THE PERFORMANCE FACTORS AFFECTING FOOD SECURITY FROM LIVESTOCK BASED IN CENTRAL JAVA

Mukson, W. Roessali, E. Prasetyo, dan H. Setiyawan
(Faculty of Animal Husbandry Diponegoro University)

ABSTRACT

The aim of research was to study: 1) Livestock food security level and 2) Factors affecting food security based from livestock in Central Java. Research was done by using institutional survey method. Data of livestock food security (meat, egg and milk) analyzed based on the level of production in Central Java. Performance livestock food security level measured by Subsistence Index which divided became 3 parts that was: excessive, (score > 100), balanced (score = 100) and less (score < 100). Here in after to factors affecting livestock food security was analyzed using Multiple Linear Regression, Y = Livestock food security, while X were meat production, egg production, milk production, livestock population, sum up the resident, regional, GDP and animal density, respectively. F test used to tested independent factors with level significant of 5%.

Result of research showed that the level of livestock food security based on production able to fulfil the livestock food requirement was 4.56 gram protein/capita/days, consisting of 2.89 egg, 1.43 egg and 0.33 milk. Livestock food security level have Subsistence Index was 76, 00 or have livestock food security level was 76, 00% from Adequate of Norm. The performance of food security were influenced significantly (P <0.01) by the production of meat, eggs, milk, livestock, the number of population, area, GDP, and livestock density. Determinacy coefficient value (R^2) of 0.825 indicates 82.50% of the performance of livestock food security together capable explained by independent variables.

Keywords : food security, livestock food.

FAKTOR-FAKTOR YANG MEMPENGARUHI KINERJA KETAHANAN PANGAN ASAL TERNAK DI JAWA TENGAH

Mukson, W. Roessali, E. Prasetyo, dan H. Setiyawan
(Fakultas Peternakan Universitas Diponegoro, Semarang)

ABSTRAK

Penelitian ini bertujuan untuk mengetahui : 1) Kinerja ketahanan pangan asal ternak dan 2) Faktor-faktor yang mempengaruhi kinerja ketahanan pangan asal ternak di Jawa Tengah. Penelitian dilakukan dengan metode survai instansional, menggunakan data-data dokumentasi dari dinas terkait dengan materi penelitian. Data kinerja ketahanan pangan asal ternak (daging, telur dan susu) dianalisis berdasarkan tingkat produksi di Jawa Tengah. Kinerja Ketahanan diukur dengan indikator Indeks Subsistensi (IS) terdiri dari 3 kriteria, yaitu : berlebih (skor >100), seimbang (skor = 100) dan kurang (skor < 100). Selanjutnya terhadap faktor-faktor yang mempengaruhi kinerja ketahanan pangan hasil ternak dianalisis dengan statistik menggunakan regresi linier berganda, sebagai variabel dependen (Y) adalah kinerja ketahanan pangan , sedangkan sebagai variabel independen (X) berturut-turut adalah produksi daging, produksi telur, produksi susu, populasi ternak, jumlah penduduk, wilayah, PDRB dan kepadatan ternak. Uji F digunakan untuk menganalisis faktor-faktor kinerja ketahanan pangan dengan taraf signifikansi 5%.

Hasil penelitian menunjukkan bahwa kinerja ketahanan pangan asal ternak mampu menyediakan 4,56 gram protein/kapita/hari, terdiri dari daging 2,89, telur 1,43 dan susu 0,33. Kinerja ketahanan pangan mempunyai Indeks Subsistensi sebesar 76,00 atau sebesar 76,00% dari norma kecukupan gizi. Berdasarkan faktor-faktor independen kinerja ketahanan pangan dipengaruhi secara sangat nyata (P<0,01) oleh produksi daging, telur, susu, populasi ternak, jumlah penduduk, wilayah, PDRB dan kepadatan ternak. Nilai Koefisien Determinasi (R^2) sebesar 0,825 menunjukkan bahwa sebesar 82,50% kinerja ketahanan pangan asal ternak secara bersama-sama mampu dijelaskan oleh variabel independen, sedangkan sisanya sebesar 17,50% dipengaruhi oleh faktor lain di luar model. Kesimpulan dari hasil penelitian bahwa kinerja ketahanan pangan asal ternak perlu terus ditingkankan agar terpenuhi sesuai dengan norma kecukupan gizi yang dianjurkan.

Kata Kunci : Kinerja ketahanan pangan, pangan asal ternak.

INTRODUCE

Food material result from livestock is one of food material that has high nutrition content and has role in improvement degree of health and intelligence. It is because animal protein contained amino acids essential that is more well-balanced and completely compared to vegetation material. Animal protein also easier to be digested and absorbed, so having better biological value (Sudono et al., 1989). According to Kamarudin (1990) animal food especially food result of livestock like

meat, egg and milk: concentration and balance of essential amino acids equal to human body requirement for growth, reproduction and other bodies functions.

Food requirement result of livestock based on result of *Widyakarya Nasional Pangan dan Gizi 1997*, has been specified consumption of animal protein of livestock equal to 6 gram/ capita/day. Level of consumption vanadium of the protein in Central Java in the year 2005 has just reached 4,53 gram/capita/day (Ranching agency of central java province, 2008). Result from Mukson research (1998), indicates that quality of family food consumption related to *Pola Pangan Harapan* (PPH), contribution of animal food result from livestock still low with score 6,30 (rural areas) and 12,50 (urban area) from ideal score 15,30. This condition indicates that level of consumption of animal food result of livestock need to be improved.

Resilience of food is result of food economics system consisted of production sub system (supply), distribution sub system and consumption sub system that interact one after another (Suryana, 2004). Resilience of food is important aspect in taking care of national stability, especially food stability. Food problem is matronly related to food system (production sub system, distribution sub system and consumption sub system).

Based On RI Law No 7 year 1996, it is mentioned that resilience of food is food fulfilled condition for household proven from availability of enough food, either its amounts and also quality, safe, flattens, and reached. Level of resilience of food can be reached if availability of food either from production aspect or distribution fulfilled, as according to purchasing power and resident request. To anticipate supply and request of food required by public that is increasing especially at animal food from livestock, hence it is important to know resilience of food and factors influencing it at one particular area. The factors is technical factor, social, environmental and economic/region. This research aim to measure level of resilience of food especially animal food from livestock (egg, meat and milk) at each sub-province/town, Bakorwil (Coordinating Region) and Central Java, and to knowing factors that affecting resilience of food in Central Java Province.

RESEARCH METHOD

Research Location

This research done with analyzing Central Java Region, based on consideration that Central Java is one of production central area of ranch that the level

of resilience need to be studied especially for meat, egg and milk commodity. Research is done by using survey method institutional. This research using secondary data coming from Central Java's statistic center and Central Java's animal ranching and health, and other references that related to this research. Primary data that analyzed is livestock production data consist of meat, egg and milk at year 2007.

Approach from production/ availability aspect and consumption/ request of food from livestock (meat, egg and milk) applied to measure level of resilience of food from livestock. From request side estimated requirement amount of food from livestock based on consumption sufficiency of food from livestock which has been recommended by Widya Karya Nasional Pangan dan Gizi at year 1997 that is equal to 6 gram/capita/day. While from side availability / production calculated based on livestock result food produced by each region (district/city).

As for calculate level of production/ availability of food (in the form of protein) meat, egg and milk expressed in set of TPSP (Protein equivalent production rate) according to guide Atmojo, *et al* (1995) with formula :

$$TPASPi = [(1-Fi) \times Hi\text{-}Ti \times (Bi)(Pi) \times 10.000] / (U \times 365)$$

Where :

TPSPi   = Production rate of gram protein/capita/day i commodity (meat, egg, milk)
Fi   = Correction factor for industry and damage of i commodity.
Hi   = i commodity production at certain one year.
Ti   = correction factor for i commodity seed.
Bi   = Consumable part from i commodity
Pi   = Protein contain from i commodity
Ui   = amount of resident at certain sub province / city
10.000   = From ton become gram
365   = days in one year.

Then, resilience of food from livestock is determined by Subsistent Index (IS) according to Aritonang (2000), that is:

$$IS = \frac{\text{Availability of food resulted from livestock (meat, egg and milk)}}{\text{Resident's requirement for food resulted from livestock}} \times 100$$

There are 3 criteria to classify it, that is: IS > 100 = excessive; IS = 100 = balance; and IS < 100 = less. Beside seeing food resilience for each region sub province / town in Central Java, it is also analyzed for each coordination region in Central Java that divided 3 Bakorwil, that is : (1) Bakorwil I (Pati region) : consist of Grobogan, Blora, Rembang, Pati, Kudus, Jepara, Demak Semarang, Kendal, Salatiga city and Semarang city; (2) Bakorwil II (Solo region) ; consist of Wonosobo,

Magelang, Boyolali, Klaten, Sukoharjo, Wonogiri, Karanganyar, Sragen, Temanggung, Magelang city and Surakarta city; dan Bakorwil III (Banyumas region) : Consist of Cilacap, Banyumas, Purbalingga, Banjarnegara, Kebumen, Purworejo, Batang, Pekalongan, Pemalang, Tegal, Brebes, Pekalongan city and Tegal city.

Determination of factors that affecting resilience rate of food that resulted from livestock, analyzed with multiple linear regression with equation :

$$Y = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7 + b_8x_8 + e$$

Where :

Y = resilience of food resulted from livestock (score)
a = constant
b = regression coefficient
x_1 = meat production (protein gram/capita/day)
x_2 = egg production (protein gram/capita/day)
x_3 = milk production (protein gram/capita/day)
x_4 = livestock population (UT)
x_5 = residents amount
x_6 = Bakorwil region (score)
x_7 = PDRB (Rp)
x_8 = livestock solidity (UT/Km^2)
e = error

Meanwhile, to know influence simultaneously from independent variable (Xi) to food resilience rate (Y), is testing with F test.

RESULT AND DISCUSSION

Common situation of Central Java region

Administratively, Central Java provinces consist of 29 sub provinces and 6 city. Wide of this region in 2006 is 3,25 million hectares or 25,04 % from Java Island (1,70 % from Indonesia). The wide consisted of non rice field area 2,26 million hectares (69,50 %) and rice field area 992 thousand hectares (30,50 %). According to its use, rice field that technically irrigated is 11,9 % and non technically irrigated is 9.7 %. Whereas for non rice field area, 21.2 % for non irrigated dry field and shifting cultivation, buildings 17,9 %, forests 20,0 % and others 17,3 %.

Central Java's resident situation based on National Economic Survey (Susenas) year 2006 is 32,18 million peoples or around 14 % of total Indonesian population. This numbers got third place in Indonesia after West Java and East Java. Numbers of male resident is 16,054,473 (49,10 %) and female is 16,123,257 (50,10 %). Based on group of productive age (age 15-64 tears) have highest numbers that is 66,93 %. This condition shows that Central Java residents is very potential for human

resources development from various dimension, either it is social, economic, culture ,etc. Besides that, potential of natural resources is very big in Central Java especially agricultural, ranching, plantation, fisheries and industrial sector.

Production rate of food that resulted from livestock in Central Java

Food result from livestock in the form of meat, egg and milk is important food product in fulfilling requirement of animal protein. To fulfill this requirement, Central Java always tries to increasing their production. Table 1 shows that meat production rate of all commodities experiences improvement, except beef and buffalo. Same with egg production that experiences improvement, except to of duck egg. Related with resilience of food hence need to increasing production, so public requirement always fulfilled.

Table 1. Production rate of food from livestock (meat, egg and milk) in Central Java years 2005 – 1006

No	Type	2005 (Kg)	2006 (Kg)	(+/-) (%)
1	meat			
	1.1. Cow	53.962.235	50.326.159	-6.73
	1.2. Buffalo	3.648.687	3.499.064	-4.1
	1.3. Horse	6.223	14.277	129,42
	1.4. Pig	1.617.042	1.755.980	8,59
	1.5. Goat	8.916.527	13.510.639	51,52
	1.6. Sheep	5.593.242	6.162.544	10,17
	1.7. Ras chicken	65.039.687	90.264.713	38,78
	1.8. Buras chicken	38.692.653	41.198.150	6,47
	1.9. Duck	3.172.382	5.023.977	58,36
	Total	181.037.114	212.597.638	
2	Egg			
	2.1. Ras Chicken	92.161.875	125.221.398	35.87
	2.2. Buras chicken	29.610.180	30.657.636	3.53
	2.3. Duck	31.996.900	28.558.983	-10.74
	2.4. Quail	5.996.319	7.198.850	20.65
	total	159.735.272	191.636.859	
3	Milk	70.693.094	71.375.710	0.96
	total	70.693.095	71.375.711	

Source : Livestock Statistics of Central Java (2007)

Resilience rate analysis of food produced from livestock in Central Java

Food resilience is a condition where food is fulfilled for household that proven from enough food availability, either it's the amounts also quality, safe, flattens and reached. Now resilience of food must be strived to become reality until the level of household that is all families/household is expected not finding any difficulty to obtain food normally. This condition requires condition of food system consisted of production subsystem, distribution subsystem and consumption subsystem must run well. Resilience systems analysis of food result from livestock at Bakorwil I shown at Tables 2

Table 2. Food Resilience Rate Resulted From Livestock Based on Substituent Index in Bakorwil I (Pati region)

No	Bakorwil I	Protein availability (gr/capita/day)			Total	IS (Score)
		Meat	Egg	Milk		
1	Grobogan	1.14	1.37	0.054	2.57	42.8
2	Blora	1.9	0.37	0.001	2.28	38.01
3	Rembang	1.21	0.29	0.001	1.51	25.13
4	Pati	1.45	0.64	0.012	2.09	34.86
5	Kudus	2.64	1.01	0.08	3.74	62.37
6	Jepara	0.94	0.24	0.003	1.86	19.76
7	Demak	2.02	0.52	0.003	2.55	42.44
8	Semarang	3.84	3.68	1.838	9.36	156.05
9	Kendal	1.85	6.51	0.007	8.37	139.58
10	Salatiga city	5.07	2.09	2.354	9.52	158.67
11	Semarang city	3.2	1.17	0.167	4.55	75.75
	Total	25.3	17.89	4.524	47.74	795.85
	Mean	2.3	1.63	0.411	4.34	72.35

Table 3. Food Resilience Rate Resulted From Livestock Based on Substituent Index in Bakorwil II (Solo region)

No	Bakorwil II	Protein availability (gr/capita/day)			Total	IS (Score)
		Meat	Egg	Milk		
1	Wonosobo	1.41	0.014	0.027	1.5	24.16
2	Magelang	2.63	2.38	0.057	5.05	84.32
3	Boyolali	4.67	0.87	2.230	7.77	129.57
4	Klaten	5.93	1.92	0.263	8.12	135.32
5	Sukoharjo	2.59	2.87	0.025	5.49	91.66
6	Wonogiri	6.19	0.42	0	6.61	110.07
7	Karanganyar	3.93	5.62	0.019	9.57	159.55
8	Sragen	6.08	0.98	0.002	7.08	118.06
9	Temanggung	5.04	2.94	0.004	7.99	133.15

10	Magelang city	4.22	0.17	0.013	4.42	73.58
11	Surakarta city	2.68	0.05	0.035	2.77	46.13
	Total	45.4	18.26	2.69	66.34	1105.56
	Mean	4.12	1.67	0.25	6.03	100.5

Tables 2 indicates that resilience of food result of livestock at region Bakorwil I is around 4,34 grams protein/capita/day, or has score 72,35 of norm suggested, or has just been reached 72,35 %. It is indicates that supply and consumption problem of animal protein from livestock need to be improved, especially from awareness side to consume, production and also price which must be taken care. So, public is able to reach it.

Then, position of resilience of food at Bakorwil II (Surakarta region) shown at Tables 3, indicates that position of region to Bakorwil II, food resilience from livestock higher compared to with the Bakorwil I. This possibility is because of the many meat and egg production central at Bakorwil II like sub-province Boyolali, Klaten, Wonogiri, Karanganyar, Temanggung so that the supply exceeds requirement /sufficiency norm. But the availability excess will be distributed to other region, either to Bakorwil I or also between regions in Bakorwil I and even outside Central Java.

Food resilience position resulted from livestock in Bakorwil III (Banyumas region) can be seen at Table 4. According to Table 5 can be seen that all region in Bakorwil III, Food resilience position resulted from livestock still relatively lower than Bakorwil I or II. Some region that potential enough as livestock producer is Brebes (salted egg center), Pekalongan City (beef, mutton).

Table 4. Food resilience rate resulted from livestock based on Substituent Index in Bakorwil III (Banyumas region)

| No | Bakorwil III | Protein availability (gr/capita/day) | | | Total | IS (Score) |
		Meat	Egg	Milk		
1	Cilacap	0.61	0.1	0	0.71	11.84
2	Banyumas	3.39	1.44	0.172	5.00	83.38
3	Purbalingga	1.56	0.99	1.002	2.56	42.72
4	Banjarnegara	1.53	0.22	0.002	1.75	29.15
5	Kebumen	1.65	0.38	0.001	2.04	33.96
6	Purworejo	1.94	0.21	0.003	2.15	35.87
7	Batang	3.24	0.77	0.014	4.02	67.06
8	Pekalongan	2.61	0.52	0.028	3.15	52.58
9	Pemalang	0.65	0.49	0	1.15	19.13
10	Tegal	2.85	0.79	0.046	3.69	61.54

11	Brebes	2.76	3.02	0.001	5.79	96.44
12	Pekalongan city	3.89	1.77	0.097	5.76	95.97
13	Tegal city	2.69	2.49	0.073	5.26	87.59
	Total	29.41	13.19	0.444	43.05	717.22
	Mean	2.26	1.00	0.034	3.31	55.17

There is possibility that requirement of food resulted from livestock in Bakorwil III fulfilled from Bakorwil II, of course because condition of Bakorwil II has exceeded requirement. Then, if calculated mean of food resilience rate resulted from livestock on overall Bakorwil I, II and III will be shown in Table 5.

Table 5. Food resilience rate resulted from livestock based on Substituent Index in Bakorwil I, II, and III

No	Bakorwil	Protein availability (gr/capita/day)			Total	IS (Skor)
		Meat	Egg	Milk		
1	Bakorwil I	2.30	1.63	0.41	4.34	72.35
2	Bakorwil II	4.12	1.67	0.25	6.04	100.5
3	Bakorwil III	2.26	1.00	0.34	3.30	55.17
	Total	8.68	4.30	1.00	13.68	228.02
	Mean	2.89	1.43	0.33	4.56	76.00

Result of research shows that resilience of food from livestock for Central Java level has just been reached 76,00 (table 5), it means that food production from livestock now only fulfills 76,00 % from sufficiency norm. This condition shows that improvement of food resilience rate from livestock must be strived.

Analysis factors that affecting food security rate from livestock in Central Java

Resilience of food in a region many influenced by either technically, economic or culture social environment factor. influence from various the factors in this research tried analyzed by using doubled linear regression, with dependent variable is resilience rate of food from livestock, while independent variable in the form of meat production ($x1$), egg production ($x2$), milk production ($x3$), population of livestock ($x4$), number of residents ($x5$), Bakorwil region ($x6$), PDRB ($x7$) and livestock density ($x8$). Analysis result of factors that influencing resilience of animal food from livestock can be seen at Tables 6.

Table 6. Result Of Multiple Regression Analysis From Factors That Influencing Resilience Of Food From Livestock In Central Java

Variable	Regression coefficient	t cal (t hitung)	Significant
Constant	93.406	6.17	0.000
x1 (Meat production)	0.501	4.385	0.000
x2 (Egg production)	0.58	6.049	0.000
x3 (Milk production)	0.234	2.568	0.016
x4 (livestock population)	-0.007	-0.61	0.952
x5 (number of residents)	-0.744	-5.5	0.000
x6 (region)	-0.22	-0.234	0.817
x7 (PDRB)	0.057	0.526	0.603
x8 (Livestock density)	-0.052	-0.552	0.585
R^2	0.825		
F	15.35		0.000

Table 6 above shows that (f test) meat, egg, milk productions, livestock population, number of residents, region, PDRB and livestock density influencing (P<0,01) resilience of food from livestock in Central Java.

Meat production factor (x1) give regression coefficient of 0,501 this condition can be interpreted that increase of meat production equal to 1gram protein/capita/day, will increase resilience of food 0,501 IS. It can be explained that resilience of food hardly influenced by production result of livestock increases of production is expected will add food resilience. In Central Java, meat supply occupies first sequence to accomplishment of food result of livestock for consumption requirement of resident. This condition also is caused that meat sufficiency norm is bigger compared to other livestock product (egg and milk) that is 3,87 grams protein/capita/day (Soedjana et al, 1998).

Egg production factor (x2) yields regression coefficient 0,58. This condition can be explained that increase of produce of egg equal to 1 gram protein/capita/day, will increase food resilience 0,58 IS. It indicates that role of egg production of vital importance in increasing resilience of food result of livestock, with value larger ones compared to with meat product. It is because egg product easier to be obtained and the price relatively cheap, so that role of egg in taking care of food resilience is very strategic.

Milk production factor (x3) yields regression coefficient 0,234. This condition can be explained that increase of produce of milk equal to 1 gram protein/capita/day will increase food resilience 0,234 IS this condition indicates that the role of food result of livestock (milk product) though still a few but having role that is important

enough in taking care and increasing resilience of food resulted from livestock. Milk product still be predominated by import product, especially as component of industrial standard of milk processor which its percentage reaching 70 % compared to milk product from within country. It is becomes opportunity effort and at the same time can push creation of food resilience through milk product increase in this country.

Livestock population factor (x4) yields regression coefficient equal - 0007. This condition can be interpreted that increase of population of livestock equal to 1 UT will reduce level of resilience of food 0,007 IS, the influence is partially unreal. condition is explainable that livestock population in a region ought to be applied and given high priority to support requirement of the region, but because many request influenced by price factor, purchasing power, consumption habit and request of livestock result from other area, hence population of the livestock in this Central Java not just for fulfilling requirement in Central Java only, but also supplying other area that needed it.

Factor number of residents (x5) yields regression coefficient equal -0,744. This condition can be explained that increase of 1 resident will reduce food resilience 0,744 IS. It is excusable that to take care of resident request that keep increasing must be followed with supply of food that is enough, so degradation of food resilience couldn't happen. Very real resident factor (P<0,01) causing its needs anticipation for supply of food result from livestock. Statistical indicates that average amount increase of Central Java resident of 1,10 %/year (Statistic Center Agency, 2007)

Region factor (x6) yields regression coefficient equal - 0,220. This condition can be explained that increase of 1 region score Bakorwil will reduce resilience of food 0,220. It is happened because food resilience in a region is not only shows sufficiency of the region food but food production from animal from the region is also applied to fulfill request of other region. It is as according to resilience system of food that food distribution subsystem problem is essential part in taking care of resilience of food a region. Thereby, resilience of food a region can go down because food production from that area is distributed to other region of which still lacking of food.

GDP regional factor (x7) yields regression coefficient 0,057. This condition can be explained that increasing a thousand rupiahs GDP Central Java residents will increase food resilience 0,057 IS. It is indicates that economics growth will affect supply and request of food result from livestock. Central Java economics growth is

always springs up, with mean 5-6 % per year, causing needs to be anticipated requirement of resident food as result of public economics improvement.

Livestock density factor (x8) yields regression coefficient equal -0,052. This condition can be explained that increase of livestock density equal to 1 UT/km2 will reduce resilience of food 0,052. This condition happened because production result from livestock is not only supplied to that region but to other region too. Other factor is because many residents especially in urban area would more making account purchasing power to food than adding number of the livestock in urban region.

Coefficient of determination value (R^2) 0,825 can be explained that 82,50 % resilience factor of food from livestock in Central Java influenced by production variable of meat, egg production, milk production, livestock population, number of residents, region, GDP regional and livestock's density while remains 17,59 % is influenced by other factor outside model.

CONCLUSION AND SUGGESTION

Conclusion

Resilience rate of food resulted from livestock based on production yield can fulfill 4,56 grams protein/capita/day from 6 gram protein/capita/day that suggested. Food resilience rate in Central Java has Subsistent Index (IS) 76,00 or has level of food resilience 76,00 %, it mean that produce of the food from livestock can only fulfill 76,00 % from sufficiency norm.

Based on division of Bakorwil , Bakorwil II (region Surakarta) has highest food resilience rate that is 100,50 %; then followed by Bakorwil I (region Pati) that is 72,35 % and then Bakorwil III (region Banyumas) with 55,17 %.

Overall factors that is meat production, egg production, milk production, livestock population, number of residents, region, GDP regional and livestock density influence very significant food resilience from livestock in Central Java.

Suggestion

Based on result, suggestion suggested is to push production that resulted from livestock with followed by awareness of public to increase consumption of food from animal, Remembered that right now, production is only reached 76,00 % from sufficiency norm suggested

Also suggested to be more pays attention to factors that influencing food resilience especially production aspect of food resulted from livestock (meat, egg and milk) and effort to controlling number of residents.

Reference

Aritonang. I. 2000. Krisis Ekonomi : Akar Masalah Gizi. Cetakan I. Penerbit Pressindo, Yogyakarta.

Atmojo, S.M., H. Syarief, D. Sukandar, M. Latifah. 1995. Pengembangan Model Identifikasi Keterjaminan Pangan di Propinsi Jawa Timur dan Nusa Tenggara Timur. Media Gizi dan Keluarga. Nomor : XIX (2) : 1 – 16.

Badan Pusat Statistik. 2007. Jawa Tengah dalam Angka 2007. Kerjasama BAPPEDA dengan BPS, Semarang.

Dinas Peternakan Propinsi Jawa Tengah. 2008. Buku Statistik Peternakan Propinsi Jawa Tengah 2008. Ungaran, Jawa Tengah.

Kamaruddin, A. 1990. Sumbangan Pangan Hasil Ternak untuk Gizi Masyarakat. Prosiding Kursus Penyegar Ilmu Gizi serta Kongres IV Pergizi – Pangan Indonesia, Jawa Barat.

Mukson, 1998. Keragaan Konsumsi Pangan Hewani Menuju Pola Pangan Harapan di Kotamadia Dati II Semarang. Journal of Tropical Animal Development. Volume 23 No. 2. p : 47 – 55.

Soedjana, T.D., I.W. Rusastra dan T. Sudaryanto. 1998. Penawaran, Permintaan dan Konsumsi Pangan Hewani di Indonesia. Widyakarya Nasional Pangan dan Gizi VI. LIPI, Jakarta.

Soetrisno, N. 1998. Ketahanan Pangan. Widyakarya Nasional Pangan dan Gizi. LIPI, Jakarta.

Sudono, A., P.S. Hardjosworo, H.M. Eidman dan Muhilal. 1989. Peranan Bahan Makanan Hewani Guna Mencapai Kecukupan Gizi, LIPI, Jakarta.

Suryana. A. 2004. Kapita Selekta Evolusi Pemikiran Kebijakan Ketahanan Pangan. Cetakan Pertama. Penerbit BPFE, Yogyakarta.