RESEARCH ARTICLE

EXAMINATION OF REGIONAL GROWTH POTENTIALITY FOR GYEONGNAM IN SOUTH KOREA.

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Manuscript Info	*Abstract*
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In this study, we carried out location quotient analysis (LQA) to estimate specialization of livestock for individual cities in Gyeongnam at South Korea, 2014. The specialized animal species were evaluated for contribution rate to regionally economic growth based on gross regional domestic product (GRDP) from 2005 to 2014. The specialized domestic animals according to results of LQA included deer, duck, Korean cattle, pig and chicken. The results of regional growth rate differential analysis (RGADA) of Korean cattle, pig and chicken in the cities such as Gimhae, Miryang, Changnyeong, Goseong, Sancheong and Hapcheon in Gyeongnam maintained growth capability in the cities. When compared to other cities in South Korea, livestock industries in their cities were relatively high competitiveness. Therefore, we suggest that their cities induce intensively promotion of Korean cattle, pig and chicken industries for development and growth of regional economy. Furthermore, it is estimated that the results in this study are useful not only for establishment of regional animal husbandry policy but also for decision-making to select a city and livestock type of pre-entrepreneurs who want to start-up in animal husbandry sector.

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Introduction:-

Industrial structure in South Korea has been rapidly converted from agriculture to heavy industries due to export-oriented industrialization policy. Recently, primary industry such as agriculture, forestry, livestock and fishery industries has been largely shrunk owing to reorganization into service industry in South Korea (http://kosis.kr). As a result, local governments with an industrial structure centered on the primary industry have become increasingly important to accurately identify conditions and characteristics of the region, and to develop the region based on agricultural items with high growth potential. However, although complexity of interaction among components gives it hard to precisely define, regional development is generally defined as growth in quantity and quality of economic and non-economic components of a city (Won and Shin, 2007). In addition, consumption tendency of food due to improvement of country's income level has been changed to emphasize qualitative aspect rather than physical one. As well-being and lifestyles of health and sustainability (LOHAS) consumption trends have been expanded in recent years, consumers are increasingly demand for environmentally friendly foods and high-quality's functional foods (Kwon, 2012). Therefore, it is necessary to focus on items to be evaluated as competitiveness in accordance with tendency of consumers in local government centered on primary industry.

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In this way, possibility of regional growth means regional characteristics as basis for exploring direction and strategy of regional development. In order to promote successfully local development, it is necessary to maximize development and nurture of growth potentiality possessed by a specific region. Methods to measure or analyze growth possibility of these regional economics can be variously developed and utilized according to purpose of researchers. In general, location quotient analysis (LQA) is easy to measure degree of relatively comparative advantage to specific industries and items within specific region or through comparison with other regions as a method of focusing on industrial structure of a region from a static point of view. Otherwise, regional growth rate differential analysis (RGADA) is useful to analyze possibility of relative growth for regional economics through focus on changes in regionally industrial structure from a dynamic analysis (Kim and Kim, 2011). GRDA is purely designed to tackle inequalities of regional development. It permits multidimensional understanding even with insufficient data. Furthermore, it helps to more easily understand various aspects of public policy (Won and Shin, 2007).

In this study, domestic animals to occupy an important portion in agricultural production value were selected from LQA in livestock that is produced in each city of Gyeongnam on the basis of 2014 (http://stat.gsnd.net), and possibility of city's growth was evaluated by RGADA. It is possible to select cities that are highly competitive nationwide and have highly sustainable growth while driving regionally economic growth through these analyses. It is estimated to contribute not only to expansion or reduction of existing livestock enterprises' breeding scale, but also to decision-making to select a region and livestock type of pre-entrepreneurs who want to start-up in animal husbandry sector.

Materials And Methods:-

Data acquisition:-
LQA was performed in livestock produced in cities of Gyeongnam based on 2014. Data employed for analysis were breeding number of livestock and GRDP such as Korean cattle, dairy cow, pig, goat, deer, rabbit, chicken and duck produced in Gyeongnam and nationwide. The employed data were obtained from the second statistical data of Gyeongnam and South Korea government, and the analysis period was covered from 2005 to 2014.

Location Quotient Analysis:-
LQA is a static analytical method for examining specialized livestock to have highly growth ability with high degree of concentration in various livestock that are produced and distributed in particular areas at specific points in time (Lee, 1998; Park and Lee, 2005; Kim and Kim, 2012; Kim et al., 2017).

$$LQ = \frac{E_{ij}/E_{tj}}{E_i/E_t}$$

E_{ij} = GRDP of i livestock in j region

E_{tj} = GRDP of livestock in j region

E_i = GRDP of i livestock

E_t = GRDP of agriculture and forestry industries

Regional Growth Rate Differential Analysis (RGRDA):-
RGRDA is a technique designed by Henderson (1962) to understand a local economy originated in shift-share analysis, which is developed by Creamer (1942) to analyze growth factors of a given industry in a specific region using indicators of a standard year and comparative year (Won and Shin, 2007). It is a method to analyze growth potentiality and capability of a regional economy by measuring effect on regionally economic growth to indicate growth contribution by industry as growth rate (Lee, 1998; Kim and Kim, 2011).

$$TGD = RG - NG = WP + RP$$

$$WP = \left(\frac{V_{ij}(o)}{V_j(o)} - \frac{V_i(o)}{V(o)}\right) \times \left(\frac{V_i(t) - V_i(o)}{V_i(o)}\right)$$

$$RP = \left(\frac{V_{ij}(t) - V_{ij}(o)}{V_{ij}(o)} - \frac{V_i(t) - V_i(o)}{V_i(o)}\right) \times \frac{V_{ij}(o)}{V_j(o)}$$

$V_{ij}(o)$ = GRDP of i livestock in j region at standard year (o)

$V_{ij}(t)$ = GRDP of i livestock in j region at compared year (t)

$V_j(o)$ = GRDP of livestock in j region at standard year (o)

$V_i(o)$ = GRDP of i livestock at standard year (o)
$V_i(t)$ = GRDP of i livestock at compared year (t)
$V(o)$ = GRDP of agriculture and forestry industries at standard year (o)

Classification of data:-
LQA, which evaluates comparative advantage at a particular point in time, uses data of 2014 because it is important to understand current situation in South Korea. However, unlike LQA, result of RGRDA has many differences depending on range setting of analysis period. In other words, when compared and analyzed between specific points in time, the longer period between viewpoints, the less it can grasp intermediate situation (Choi, 1986), whereas if period is too short, it can be difficult to seize trend of economic growth (Kim and Kim, 2012).

Therefore, in this study, as we derive objective results reflecting a special situation that can bring about a temporary change in coefficient value due to internal and external factors, such as change in supply and demand of products according to change in domestic and overseas market environments together with production amount of locally produced items and to change in production value depending on changes in natural environment, analysis period to minimize judgment errors in 2005 to 2014 was divided into every 5 years.

Results And Discussion:-
Agricultural status of Gyeongnam:-
Since GRDP employed for analysis in this study can reflect livestock-rearing situation as well as consumer's preference in market value at a time of survey, it can be useful to analyze possibility and importance of livestock growth. Although gross domestic product (GDP) of Gyeongnam decreased slightly from 6.9% at 2005 to 6.8% at 2014 according to Regional Income Statistics (www.kosis.kr), nominal production increased 59.3% in GDP of Gyeongnam (Table 1). Gyeongnam tends to increase the rearing numbers of main domestic animals such as Korean cattle, pig and chicken and agricultural production. Especially, since the ratio of livestock including Korean cattle, pig and chicken was highly accounted for 91.3% in GRDP of livestock, these domestic animals are highly important to the regional economy in Gyeongnam (Table 2).

Results of location quotient analysis:-
According to location quotient (LQ) to analyze degree of relative specialization for major livestock in 18 cities of Gyeongnam, a large number of domestic animals in many cities were evaluated to have competiveness due to relative specialization based on GRDP at 2014 (www.kosis.kr). Especially, deer, duck, Korean cattle, pig and chicken were classified to be relatively specialized when compared to other livestock species. In addition, the cities concentrated by the secondary and tertiary industries had low LQ in livestock species, whereas the cities based on the primary industry maintained high LQ in relatively various animals (Table 3). However, influence from each animal showed considerable difference on the regional economy.

Domestically rearing deer is raised in most of Gyeongnam area as 91.6% of whole rearing number and production amount in the country. As a result, since LQ of deer appeared very high in whole cities of Gyeongnam including 52.92 in Namhae, it is indicated that Gyeongnam is specialized for deer when compared to cities in other provinces. However, deer showed low importance due to only 0.1% of domestic animal production scale. When compared with its data, although Korean cattle, pig and chicken which are included as main domestic animals were classified as specialized or non-specialized animals according to cities, production value of these animals was accounted for approximately 91.3% of Korean livestock production value in 2014, which economic importance is very high (http://kosis.kr).

LQ of Korean cattle appeared in Hapcheon 3.46, Namhae 2.76, and Gimhae 2.60, indicating that it was relatively specialized when compared to the other cities. Pig showed higher values in order of Gimhae 4.51, Hapcheon 3.56, and Yangsan 3.24. Chicken was evaluated as specialized livestock in order of Yangsan 3.61, Changyeong 2.88, and Hapcheon 2.23. In addition, the cities with LQ more than 1 for Korean cattle, pig and chicken were found in Gimhae, Miryang, Changyeong, Goseong, Sancheong, and Hapcheon (Table 3).

Results of regional growth rate differential analysis:-
Growth possibilities of major domestic animals such as Korean cattle, pig and chicken, which accounts for 91.3% of total livestock production in South Korea, were evaluated by cities in Gyeongnam based on GRDP. Korean cattle in

analysis of the period from 2005 to 2014 was presented as growing livestock in cities including Sacheon, Miryang, Uiryeng, Haman, Changnyeong, Sancheong, Hamyang, Geochang and Hapcheon (Table 4). However, according to results of the period of 2010 to 2014 analyzed by every five years in their cities, although Korean cattle maintained national growth, the cities that produce potential livestock, where region's competitiveness is relatively lower than in other regions, were Sacheon, Miryang and Haman. Especially, Korean cattle to be produced in Changnyeong, Sancheong, Hamyang, Geochang and Hapcheon was recently decreased from the national growth as well as the region's competitiveness. Furthermore, although it had not grown nationally in analysis of the period from 2005 to 2014, the cities to produce competitive livestock which has high regional competitiveness were Jinju, Gimhae and Yangsan. Among them, in 2010~2014, Jinju was classified into city to produce growing livestock, and Gimhae was evaluated into competitive livestock, but Yangsan was presented by a decreased competitiveness.

Pig of Goseong and Namhae in 2005~2014 was classified into cities to produce growing livestock (Table 5). Therefore, these regions were recognized that pig's GRDP grows nationally and also has possibility of regional growth. However, these cities in 2005~2009 were ranged into competitive city, but into the cities to produce potential livestock in 2010~2014. In addition, although it has not grown nationally in analysis of the period from 2005 to 2014, the cities to produce competitive livestock due to having high regional competitiveness were Changwon, Jinju, Sacheon, Gimhae, Miryang, Geoje, Yangsan, Uiryeng, Haman, Changnyeong, Hadong, Sancheong, Hamyang, Geochang and Hapcheon. Among them, Sacheon, Gimhae, Miryang, Uiryeng, Haman, Changnyeong, Sancheong, Hamyang, Geochang and Hapcheon in the 2010~2014 period were evaluated into cities to produce growing livestock. Tongyeong, Yangsan and Hadong in the same period were classified into cities to produce potential livestock.

Chicken in the 2005~2014 period was not classified in any city to produce growing livestock among the cities of Gyeongnam (Table 6). In addition, except for Tongyeong and Goseong, the residual cities were categorized into competitive livestock producing declined livestock in Gyeongnam. However, in analysis of 2010~2014 period, all the cities except Jinju were evaluated as a stagnant livestock.

From above analysis result, Korean cattle, pig and chicken were classified as growing or competitive livestock in many cities of Gyeongnam. It is estimated that the results are derived from expansion of production for major livestock in the region not only by systematically fostering local representative brands through livestock brand promotion policy in the region, but also by registering local co-branding, and then promoting marketing and marketing policies. As the cities classified as growing or competitive livestock in Korean cattle participate actively in project to foster regional co-brands promoted by Gyeongnam, it is estimated to positive influence of trust and awareness through local government support and guarantee.

The cities that produce growing or competitive livestock throughout analysis period are not temporary phenomena caused by external factors, but competitiveness of their livestock which is produced in the region is not only relatively higher than in other regions but also agrees with the national trend of growth (Kim and Kim, 2011). Accordingly, livestock in these regions can be regarded as having a high contribution to the regional economic growth and a high potential for continued growth and development. Therefore, depending on the result of evaluation on growth capability of livestock produced in the region, the cities to have competition for livestock will reduce trial and error by promoting mid- to long-term development and training policies. In addition, it does not mean that degree of specialization highly evaluated or classified into a competitive city is a lot of domestic animals produced in the city (Kim and Kim, 2011). It indicates that GRDP of the corresponded livestock accounts for economic importance due to relatively high proportion of agricultural and forestry industry's GRDP. Nevertheless, it is necessary to recognize that these results have highly substantial growth possibility in their cities.

Urban growth is born out by interaction among various social, economic and political factors (Won and Shin, 2007). However, in the cities where industrial structure is centered in the primary industry, agricultural policies should be established intensively on the main agricultural products that are more competitive than other regions.

Conclusions:-
Regional specialization degree of major domestic livestock such as Korean cattle, pig and chicken rearing in Gyeongnam were highly evaluated by Gimhae, Miryang, Changnyeong, Goseong, Sancheong and Hapcheon. In addition, livestock produced in their regions showed high growth capability. It is not only highly specialized in their cities but also nationally growing trend. Therefore, the strategic fostering and revitalization policy are required for

livestock evaluated to leading regional agriculture growth, because of highly growth relative to other areas. In order to efficiently realize these policies, first, it is necessary to cooperate with government policy projects, and to positively consider proposals which expand new business of local governments. Second, for characterization and promotion of regional agricultural products, we must strengthen a consumer-oriented production, processing, sales and publicity through a differentiation strategy that links livestock products and regional characteristics utilizing a support system like the geographical indication system that is enacted by the government. Third, it is necessary to train competent human with expertise in addition to participation of local residents in order to steadily promote policies and derive their performance. For this purpose, it is necessary to establish systematic support and management system by organizing and running an organic joint council of industry, academia, government and research. Fourth, there is necessary to improve efficiency of management by applying ICT to production and management of livestock. Fifth, it is needed planning and decision-making from business perspective of livestock manager. Establishment of the basis for realizing the sixth industrialization of regional animal products through these various alternatives can be an important indicator for decision making of livestock species and local region by new entrepreneurs entering livestock sector.

Table 1:- GRDP according to economic sector in Gyeongnam (Unit: billion KRW)

	2005			2014		
	South Korea (A)	Gyeongnam (B)	B/A (%)	South Korea (A)	Gyeongnam (B)	B/A (%)
Gross Domestic Products	920,027.7	63,401.8	6.9	1,485,504.7	101,028.4	6.8
Agriculture, Forestry & Fisheries	26,151.2	3,027.0	11.6	31,618.0	3,388.0	10.7
Mining & Quarrying	2,089.5	152.1	7.3	2,702.0	124.3	4.6
Manufacturing	234,681.2	25,256.0	10.8	407,773.8	41,606.9	10.2
Electricity, Gas & Water	17,343.7	1,644.5	9.5	29,961.3	2,937.4	9.8
Construction	53,460.4	3,776.5	7.1	67,165.6	4,517.1	6.7
Services	495,874.4	24,049.1	4.8	815,299.2	40,452.4	5.0
Others	90,427.2	5,496.7	6.1	130,985.0	8,002.2	6.1

Note: Current market prices
Source: Gyeongnam, Agriculture, Forestry & Fishing Statistical Yearbook Statistics Korea, Regional Income Statistics (www.kosis.kr)[17].

Table 2:- Heads and GRDP of livestock depending on years in Gyeongnam, 2014 (Unit: heads, million KRW)

	heads			GRDP		
	South Korea (A)	Gyeongnam (B)		South Korea (A)	Gyeongnam (B)	B/A (%)
Korean cattle	2,759,273	296,872		4,285,300	461,058	10.8
Dairy	430,678	27,708		50,600	3,255	6.4
Pig	10,090,286	1,158,419		6,615,100	759,449	11.5
Goats	250,729	4,424		95,800	1,690	1.8
Deer	37,314	34,197		20,500	18,788	91.6
Rabbit	114,615	3,176		9,500	263	2.8
Broiler	156,410,352	13,701,337		2,023,800	177,282	8.8
Duck	7,539,388	947,698		1,057,500	132,927	12.6

Note: Current market prices
Source: Gyeongnam, Agriculture, Forestry & Fishing Statistical Yearbook Statistics Korea, Regional Income Statistics (www.kosis.kr)[17].

Table 3:- Location quotient analysis based on GRDP of livestock depending on cities in Gyeongnam, 2014

	Korean cattle	Dairy	Pig	Goat	Deer	Rabbit	Broiler	Duck
Changwon	0.73	1.34	0.97	0.29	15.72	0.10	0.24	0.07
Jinju	0.63	0.66	0.71	0.42	15.35	0.11	0.73	1.38
Tongyeong	0.15	0.00	0.08	0.28	10.81	0.01	0.06	0.00

Sacheon	1.16	2.27	1.58	0.33	19.62	0.27	0.02	0.09
Gimhae	2.60	0.83	4.51	0.10	6.64	0.24	2.06	0.11
Miryang	1.51	0.61	1.18	0.10	9.52	0.02	1.16	0.01
Geoje	0.62	0.00	0.19	0.38	21.31	2.63	1.16	0.01
Yangsan	0.60	1.84	3.24	1.00	9.59	0.29	3.61	0.04
Uiryeng	1.84	1.23	1.27	0.16	7.53	0.03	0.84	1.39
Haman	0.84	1.52	1.44	0.09	7.23	0.03	0.70	0.01
Changnyeong	1.99	0.70	1.46	0.17	4.29	0.71	2.88	0.00
Goseong	2.07	2.12	2.99	0.77	24.47	0.38	1.35	5.88
Namhae	2.76	0.61	0.31	0.11	52.92	2.19	0.28	0.00
Hadong	2.03	1.37	0.90	0.07	11.28	0.73	0.22	0.95
Sancheong	1.49	0.89	2.95	0.36	19.48	0.88	1.77	0.01
Hamyang	1.67	0.50	1.64	0.21	20.05	1.27	0.98	3.84
Geochang	1.95	0.31	1.00	0.01	5.92	0.24	1.93	12.51
Hapcheon	3.46	0.00	3.56	0.13	8.52	0.05	2.23	2.16

Source: Gyeongnam-do, Agriculture, Forestry & Fishing Statistical Yearbook Statistics Korea, Regional Income Statistics (www.kosis.kr)[17].

Table 4:-Regional growth rate differential analysis based on GRDP of Korean cattle according to cities in Gyeongnam

	2005-2014				2005-2009				2010-2014		
	TGD	WP	GP		TGD	WP	GP		TGD	WP	GP
Changwon	-0.08	0.00	-0.08		-0.08	-0.20	0.12		-0.24	0.00	-0.24
Jinju	0.42	-0.02	0.43		0.00	-0.22	0.22		0.05	0.01	0.04
Tongyeong	-0.45	-0.02	-0.42		-0.30	-0.22	-0.08		-0.39	0.01	-0.40
Sacheon	0.02	0.01	0.01		-0.20	-0.19	-0.01		-0.15	0.00	-0.15
Gimhae	0.27	-0.01	0.28		-0.12	-0.21	0.09		0.02	-0.03	0.05
Miryang	0.24	0.00	0.24		-0.03	-0.21	0.18		-0.08	0.00	-0.08
Geoje	-0.16	0.04	-0.20		-0.33	-0.17	-0.16		-0.23	0.01	-0.24
Yangsan	0.17	-0.01	0.18		0.14	-0.21	0.35		-0.32	0.00	-0.32
Uiryeng	0.43	0.04	0.39		0.03	-0.17	0.20		-0.01	-0.01	0.00
Haman	0.32	0.01	0.32		0.06	-0.20	0.26		-0.11	0.00	-0.11
Changnyeong	0.10	0.06	0.03		-0.19	-0.15	-0.03		-0.07	-0.01	-0.06
Goseong	-0.34	0.11	-0.45		-0.24	-0.11	-0.13		-0.37	-0.01	-0.36
Namhae	-0.23	0.10	-0.33		-0.14	-0.12	-0.02		-0.35	-0.01	-0.34
Hadong	-0.13	0.07	-0.20		-0.06	-0.14	0.09		-0.28	-0.02	-0.26
Sancheong	0.29	0.02	0.27		0.01	-0.19	0.20		-0.11	-0.01	-0.10
Hamyang	0.08	0.04	0.04		0.03	-0.17	0.20		-0.14	-0.01	-0.13
Geochang	0.29	0.04	0.24		0.13	-0.17	0.30		-0.13	-0.02	-0.11
Hapcheon	0.24	0.07	0.17		-0.06	-0.15	0.09		-0.09	-0.03	-0.06

Source: Gyeongnam, Agriculture, Forestry & Fishing Statistical Yearbook Statistics Korea, Regional Income Statistics (www.kosis.kr)[17].

Table 5:-Regional growth rate differential analysis based on GRDP of pig depending on cities in Gyeongnam

	2005-2014				2005-2009				2010-2014		
	TGD	WP	GP		TGD	WP	GP		TGD	WP	GP
Changwon	0.63	-0.02	0.65		0.51	-0.22	0.73		-0.01	0.01	-0.02
Jinju	1.49	-0.03	1.52		0.64	-0.23	0.87		0.36	0.01	0.35
Tongyeong	-0.01	-0.03	0.01		0.18	-0.23	0.41		-0.21	0.01	-0.22
Sacheon	0.80	-0.02	0.82		0.33	-0.22	0.55		0.10	0.01	0.10
Gimhae	1.23	-0.03	1.26		0.45	-0.23	0.67		0.33	0.00	0.33
Miryang	1.19	-0.02	1.21		0.60	-0.23	0.82		0.20	0.01	0.19

Geoje	0.49	-0.01	0.50		0.13	-0.22	0.35		0.00	0.01	-0.01
Yangsan	1.07	-0.03	1.09		0.84	-0.23	1.07		-0.12	0.01	-0.13
Uiryeng	1.52	-0.01	1.54		0.68	-0.22	0.90		0.28	0.00	0.28
Haman	1.33	-0.02	1.35		0.73	-0.22	0.96		0.15	0.01	0.14
Changnyeong	0.93	-0.01	0.94		0.35	-0.21	0.56		0.21	0.00	0.20
Goseong	0.18	0.00	0.17		0.27	-0.20	0.47		-0.18	0.01	-0.19
Namhae	0.37	0.00	0.37		0.42	-0.20	0.63		-0.16	0.01	-0.16
Hadong	0.54	-0.01	0.55		0.55	-0.21	0.76		-0.07	0.00	-0.07
Sancheong	1.27	-0.02	1.28		0.65	-0.22	0.87		0.16	0.01	0.16
Hamyang	0.91	-0.01	0.92		0.67	-0.22	0.89		0.12	0.01	0.11
Geochang	1.27	-0.01	1.28		0.83	-0.22	1.05		0.13	0.00	0.13
Hapcheon	1.18	-0.01	1.19		0.54	-0.21	0.75		0.18	0.00	0.18

Source: Gyeongnam, Agriculture, Forestry & Fishing Statistical Yearbook Statistics Korea, Regional Income Statistics (www.kosis.kr)[17].

Table 6:-Regional growth rate differential analysis based on GRDP of chicken depending on cities in Gyeongnam

	2005-2014				2005-2009				2010-2014		
	TGD	WP	GP		TGD	WP	GP		TGD	WP	GP
Changwon	0.32	-0.03	0.36		0.60	-0.23	0.83		-0.27	0.01	-0.28
Jinju	1.02	-0.03	1.06		0.74	-0.23	0.97		0.01	0.01	0.00
Tongyeong	-0.20	-0.03	-0.17		0.25	-0.23	0.49		-0.41	0.01	-0.42
Sacheon	0.46	-0.03	0.49		0.41	-0.23	0.64		-0.18	0.01	-0.19
Gimhae	0.82	-0.03	0.85		0.54	-0.23	0.77		-0.01	0.01	-0.03
Miryang	0.78	-0.03	0.81		0.70	-0.23	0.93		-0.11	0.01	-0.12
Geoje	0.21	-0.03	0.24		0.20	-0.23	0.44		-0.26	0.01	-0.27
Yangsan	0.68	-0.03	0.71		0.95	-0.23	1.19		-0.35	0.01	-0.36
Uiryeng	1.05	-0.03	1.08		0.79	-0.23	1.02		-0.05	0.01	-0.06
Haman	0.89	-0.03	0.92		0.84	-0.23	1.07		-0.15	0.01	-0.16
Changnyeong	0.57	-0.03	0.60		0.44	-0.23	0.67		-0.10	0.01	-0.12
Goseong	-0.05	-0.03	-0.02		0.35	-0.23	0.58		-0.39	0.01	-0.41
Namhae	0.11	-0.03	0.14		0.51	-0.23	0.74		-0.37	0.01	-0.39
Hadong	0.25	-0.03	0.28		0.64	-0.23	0.87		-0.31	0.01	-0.32
Sancheong	0.84	-0.03	0.87		0.75	-0.23	0.98		-0.14	0.01	-0.15
Hamyang	0.55	-0.03	0.58		0.78	-0.23	1.01		-0.17	0.01	-0.18
Geochang	0.84	-0.03	0.87		0.95	-0.23	1.18		-0.16	0.01	-0.17
Hapcheon	0.77	-0.03	0.80		0.64	-0.23	0.87		-0.12	0.01	-0.14

Source: Gyeongnam, Agriculture, Forestry & Fishing Statistical Yearbook Statistics Korea, Regional Income Statistics (www.kosis.kr)[17].

Acknowledgements:-

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