 45 years, with an average level of education of 50% of high school graduates, while 50% have elementary and junior education. For housewives' knowledge about nutrition, 44% of housewives have great knowledge about nutrition.

Housewives are determinants of consumption patterns in households with higher education they automatically understand and understand nutrition and are more selective in choosing healthful foods. Because in the opinion of Harper et al (1986), highly educated mothers always choose the type of food for their families by

considering the nutritional requirements in addition to considering tastes. Therefore, housewives generally manage all food and family needs.

In phase I, all variables are included in the model as variables that are thought to influence household consumption of chicken eggs. The results of the estimation of the stage I model are summarized in Table 5 below.

Table 5. Estimation Results of Request Function Models Chicken Egg Stage I

Model	Variable	Nilai sig.	R ²	Adj R ²	Koef. regresi	T Sign.	D-W	Tolerance	VIF
Linear		0,000**	0,431	0,381			2,205		
	Constant				1193				
	Pdb				0,031	0,069*		1,842	1,187
	Ptar				0,060	0,000**		1,776	1,288
	I				0,0001	0,000**		0,785	1,274
	Uibu				-4,741	0,298 ^{NS}		0,901	1,110
	N				-23,761	0,445 ^{NS}		0,836	1,196
	D ₁				-59,283	0,546 ^{NS}		0,725	1,378
	D ₂				-54,828	0,564 ^{NS}		0,788	1,269
	D ₃				2,776	0,977 ^{NS}		0,936	1,068

Note: ** = significant at 1% level * = significant at 10% level NS = non significant

From the results of the estimation of the stage I, model the ANOVA result (F-test) is significant, meaning that the model can be accepted, as a whole the variables together have a significant effect on chicken egg consumption at 1% (P <0.01) which is indicated by the significant value at F-test results of 0,000.

The model is free from autocorrelation cases because the Durbin-Watson value is between 1.55 to 2.46. The model also shows that the tolerance value is close to 1 and the VIF is around 1, and the correlation coefficient is weak, below 0.5. This shows that in this model there were no cases of multicollinearity.

It turns out that in the model, variables other than price and income have no significant effect on the amount of consumption of chicken egg. To get better results, try to make a new model that only includes the variable price and income into the explanatory variable. The results of the estimation of the model in stage II are summarized in the following Table 6.

Table 6. Estimation Results of Request Function Models Chicken Egg Stage II

Model	Variable	Nilai sig.	R ²	Adj R ²	Koef. regresi	T Sign.	D-W	Tolerance	VIF
Linear		0,000**	0,418	0,400			2,205		
	Constant				901				
	Pdb				0,029	0,084*		1,842	1,187
	Ptar				0,057	0,000**		1,776	1,288
	I				0,0001	0,000**		0,785	1,274

Note: ** = significant at 1% level * = significant at 10% level

From the results of estimating the model, the request function can be made:

$$Q = 901,607 + 0,029 Pdb - 0,057 Ptar + 0,0001 I$$

It turns out that the model that only included the price and income variables was relatively better than models that include household characteristic variables as one of the explanatory variables that affect the consumption of chicken egg. The model can be used to reflect the demand behavior of chicken egg by households in

Sijunjung Regency, wherefrom the ANOVA test results it can be concluded that the model can be accepted meaning that the overall explanatory variables are variable chicken egg price, chicken meat price, and household income, together significantly affected the consumption of chicken egg at 1% ($P < 0.01$) as indicated by the significant value on the F-test results for the above model of 0,000.

The model also fulfills the multicollinearity case shown by the tolerance value close to 1, which ranges from 0,785 to 1,842 and the VIF number is around 1, which ranges from 1,187 -1,288. The freedom of the model from the autocorrelation case is shown by the D-W value of 2,205. Models without including household characteristic variables as explanatory variables are also free from heteroscedasticity cases as indicated by the absence of clear patterns in scatterplot diagrams where the points spread above and below zero on the Y-axis (Santoso, 2000).

The coefficient of determination for the model that is 0.418 means that the variation in the level of household consumption of chicken egg 41,8% can be explained by the variable chicken egg price, chicken meat price and household income. From the results of the t-test, it turns out that the variable chicken egg price, chicken meat price, and household income have a significant effect on the level of household consumption of chicken egg, on 1-10% ($P < 0,01$ and $< 0,05$).

With the fulfillment of economic, statistical and econometric criteria in the model, it can be concluded that the model produces valid estimators. All variables included as explanatory variables have a significant effect on the consumption of chicken egg. This is also shown by the higher Adj R2 value. This is by following the opinion of Santoso (2000), if the value of Adj R2 increases due to the exclusion or addition of a variable into the model, it indicates that the new model is relatively better than the previous model. Thus it can be concluded that the model chosen to explain household consumption behavior towards the chicken egg in Sijunjung Regency is a model without including household characteristic variables as explanatory variables.

4. The Effect of Explanatory Variables on Chicken Egg Consumption

Influence of chicken egg. The variable price of a chicken egg has a significant effect on 1%. The influence of chicken egg prices on the demand for a chicken egg is -0,057. This means that if the price of the chicken egg goes up by 100 rupiahs, the demand for chicken egg decreases by 0,057 g and vice versa, if chicken egg price drops by 100 rupiahs, the demand for a chicken egg will go up by 0,057 g. The regression coefficient value which is negative shows the relationship between price and consumption level in the opposite direction. This means that if chicken egg price goes up, household consumption of chicken egg goes down, and vice versa. This is by following the law of demand, the lower the price of an item, the more demand for that item and vice versa (Sukirno, 2005).

Influence of household income. Variable income significantly influences the amount of **chicken** egg consumption for the Sijunjung Regency with a real level of 10%. The magnitude of the effect of household income on demand for the chicken egg is 0,0001. This means that if household income rises by 10,000 rupiahs, the demand for broiler meat will increase by 1 g and vice versa. The positive regression coefficient indicates that consumption will increase with increasing income. This means that chicken egg for households for Sijunjung Regency is a standard item.

Influence of other goods prices. It turns out that the amount of household consumption in the Sijunjung Regency on the chicken egg is influenced by chicken meat prices with a real level of 10%. The regression coefficient for the variable price

of chicken meat is 0,029. The value of the regression coefficient that is positive indicates the relationship between chicken eggs and chicken meat is a substitution. When the price of chicken meat increases, the consumption of chicken egg will decrease. Different things were found in the results of research conducted by Ilham et al (2002), where they found a complementary relationship between broiler eggs and broiler meat.

5. The Elasticity Value of Chicken Egg Consumption in Household Consumer in Sijunjung Regency

In aggregate Sijunjung Regency, the magnitude of elasticity is shown in Table 7. The value of price elasticity shows that the demand for animal food in general in Padang City is inelastic. This means that if the price of animal food rises by 1%, then the demand for animal food will experience changes smaller than the percentage change in animal food prices.

Table 7. The Elasticity of Household Chicken Egg Demand in Sijunjung Regency (aggregate)

Elasticity of Demand	Value
Price elasticity	2,08 (elastic)
Income elasticity	0,52 (inelastic)
Cross elasticity	1,70 (elastic)

Price Elasticity. The value of price elasticity in The Sijunjung Regency is elastic, as indicated by the value of price elasticity of -2.08 meaning that if the price of chicken eggs rises 1%, then consumption of chicken egg will decrease by 2.08%. This means if the price of chicken eggs changes, the consumption of chicken eggs will change with a percentage that exceeds the percentage change in chicken eggs (Sukirno, 2005).

Income Elasticity. The value of income elasticity is inelastic, which is shown by the value of the income elasticity which is smaller than one, which is equal to 0.52. if income rises 1%, then demand for chicken egg rises by 0.52%. This means that an increase in income has only a small effect on the level of consumption of the chicken egg. This indicates that chicken egg is a typical item for households in Sijunjung Regency. According to Sukirno (2005), an item is called a standard item, if it experiences an increase in demand as a result of an increase in income.

Cross Elasticity. Cross elasticity is elastic as indicated by the value of price elasticity that is greater than one, that is equal to 1.70, meaning that changes in the price of chicken meat are responsive to changes in consumption of chicken egg, where if the price of chicken meat rises 1%, the demand for chicken egg will an increase of 1.70%.

CONCLUSIONS

- a. the level of chicken egg consumption in household consumer in Sijunjung has been over the national nutrient norm standard
- b. Household demand in Sijunjung Districts for chicken egg aggregately was influenced by the price of a commodity, the price of a substitute good (chicken meat) and household income.

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- c. The value of chicken egg price elasticity is 2,08 (elastic) and the elasticity of income is 0,52 (inelastic). The variable of substitute reasonable price that influences chicken egg consumption in Sijunjung District is the price of chicken meat with the value of the cross-price is 1,70 (elastic).

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