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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, Palimeita, Margaretha, Alissha Tesanika, Trecy Kartika , Infulence Of Microcrystalline Cellulose Avicel PH 101 As Reinforcement Filler And Gliserol To The Properties Of Starch Based Bioplastic From Cassava Peel (Chemical Engineering, USU).....	12
4. Pandapotan Turnip, Hamidah Harahap, Rosdanelly 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, Zulkarnain Lubis , Implementation New Design Charging Unit For Hybrid Eco Campus Vehicle Based On Solar Power (University of Panca Budi Medan).....	20
6. Agus Setyo Budi, Ervina, Esmar Budi , Temperature and Additive Coconut Shell Charcoal Effect on Density and Porosity of Ceramic membrane Based on Zeolite and Clay (Physics, UNJ).....	25
7. Ameilia Zuliyanti Siregar, Junita Siboro, Lahmuddin Lubis, Marheni, Rahmat Setia Budi , Map Distribution of Initial Attack White Roots Fungus (WRF) (<i>Rigidoporus microporus</i>) (Swartz: FR)) Rubber Plantation in A Few People in the Labuhan Batu District (Agriculture,USU).....	28
8. A.Mutholib, Yonariza, Mahdi, Hanung Ismono , Competition and Conflict: Stakeholders Interaction in Production Forest Management Unit Dharmasraya, Indonesia (Agriculture, Unand).....	34
9. Afifuddin Dalimunthe, Budi Utomo, Samuel Marpaung, Priska Devika , Inventory Of Mpts (<i>Multy Purpose Tree Species</i>) 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 UMSU).....	44

ROOM-2 (SOCIAL SCIENCE)

1. Alfonsius, Marlon Sihombing, Rujiman, 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 Accoustic Phonetic (STBA Harapan).....	69
5. Lusiana Andriani 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 Samudera Langsa).....	82
7. Rita Eka Izzati , Student Perception About Learning Motivation: Psychological Perspective (Psicology, UNY).....	87
8. Roswani Siregar , Analysis of Translation Strategies: Contract Document (Al Azhar Medan).....	93

9.	Roswita Sitompul , A Comparative Study of the Social and Law Systems of Control, and Contention: Challenges for the Future of healthcare Between Indonesia and Malaysia (Law, UISU)	98
10.	Satria Tirtayasa , The Relationship of Order of Entry and Business Performance Moderated by Market Place Factors (Economic, UMSU).....	104
11.	Ummi Umarah, Nudia Yultisa , Theme Configuration as Stylistic Realization of Pantun Melayu Langkat Wedding Ceremony (English Education, STKIP Budidaya Binjai).....	112
12.	Wan Anayati , The Working Ethos Values Of Batubara Malay's Proverbs (English, Harapan).....	117

ROOM-3 (COMPUTER)

1.	Ahmad Rizal, Rahmat W Sembiring, Zulkarnain Lubis, Nurleyla Hasibuan, Muhammad Dicky Syahputra Lubis, Rianto Sitanggang , Enchrption Chipertext To Binary (Computer Sciences, USU).....	127
2.	Andysah Putra Utama Siahaan , Vernam Conjugated Manipulation Of Bit-Plane Complexity Segmentation (University of Panca Budi, Medan).....	129
3.	Chaeroen Niesa , The Role Of Cryptography Of Vigenere Cipher In Information Security (Informatic, USU).....	134
4.	Chandra, Herman Mawengkang, Rahmat Widia Sembiring , Enhanced Security And Performance Efficiency Of Modified AES Algorithm (Informatic, USU).....	141
5.	Dian Kurnia, Zumhari , Performance Analysis Of Management System Bandwidth Layer 7 Protocol, PCQ, HTB and Hotspot In SMK Dwiwarna (Technology of Information, USU).....	145
6.	Dicky Nofriansyah, Marsono, Ahmad Fitri 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 Sihombing, Muhammad Zarlis, Rahmat W.Sembiring , Hybrid Chriptography Stream Cipher And RSA Algorithm With Digital Signature As A Key (Technique Informatica, USU).....	152
8.	Hartono, Dahlan Abdullah, Dedy Hartama, Roslina, Mhd Furqan, Muhammad Zarlis, Zakarias Situmorang , Sentiment Analysis Using Context Based Fuzzy Linguistic Hedges (Computer Sciences, USU).....	160
9.	Niti Ravika Nasution, Muhammad Zarlis, 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 Siketang, dan Afifuddin Dlimunthe , Forest Humus Disturbances in tahura Bording The Agricultural land Society, tongkoh Village, Sub-Province Karo (Forestry USU).....	171
2.	Catur Cahyaningsih , Carbonate Microfacies And Diagenesis Of Langgun Island, Langkawi Kedah Province, Malaysia	176
3.	Danny Faturrahman, Achmad Djaeni , Study of Fuel Efficiency on Tug Boats With Use of Flowmeter Web Based Monitoring and Control System In P.T. X. (Marine Engineering, Darma Persada University).....	181
4.	Rahmad Setia Budi, Irfan Suliyansyah, Yusniwati, Sobrizal, Hendra Alfi dan Amelia Zuliyanti Siregar , Conservation of Genetic Resources of Local Upland Rice of north Sumatra (Agriculture, USU).....	185
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 Samudera Langsa).....	192
6.	Rini Sulistiani, Luthfi A.M. Siregar , Various Factors Affecting Cultivation Sweet Potato (<i>Ipomoea batatas</i> L.) in North Sumatera (Postgraduate Student Agriculture, USU).....	196
7.	Herri, Arif Prima Johan, Yuliharsi, Rebi Fara Handika, M. Arifin , Turnaround Strategy from the Perspective of Strategic Leadership: Conceptual Review (University of Andalas, Padang)	200

8.	Azhar Abdulridha Ibrahim, Jamaiah H. Yahaya, Aziz Deraman , The Quality Dynamic Website Development: The Empirical Investigation among Practitioners (UKM, Malaysia)	204
9.	Mohammad Noer, Nonon Saribanon, Andini Nurwulandari , 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.	Iswandi 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, Banda 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 (UPSI, Malaysia)	246
4.	Hotden L. Nainggolan, Marlon Sihombing, Tavi Supriana, Ma'ruf Tafsir , Integrated Farming System Based on Paddy Rice in The Framework for Regional Development In District of Lintong Nihuta Humbang Hasundutan Regency (Pascasarjana Fakultas Pertanian, USU)	247
5.	Noer Fadhly, A. Rahim Matondang, Sirojuzilam, Sofyan 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)	258
7.	Yulia Ayriza, Agus Triyanto, Farida Agus Setiawati , Career Interest and Knowledge of Lower Grade Students of Primary School	264
8.	S.Parman , Protection of Refugee And Assylum Seeker's Human Right by Indonesia as a Non-State Parties (UIR, 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 Yultisa , Theme Configuration As Stylistic Realization Of Pantun Melayu Langkat Wedding Ceremony (STMIK Budidaya, Binjai)	304

ROOM-3 (COMPUTER)

1.	Dicky Nofriansyah , 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 Hsb, TaridaYanti, Herman , The Application Of Fuzzy Mamdani Methode To Predicts The Number Of Procurement Office Stationery Based On Data Supplies And The Demand For (Study Case: Parliament Secretariat Sumut)	321
3.	Azhar Abdulridha Ibrahim, Jamaiah 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 Baed on Microcontroler Atmega 8535 (Computer, AMIK Royal Kisaran).....	332
5.	Marwa Halim, Suharjito , Learning Management System Development With Application of Asynchronous Learning Method in STMIK IBBI Medan (Information Technology, Binus University-Jakarta.Computer).....	337
6.	Mulia Dhamma, Rofa Very Andika, Kristina Annatasia Br Sitepu, Melda Pita Uli Sitompul, Rofa Very Andika, Marthin Yohannes, Parulian, Rahmat W Sembiring , Combination Algorithm of Double Transposition And Vigenere Cipher For Data text Security (Computer USU).....	344
7.	Nestiwi Sitorus, Kinanti Wijaya , Research Study On Heavy Equipment Productivity At Work Of Subgrade Preparation (Engineering Faculty, University of Medan).....	348
8.	R. Fanry Siahaan, Rian Yap, Charles, Willer Ferdinan, Afil, Rahmat W. Sembiring , Modified Version Of Cryptography Playfair Cipher Using 12x8 Matrix (Computer and Information Sciences, USU).....	349
9.	Rico Imanta Ginting, Dicky Nofriansyah, Muhammad Dahria, Puji Sari Ramadhan , Improving Dijkstra Algorithm and North West Corner Method to Distribution of Need Processing (STMIK Triguna Dharma, Medan).....	352
10.	Supriyanto, Teguh Firmansyah, Iznan H. Hasbullah, Azlan Osman , Performance Evaluation of Routing Protocol on IPv6 packets Transmission (Engeenering, Untirta-Banten).....	353

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 linier regrestion 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 Table 1. Population and research sample

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-ecological 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 are, 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.

No	Village	Household	Paddy Rice		Livestock			Farms IFS (KK)	Sum of Sample
			Land (ha)	Production (ton)	Buffalo	Kitchen	Duck		
1	Lobutua	185	101,0	549,4	53	1.351	150	93	1
2	Naga Saribu I	368	119,0	437,9	123	1.448	13	184	3
3	Naga Saribu II	265	113,0	397,6	105	1.450	14	133	2
4	Siharjulu	354	168,0	564,4	115	788	450	177	3
5	Sibuntuon Partur	247	102,0	342,7	66	1.500	20	124	2
6	Tapian Nauli	436	185,0	651,2	120	900	120	218	3
7	Siponjot	419	100,0	416,6	169	1.140	87	210	3
8	Dolok Margu	333	112,0	465,9	79	1.750	36	167	3
9	Sigompul	247	82,0	288,6	80	1.500	96	124	2
10	Nagasaribu IV	183	181,0	482,0	96	1.456	16	92	1
11	Nagasaribu V	213	82,0	485,7	86	487	19	107	2
12	Nagasaribu III	297	125,0	456,2	78	1.446	15	149	2
13	Sigumpar	260	96,0	322,5	91	1.513	18	130	2
District of Lintongnihuta		3.807	1.566	5.861	1.261	16.729	1.054	1.904	30

Source: BPS Humbang Hasundutan, 2014;
Department of Agriculture Humbang Hasundutan, 2014 (processed)

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:

$$Y = a + s_1X_1 + s_2X_2 + s_3X_3 + s_4X_4 + s_5X_5 + s_6X_6 + e \dots \dots \dots 1)$$

Y = The regional development with indicators of farmers' income IFS

- a = constant
- X1 = land
- X2 = paddy rice seed
- X3 = livestock breeds
- X4 = livestock feed
- X5 = paddy rice fertilizer
- X6 = pesticide
- e = error term

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:

$$Y = a + s_1X_1 + s_2X_2 + s_3X_3 + e \dots \dots \dots 2)$$

Y = The regional development with indicators of farmers' income IFS

- a = constant
- X1 = labor
- X2 = education of farmers
- X3 = dependant of farmers
- e = error term

To analyze the influence of economic factors; capital offarming, input prices, output prices in the integrated farming sytem (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:

$$Y = a + s_1X_1 + s_2X_2 + s_3X_3 + e \dots \dots \dots 3)$$

Y = The regional development with indicators of farmers' income IFS

- a = constant
- X1 = capital of farming
- X2 = input prices
- X3 = output prices
- e = error term

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.

No	Variable	Koefisien	t	Sig	Adjusted R-squared
1.	Intersep	986,7			0.973
	X1 (land area)	0,594*	13,311	0,03	
	X2 (paddy rice seeds)	0,337	6,056	0,08	
	X3 (livestock breeds)	0,042*	15,020	0,02	
	X4 (livestock feed)	0,499*	11,016	0,01	
	X5 (paddy rice fertilizer)	0,979	10,406	0,57	
	X6 (pesticide)	0,641	9,922	0,68	

Notes: * significant at = 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 R² value of 0.973 means it is 97.3% of the independent variables affect the dependent variable, in the sense of the variable land are, 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 = 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 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 = 5%, with a value of 0.02 t sig , meaning that if the livestock breeds are 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 = 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.

No	Variabel	Koefisien	t	Sig	Adjusted R-squared
1.	Intersep	673,9			0.951
	X1 (labor)	0,856*	10,453	0,04	
	X2 (education of farmer)	0,725*	13,760	0,01	
	X3 (dependents of farmers)	-0,352	9,143	0,09	

Notes: * significant at = 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 R² 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 = 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 $\alpha = 5\%$, 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.

No	Variabel	Koefisien	T	Sig	Adjusted R-squared
1.	Intersep	766,2		-	0.965
	X1 (Capital of farming)	0,748*	12,231	0,04	
	X2 (input prices)	-0,693	8,720	0,06	
	X3 (ouput prices)	0,574*	9,133	0,02	

Notes: * significant at $\alpha = 5\% = 0.05$

The results of the analysis of data as in Table 4 was obtained regression model as follows:

$$Y = 766.2 + 0.748X_1 - 0.693X_2 + 0.574 X_3$$

Results showed data analysts adjusted R^2 value of 0.965 means a 96.5% economic variables capital of farming, input prices, output prices give 96.5% influence on the regioanal 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 $\alpha = 5\%$, 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 regeional 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 $\alpha = 5\%$, with a value of 0.02 t_{sig} to the regional development,

but not significant with coefficient -0.532, meaning that if the farm families dependents is increasing then it will not affect the regional development in District of Lintong Nihuta Humbang Hasundutan Regency.

The Influence of Economic Factors on The Regional Development of Integrated Farming Systems (IFS) in District of Lintong Nihuta

Based on the results of data analysis using SPSS, to determine the influence of economic 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 4.

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 goverment 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 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 role in 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 in Humbang Hasundutan.

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