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# Table of Contents

## PARALLEL SESSION - 1

### ROOM-1 (ENGINEERING, ENVIRONMENT & TECHNOLOGY)

1. Emir Lutfi Pahlevi, Syiska Yana, Fuzzy Logic Based Wind Turbine Pitch Angle Control (Electrical Engineering, USU) .......................................................... 3
2. Farida Hanum, William Wardhana Kasim, Effect Of Voltage In Reactor Electro Coagulation Treatment Of Palm Oil Mill Effluent Of Anaerobic Pond (Chemical Engineering, USU) .......................................................... 8
3. Maulida, Suriani Sinaga, Palimeila, Margarethea, Alissna Tesanika, Trecy Kartika, Influence Of Microcrystalline Cellulose Avcel PH 10/1 As Reinforcement Filler And Gliserol To The Properties Of Starch Based Bioplastic From Cassava Peel (Chemical Engineering, USU) .......................................................... 12
4. Pandapan Tarnip, Hamidah Harahap, Rosdanie Hasibuan, Okta Bani, Effect Of Adsorbate Concentration And Drying Temperature Of Natural Rubber Latex Waste And Water Hyacinth Based Adsorbent On Grease Adsorption In Water (Chemical Engineering, USU) .......................................................... 17
5. Solly Aryza Lubis, Zuikarnain Lubis, Implementation New Design Charging Unit For Hybrid Eco Campus Vehicle Based On Solar Power (University of Penea Budi Medan) .......................................................... 20
6. Agus Setyo Budi, Ervina, Esmer Budi, Temperature and Additive Coconut Shell Charcoal Effect on Density and Porosity of Ceramic membrane Based On Zeolite and Clay (Physics, UNJ) .......................................................... 25
8. A.Muthholib, Yonariza, Mahdi, Hanung Ismono, Competition and Conflict: Stakeholders Interaction in Production Forest Management Unit Dharmasraya, Indonesia (Agriculture, Unano) .......................................................... 34
9. Affuddin Dalimunthe, Budi Utomo, Samuel Marpaung, Priska Devika, Inventory Of Mpts (Multy Purpose Tree Species) Plant In The Area Of Catch Water (Watershed) In Lake Toba District Karo And Simalungun (Forestry USU) .......................................................... 40
10. Hazmanan Khair, The Lifestyle of Indonesian Towards Medical Treatment in Malaysia Hospital (USM-Agriculture USM) .......................................................... 44

## ROOM-2 (SOCIAL SCIENCE)

1. Alfonsius, Marton Shombing, Rujman, Agus Purwoko, The Quality of Public Transportation Services in Medan (Regional Planning Area, USU) .......................................................... 51
2. Daniel, The Role of Iban Women in Rural Development in Sarawak (Humanities, USM) .......................................................... 56
3. Dewi Ayu Larasati, Slang As Social Identity in Stand-up Comedy Academy Indosiar: A Sociolinguistics Study (STBA Harapan Medan) .......................................................... 59
4. Emmy Erwina, Intonation of Litterance in Langkat Malay's Sad A Study of Acoustical Phonetic (STBA Harapan) .......................................................... 69
5. Lusiana Andrian Lubis, Salman Hasibuan, Communication Dynamics of North Sumatera Society in Virtual Culture Context (Magister Communication, USU) .......................................................... 77
6. M.Fuad, A Phenomenological Study of Daughter's Position as Successor in Small-Scale Family Firm (Case Study in Batu City, East Java - Indonesia) (Economic University of Samudra Langsa) .......................................................... 82
7. Rita Eka Izzati, Student Perception About Learning Motivation: Psychological Perspective (Psicology, UNY) .......................................................... 87
10. Satria Tirtayasa, The Relationship of Order of Entry and Business Performance Moderated by Market Place Factors (Economic, UMSU) ................................................................. 104
11. Ummi Umara, Nudia Yultsia, Theme: Configuration as Stylistic Realization of Pantun Malay Kang Ting wedding Ceremony (English Education, STKIP Budidaya Banjarmasin) .................................................. 112

ROOM-3 (COMPUTER)

1. Ahmad Rizal, Rahmat W Sembiring, Zulkarnain Lubis, Nurleya Hasibuan, Muhammad Dicky Syahputra Lubis, Rianto Sitanggang, Encryption Chipertext To Binary (Computer Sciences, USU) .......................................................... 127
2. Andysah Putra Utama Siahaan, Vernam Conjugated Manipulation Of Bit-Plane Complexity Segmentation (University of Pancé Budi, Medan) .......................................................... 129
3. Chaeroon Niesa, The Role Of Cryptography Of Vigenere Cipher In Information Security (Informatics, USU) .......................................................... 134
4. Chandra, Herman Mawengkang, Rahmat W Sembiring, Enhanced Security And Performance Efficiency Of Modified AES Algorithm (Informatics, USU) .......................................................... 141
5. Dian Kurnia, Zuhairi, Performance Analysis Of Management System Bandwidth Layer 7 Protocol, PCG, HTB and Hotspot In SMK Dwiwarna (Technology of Information, USU) .......................................................... 145
6. Dicky Nofriansyah, Marsono, Ahmad Fitriz Boy, Eye Iris Pattern Recognition And Data Secure Using Hopfield Discrete Algorithm And Least Significant Bit Method (STMIK Triguna Dharma, Medan) .......................................................... 151
7. Grace Lamudur Arta Silombsing, Muhammad Zaris, Rahmat W. Sembiring, Hybrid Cryptography Stream Cipher And RSA Algorithm With Digital Signature As A Key (Techniques Informatics, USU) .......................................................... 152
8. Harunto, Dahlil Abdullah, Dedy Hartama, Rosilin, Mhd Furqan, Muhammad Zaris, Zakarias Situmorang, Sentiment Analysis Using Context Based Fuzzy Linguistic Hedges (Computer Sciences, USU) .......................................................... 160
9. Niti Ravika Naution, Muhammad Zaris, Rahmat W. Sembiring, Cryptography Algorithm RSA-CRT Development With Techniques Steganography Random Least Significant Bits (LSB) (Faculty of Computer and Information Sciences USU) .......................................................... 163

PARALLEL SESSION – 2

ROOM-1 (ENGINEERING, ENVIRONMENT & TECHNOLOGY)

1. Budi Utomo, Christovorus Sintong Situmorang, Bangun Sikutang, dan Affuddin Dilmunthoe, Forest Humus Disturbances in tahura Bordering The Agricultural land Society, tongkoh Village, Sub-Province Keru (Forestry USU) .......................................................... 171
2. Catur Cahyaningsih, Carbonate Microfacies And Diagenesis Of Langgun Island, Langkawi Kedah Province, Malaysia .......................................................... 178
3. Danny Fatursyah, Achmad Djajadi, Study of Fuel Efficiency on Tug Boats With Use of Flowmeter Water Based Monitoring and Control System In P.T. X. (Marine Engineering, Darma Persada University) .......................................................... 181
5. Rini Mastuti, The Development of Sustainable Cattle Farms in East Aceh to Support the Domestic Resource-Based Self-Sufficiency of National Beef Production (Agriculture, University of Sumatera Langsa) .......................................................... 186
6. Rini Sulistiari, Lutfi A.M. Siregar, Various Factors Affecting Cultivation Sweet Potato (Ipomoea batatas L) in North Sumatera (Postgraduate Student Agriculture, USU) .......................................................... 195
7. Herri, Arif Prima Iwan, Yuliasmri, Rebi Fara Handika, M. Arifin, Turnaround Strategy from the Perspective of Strategic Leadership: Conceptual Review (University of Andalas, Padang) .......................................................... 200
8. Azhar Abdulricha Ibrahim, Jamaah H. Yahaya, Aziz Deraman, The Quality Dynamic Website Development: The Empirical Investigation among Practitioners (UKM, Malaysia) .................................................. 204
9. Mohammad Noer, Nonon Sanbaran, Andini Nurwulantri, Business Model Analysis of Natural Production Forest with Sustainable Forest Management Approach (University of National, Jakarta) .................................................................................. 212
10. Noor Hayat, Professor Dato, Dr. Adnan Hussein, Social Media and Virtual Politics of Pakistan: Measuring the Impact of Facebook on Youth (Communication, USM-Malaysia) .................................................. 219
11. Istiwandi Idris, Ruri Aditya Sari, Analysis of Attendance Level of Employee with Normal Distribution Method .................................................. 224
12. Warjio, Dynamics of Arab Family in Indonesia Development: Identity and Changing (FISIP USU) .................................................................................. 225

ROOM-2 (SOCIAL SCIENCE)

1. Anwar Muhammad Ali, The Correlation of Government Role and Zakat Management in Facing ASEAN Economic Community (AEC) (Universitas Malikul Saleh, Bandung Aceh) .................................................. 235
2. Conny, Learning Strategies and Sex Differences in Mastering Vocabulary (English Education, STKIP Binjai) .................................................................................. 240
3. Haneem Said, Roslind Xaviour Thambusamy, The Impact of Educational Practice of Forum Theatre on Criminal Attitude and the Readiness of Transition among Juvenile Offenders (UPSIP Malaysia) .................................................................................. 246
5. Noor Fadly, A. Rahim Matdang, Sirojzulam, Solyan M. Saleh, Frequency of Travel and its Relationship to the Structure of Space at Kuta Alam Sub-District of Banda Aceh (Regional Planning Area, USU) .................................................................................. 253
6. Syarifuddin Pohan, Quo Vadis Frequency as the Public Sphere in the Broadcasting System in Indonesia (FISIP. USU) .................................................................................. 256
7. Yulia Ayria, Agus Triyanto, Fadna Agus Setiawati, Career Interest and Knowledge of Lower Grade Students of Primary School .................................................................................. 264
8. S. Parman, Protection of Refugee And Asylum Seeker's Human Right by Indonesia as a Non-State Parties (UIK, Riau) .................................................................................. 269
9. Pin Pin, Family Business Descriptive Study On The Third Generation Family Business in Medan, Indonesia .................................................................................. 279
10. Safarina Abdul Ghani, Fatin Areena Azlan, The Relationships of Political Stability and Tax Incentive towards Marginal Oil Field Investment Climate (UCSI University, Terengganu-Malaysia) .................................................................................. 285
11. Simon S. Hutagalung, Agrarian Conflict in Indigenous Land Transfer (A Case Study of Conflict Reclaiming on Public Land District of Padang Ratu, Central Lampung, Province Of Lampung) (Unila, Lampung) .................................................................................. 295
12. Haneem Said, Roslind Xaviour Thambusamy, The Impact of Educational Practice of Forum Theatre on Criminal Attitude and The Readiness of Transition Among Juvenile Offenders .................................................................................. 303
13. Ummi Umara and Nudia Yuillisa, Theme Configuration As Stylistic Realization Of Pantun Malayu Langkat Wedding Ceremony (STMIK Budidaya, Binjai) .................................................................................. 304

ROOM-3 (COMPUTER)

1. Dicky Nooriansyah, Computer Vision And Steganography - Frame Difference, Edge Detection And Least Significant Bit Method For Object Movement Detection And Data Secure (Padang State of University) .................................................................................. 312
2. Ismail, Roy Nuary, Eka Hayana Heri, Tarida Yanti, Herman, The Application Of Fuzzy Mamdani Method To Predict The Number Of Procurement Office Stationery Based On Data Supplies And The Demand For (Study Case: Parliament Secretariat Sumut) .................................................................................. 321
3. Azhar Abdurridha Ibrahim, Jamaah H. Yahaya, Aziz Deraman, The Quality Dynamic Website Development: The Empirical Investigation among Practitioners (UKM, Bangi) .................................................................................. 324
4. Jhonson Efendi Hutagalung, M. Irfan Fahmi, Jeperson Hutahaean, Tool Design Automatic Flow For Controlling The Installation of Siple House Based on Microcontroller Atmega 8535 (Computer, AMIK Royal Kisaran) .................................................................................................................. 332
7. Nestiwi Sitorus, Kinanti Wijaya, Research Study On Heavy Equipment Productivity At Work Of Subgrade Preparation (Engineering Faculty, University of Medan). ............................................................................................................................ 348
9. Rico Imanta Ginting, Dicky Noftriansyah, Muhammad Dahria, Puji Sari Ramadhan, Improving Dijkstra Alogithm and North West Corner Method to Distribution of Need Processing (STMIK Triguna Dharma, Medan) .......................................................................................................................... 352
Integrated Farming System Based on Paddy Rice in The Framework for Regional Development In District of Lintong Nihuta Humbang Hasundutan Regency

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ABSTRACT

The aim of this study are; a) the effect of physical factors paddy rice farming and livestock in integrated farming system (IFS) to the regional development with indicators of income of farmers in District of Lintong Nihuta, b) the effect of social and economic factors of IFS to the regional development in District of Lintong Nihuta. This study uses analysis of linear regression with the assistance program statistical product and service solution (SPSS). The results showed; a) physical factors IFS in the form of a variable; land area, livestock breeds and livestock feed had a positive and significant impact on regional development, b) social factors IFS in the form of a variable; labor and education of farmers have a positive and significant impact on regional development, while social variables the dependents of farmers a negative effect on the regional development, c) economic factors IFS in the form of a variable; capital of farmers and output prices significant positive effect on the regional development, while the input price variable a negative effect on regional development in District of Lintong Nihuta. Suggested to the government Humbang Hasundutan: a) order a role in providing seed farming quality and affordable for farmers, in addition to the necessary counseling for farmers or ranchers about how to raise better, b) undertake education or training to improve traffic farmers in managing and development farming that have an impact on increasing the income of farmers and regional development, c) helping farmers to obtain capital more flexible farming and the government is also expected to contribute to maintaining price stability in the output of agricultural products Humbang Hasundutan Regency.

Keywords; Income, Integrated farming system, farmers, regional development, paddy rice.

INTRODUCTION

Development and regional planning is a process of development that is intended to make a change towards a better development for communities, governments and the environment in the region by utilizing a variety of existing resources (Riyadi and Baratakusumah, 2003). Regional planning and development is expected to generate structuring the area and space allocation in the manner intended for the smooth development that support the promotion of social welfare.

The agricultural sector has an important role in national economic development that includes several indicators including; agricultural sector acts as an absorber of labor, producing staple food for the population, agricultural commodities as a determinant of price stability, the development of agriculture as a driver of exports, agricultural commodities as material manufacturing industry and agriculture has a high sectoral linkages.

Agricultural development should be an effort to improve the welfare of farmers, and is able to promote the establishment of regional economic development through productive activities and high competitiveness. So farmers as agribusiness unit smallest rational achieve added value corresponding scale farming operation (integrated farming system).

Agricultural development can be done through intensification, extencification, diversification and rehabilitation in an integrated manner with the aim to increase people's income and the region. Development of the agricultural sector can be done with a variety of approaches that has been linked to several variables such as; seeds, irrigation, cultivation, fertilization, plant protection and others.

Development of the agricultural sector can also be done with a variety of approaches that have relevance to physical factors, namely; land use, fertilizer, seed, plant cultivation, plant protection. Social factors such as; labor, farmer education and institutional level. Economic factors such as; capital, farm family income, interest rates, inflation and the form factor of development; facilities and irrigation (watering).

Diabel et al, (2008), said that physical factors such as; fertility of soil, topography, land use, and social factors such as; management activities of farmers and shape affect the productivity of up to 10% of the farms are managed. Boix and Zinck (2008) also expressed over the planning of physical factors, namely; good land use affect monoculture farming systems for food commodities, helping farmers may use the land effectively. Development of the agricultural sector is a strategy to spur increased revenue and economic growth, thereby providing a multiplier effect in other sectors.

For Humbang Hasundutan, the agricultural sector has an important role for people's income and development of this region, because the agricultural sector is able to provide a higher contribution to GDP Humbang Hasundutan. The agricultural sector
contributed 52.79% (in 2012), and 53.6% (in 2014) to the GDP Humbang Hasundutan, with an average growth rate of 3.83% in 2009-2014.

In the second position is occupied by trade, hotels and restaurants by providing a contribution of 18.47% (in 2014) to the GDP formation Humbang Hasundutan with a growth rate of 8.75%, followed by the services sector, and service with a contribution of 15%, 84% (in 2014) to the GDP formation Humbang Hasundutan with a growth rate of 8.10% (BPS, Humbang Hasundutan Dalam Angka, 2015).

BPS (2014) show that the rate of growth of productivity of commodity rice on Humbang Hasundutan fluctuated 2009-2012. Year 2009 recorded 1.0%, rising to 1.48% in 2010 and fell to 0.10% in 2011 and rising to 0.60% in 2012, with an average growth rate of 0.80% and smaller than the average rate of growth of productivity of rice is 2.14% of North Sumatra Province (BPS Sumatera Utara, 2014), thus the much needed agricultural development planning to improve the productivity of agriculture in the region.

Agus (2006); Ugwumba (2010), said the integrated farming system (IFS) were able to improve the productivity of rice farming and improve the income of farmers. Rice production can be increased from the usual 5-6 tonnes/ha to 7.6 to 8 tons /hectare. Chili productivity can be increased from 0.5 kg / plant to 0.7 kg / plant (Nurcholish, 2011), even the integrated farming system (IFS) is more reliable if the constituent components is a local resource (Salikin, 2003).

Preston (2000); Pasandaran (2005); Supangkat (2009); Ugwumba (2010), delivering an integrated farming system (SPT) is a management system of plants, animals and livestock and the environment to produce optimal, so it requires good planning to increase incomes.

The advantages of this system, input from outside is minimal since the recycling of waste among the organisms constituent, biodiversity increases with the use of local resources, plant resistance against pests is higher and byproducts can serve as fuel biogas for household (Rodriguez and Preston 1997; Preston, 2000).

Sutanto (2002); Supangkat (2009) stated that the integrated farming system (IFS) has the advantage of both aspects of the ecological and economic, that is adaptive to changes in habitat, the farm is environmentally friendly, energy-saving, high biodiversity, diversification of products is higher, the product is healthier, sustainable farming better, better absorption of labor and sustainable.

District of Lintong Nihuta is one of the districts in Humbang Hasundutan Regency a potential for the development of the agricultural sector. In 2012 in this district there is a broad commodity of paddy rice with 1,992 ha, with a production of 7,615 tons with an average production of 3.82 tons/ha. Rice field is spread over 22 villages. Rice field of the most widely found in the Village of Siharjulu area of 168 ha with a production of 564.4 tons, with an average yield of 3.36 tonnes/ha (BPS, Lintong Nihuta, 2013). Average production of paddy rice in the district area of commodities is still much lower than the productivity of paddy rice in Region of Humbang Hasundutan.

The year 2012 recorded the productivity of paddy rice commodity in District of Lintong Nihuta is 3.82 tonnes/ha < compared to the productivity of paddy rice in Region of Humbang Hasundutan is 5.27 tonnes/ha, so it requires more comprehensive agricultural development in accordance with the potential and agro-environmental conditions in the sub-district order to increase the income of farmers in this district. Based on the above, the research conducted by the title of the integrated farming system (IFS) based on paddy rice in the framework of regional development in District of Lintong Nihuta Humbang Hasundutan Regency.

RESEARCH PURPOSES

Based on the background and the formulation of the problem, the purpose of this study are:

1. To determine the effect of physical factors paddy rice farming: land, paddy rice seed, paddy rice fertilizer, pesticide and physical factors of livestock; livestock breeds, livestock feed in the integrated farming system to the regional development with indicators of income of farmers in District of Lintong Nihuta.

2. To determine the influence of social factors; labor, education of farmer, dependent of farmer in the integrated farming system to the regional development with indicators of income of farmers in District of Lintong Nihuta.

3. To determine the effect of economic factors; capital of farming, input prices, output prices in the integrated farming system to the regional development with indicators of income of farmers in District of Lintong Nihuta.

RESEARCH METHODS

The research location is the District Lintongnihuta Humbang Hasundutan, determined intentionally (purposive) in accordance with the wishes of the researcher. The location of this research is an agricultural area with the potential to be developed in the framework of regional development.

The study population was farming communities that seek commodity rice paddy fields and farms in the household (small) by integration found in 13 villages of 22 villages in the district Lintong Nihuta, with a population of 1,903 households, and sampling is to purposive sampling or intentionally with a sample of 30 households and distributed proportionally on 13 villages, as in Table 1.
TYPES AND SOURCES OF DATA
The data used in this study are; primary data and secondary data. Primary data is data obtained from the field through interviews using questionnaires. Secondary data is data obtained sourced from the publication of the Badan Pusat Statistik (BPS) Humbang Hasundutan and various journals, research results and other official publications.

METHOD ANALYSIS OF DATA
To analyze the effect of physical factors of paddy rice farming: land are, paddy rice seed, paddy rice fertilizer, pesticide and physical factors of livestock: livestock breeds, livestock feed in the integrated farming system (IFS) to the regional development with indicators of income of farmers in District of Lintong Nihuta used multiple linear regression, which is estimated by ordinary least squares technique, with the formula:

\[ Y = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + e \]  

\[ Y = \text{The regional development with indicators of farmers' income IFS} \]

To analyze the effect of the influence of social factors; labor, education of farmer, dependant of farmer in the integrated farming system to the regional development with indicators of income of farmers in District of Lintong Nihuta, used multiple linear regression, which is estimated by ordinary least squares technique, with the formula:

\[ Y = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e \]  

\[ Y = \text{The regional development with indicators of farmers' income IFS} \]

RESULTS AND DISCUSSION
The Influence of Physical Factors Paddy Rice Farming and Livestock Business Against Integrated Farming System (IFS) In Regional Development in District of Lintong Nihuta.

The Regional development in District of Lintong Nihuta in the context of an integrated farming system will be seen from the parameter farmers' income as the result of research Rustiadi, (2011) which states that one of the indicators of regional development based on the development process is revenue. The income of farmers in this region certainly is influenced by various factors that are categorized into physical, social and economic among others; land area, rice production, the use of labor, the use of capital of farming, paddy rice fertilizers, pesticide for paddy rice farming and livestock breed for livestock operations.

Based on the results of data analysis using SPSS, to determine the effect of physical factors paddy rice farming and livestock in integrated farming system (IFS) to the regional development as seen from the level of income of farmers in District of Lintong Nihuta, obtained the results as in Table 2.
Table 2. Results of the analysis of the influence of physical factors of paddy rice farming and livestock business in the IFS of the regional development in District of Lintong Nihuta.

<table>
<thead>
<tr>
<th>No</th>
<th>Variable</th>
<th>Koefisien</th>
<th>t</th>
<th>Sig</th>
<th>Adjusted R-squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Intersep</td>
<td>986.7</td>
<td></td>
<td></td>
<td>0.973</td>
</tr>
<tr>
<td></td>
<td>X1 (land area)</td>
<td>0.594*</td>
<td>13.311</td>
<td>0.03</td>
<td></td>
</tr>
<tr>
<td></td>
<td>X2 (paddy rice seeds)</td>
<td>0.337</td>
<td>6.056</td>
<td>0.08</td>
<td></td>
</tr>
<tr>
<td></td>
<td>X3 (livestock breeds)</td>
<td>0.042*</td>
<td>15.020</td>
<td>0.02</td>
<td></td>
</tr>
<tr>
<td></td>
<td>X4 (livestock feed)</td>
<td>0.499*</td>
<td>11.016</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td></td>
<td>X5 (paddy rice fertilizer)</td>
<td>0.979</td>
<td>10.406</td>
<td>0.57</td>
<td></td>
</tr>
<tr>
<td></td>
<td>X6 (pesticide)</td>
<td>0.641</td>
<td>9.922</td>
<td>0.68</td>
<td></td>
</tr>
</tbody>
</table>

Notes: * significant at α = 5%

The results of the analysis of data as in Table 2 was obtained regression model as follows:

\[ Y = 986.7 + 0.594X1 + 0.337X2 + 0.042X3 + 0.499X4 + 0.979X5 + 0.641X6 \]

Results showed data analysts adjusted \( R^2 \) value of 0.973 means it is 97.3% of the independent variables affect the dependent variable, in the sense of the variable land area, paddy rice seeds, livestock breeds, livestock feed, paddy rice fertilizers, and pesticide effect of 97.3% of the regional development in Humbang Hasundutan seen from the level of income of farmers in this region, while the remaining 2.70% caused by other factors beyond the variables to be estimated.

Based on the results of data analysis found that the variable land area has a positive effect with the coefficient of 0.594 and significant at \( \alpha = 5\% \), with a value of 0.03 t sig to the regional development in District of Lintong Nihuta Humbang Hasundutan Regency, meaning that if the land is managed by farmers, the income level of farmers in IFS will increase correspondingly increased revenues, illustrate the regional development in District of Lintong Nihuta Humbang Hasundutan Regency, as submitted Rustiadi, (2011) which states that one of the indicators of regional development based on the development process is revenue.

Then based on the results of the data processing as in Table 2, that the variables of calves positive and significant impact on regional development in District of Lintong Nihuta Humbang Hasundutan Regency, as indicated by the coefficient of 0.042 and significant at \( \alpha = 5\% \), with a value of 0.02 t sig, meaning that if the livestock breed is available at an affordable price, the farmer’s income of farmers who manage the IFS will increase and it also describe the regional development in District of Lintong Nihuta Humbang Hasundutan Regency.

Based on the results of data processing as well as in Table 1, that livestock feed significant and positive impact on regional development, which is based on the level of significance known livestock feed variable has a coefficient of 0.499 and significant at \( \alpha = 5\% \), with a value of 0.01 t sig to the regional development, where if livestock feed is available with either the income of farmers in IFS will increase, emphasizing the regional development in District of Lintong Nihuta Humbang Hasundutan Regency.

Social Factors Influence of Integrated Farming Systems (IFS) for Regional Development in District of Lintong Nihuta

Based on the results of data analysis using SPSS, determines the influence of social factors on the regional development of integrated farming system (IFS) seen from the income of farmers in District of Lintong Nihuta, obtained the results as in Table 3.

Table 3. Results of the analysis of social influence on the regional development of integrated farming System (IFS) in District of Lintong Nihuta.

<table>
<thead>
<tr>
<th>No</th>
<th>Variable</th>
<th>Koefisien</th>
<th>t</th>
<th>Sig</th>
<th>Adjusted R-squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Intersep</td>
<td>673.9</td>
<td></td>
<td></td>
<td>0.951</td>
</tr>
<tr>
<td></td>
<td>X1 (labor)</td>
<td>0.856*</td>
<td>10.453</td>
<td>0.04</td>
<td></td>
</tr>
<tr>
<td></td>
<td>X2 (education of farmer)</td>
<td>0.725*</td>
<td>13.760</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td></td>
<td>X3 (dependents of farmers)</td>
<td>-0.352</td>
<td>9.143</td>
<td>0.09</td>
<td></td>
</tr>
</tbody>
</table>

Notes: * significant at \( \alpha = 5\% \)

The results of the analysis of data as in Table 3 obtained regression model as follows:

\[ Y = 673.9 + 0.856X1 + 0.725X2 - 0.352X3 \]

Results showed data analysts adjusted \( R^2 \) value of 0.951 means that 95.1% is a variable independent variable labor, education of farmers, dependents of farmers amounted to 95.1% giving effect to the regional development in Humbang Hasundutan Regency seen from the level of income of farmers in the region and the remaining 4.9% is due to other factors beyond the variables to be estimated.

Based on the results of data analysis found that the variable labor has a positive effect with the coefficient of 0.856 and significant at \( \alpha = 5\% \), with a value of 0.04 t sig to the regional development in District of Lintong Nihuta Humbang Hasundutan Regency, this can be interpreted if the labor available well then it will have an impact on regional development that can be seen from the increase in the income of farmers in the District of Lintong Nihuta Humbang Hasundutan Regency, according to research results Tarmizi (2012) which states that the integrated
system of rice cattle (ISRC) a positive impact on regional development in Serdang Bedagai, as indicated by the increase in rice production in farming ISRC and increased use of labor in the family.

Then livestock feed education of farmers is also positive and significant impact on regional development in District of Lintong Nihuta Humbang Hasundutan Regency, as indicated by the coefficient of 0.725 and significant at α = 5%, with a value of t sig 0.01, meaning that if the higher education level of farmers or changes it will positively affect the regional development by the increasing level of income of farmers in District of Lintong Nihuta Humbang Hasundutan Regency.

Meanwhile the social variable dependents of farmers a negative effect on the regional development,

Table 4. Results of the analysis of the economic effects of integration farming system (IFS) to the regional development in District of Lintong Nihuta.

<table>
<thead>
<tr>
<th>No</th>
<th>Variabel</th>
<th>Koefisien</th>
<th>T</th>
<th>Sig</th>
<th>Adjusted R-squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Intersep</td>
<td>766.2</td>
<td></td>
<td></td>
<td>0.965</td>
</tr>
<tr>
<td></td>
<td>X1 (Capital of farming)</td>
<td>0.748*</td>
<td>12.231</td>
<td>0.04</td>
<td></td>
</tr>
<tr>
<td></td>
<td>X2 (input prices)</td>
<td>-0.693</td>
<td>8.720</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td></td>
<td>X3 (output prices)</td>
<td>0.574*</td>
<td>9.133</td>
<td>0.02</td>
<td></td>
</tr>
</tbody>
</table>

Notes: * significant at α = 5% = 0.05

The results of the analysis of data as in Table 4 was obtained regression model as follows: Y = 766.2 + 0.748X1 - 0.693X2 +0.574 X3

Results showed data analysts adjusted R2 value of 0.965 means a 96.5% economic variables capital of farming, input prices, output prices give 96.5% influence on the regional development in District of Lintong Nihuta Humbang Hasundutan Regency seen from the level of farmers' income, the rest of 3.50% due to other factors not included in the estimate.

Based on the results of data analysis found that the variable capital has a positive effect with the coefficient of 0.748 and significant at α = 5%, with a value of 0.04 t sig to the regional development as seen from the income level of farmers with trinTEGRATED farming systems in District of Lintong Nihuta Humbang Hasundutan, meaning that if the farming capital increase will have a positive impact for the regional development of which can be seen from the increase in the income of farmers with integrated farming systems in District of Lintong Nihuta Humbang Hasundutan Regency.

Then the variable input prices have a negative effect but not significant on the regional development in District of Lintong Nihuta Humbang Hasundutan Regency, as indicated by the coefficient of -0.693, meaning that if the price of inputs in this case the price of fertilizers, pharmaceutical, seed and feed increases then will have an impact the reduction in income level of farmers with integrated farming system (IFS) in District of Lintong Nihuta Humbang Hasundutan.

Meanwhile output prices significantly and positively to earnings as an indicator of regional development, which is based on the level of significance known output price variable has a coefficient of 0.574 and significant at α = 5%, with a value of 0.02 t sig to the regional development, meaning that the price of output in terms the price of rice, buffalo selling price, the price of meat and milk price increases then the income level of farmers with integrated farming system will increase to describe the regional development in District of Nihuta Lintong Humbang Hasundutan Reegncy.

CONCLUSION

Based on the results of data processing and discussion that done so the conclusions that can be drawn is:
1. Physical factors such as variable integrated farming system (IFS), land area, livestock seeds and livestock breeds a positive and significant impact on regional development in District of Lintong Nihuta Humbang Hasundutan.
2. Social factors integrated farming system (IFS) in the form of a variable; labor and education of farmers have a significant positive effect on the regional development, while the number of dependents social variables negative effect on regional development in District of Lintong Nihuta Humbang Hasundutan.
3. Economic factors are integrated farming system (IFS) in the form of a variable; capital of farming and output prices significant positive effect on the regional development, while the input price of economic variables negative effect on regional development in District of Lintong Nihuta Humbang Hasundutan.

SUGGESTION

Based on the results of data processing and the discussion that has been done, it is recommended:
1. In order for the government Humbang Hasundutan role in providing seed farming quality and affordable for farmers, in addition to the necessary
counseling for farmers or ranchers about how to raise better.

2. In order for the government Humbang Hasundutan to undertake education or training to improve traffic farmers in managing and developing farming that have an impact on increasing the income of farmers and regional development in Humbang Hasundutan.

3. In order for the government Humbang Hasundutan to undertake education or training to improve traffic farmers in managing and developing farming that have an impact on increasing the income of farmers and regional development in Humbang Hasundutan.

REFERENCE


