สถานการณ์การเลี้ยงไก่พื้นเมืองของเกษตรกร ในเขตเมืองหลา แขวงอุดมซัย สาธารณรัฐประชาธิปไตยประชาชนลาว

The Situation of Farmers Rearing Native Chickens in Muang La, Udomxay province, Laos PDR

อัมพร ผาสุก
คณะเกษตรศาสตร์และทรัพยากรป่าไม้ มหาวิทยาลัยสุภานุวง สาธารณรัฐประชาธิปไตยประชาชนลาว
Amphone Phasouk
Faculty of Agriculture and Forest Resource, Souphanouvong University, Lao PDR
พหล ศักดิ์คะทัศน์, พุฒิสรรค์ เครือคำ และ สายสกุล ฟองมูล
Phahol Sakkatat, Phutthisun Kruekum and Saisakul Fongmul
คณะผลิตกรรมการเกษตร มหาวิทยาลัยแม่โจ้
Faculty of Agricultural Production, Maejo University
E-mail: m.amphone@hotmail.com, phahol@mju.ac.th, rungsun14@hotmail.com and saisakul_tor@yahoo.com

(Received : April 20, 2021 Revised : June 15, 2021 Accepted : June 22, 2021)

บทคัดย่อ

การวิจัยครั้งนี้มีวัตถุประสงค์ เพื่อศึกษาลักษณะพื้นฐานส่วนบุคคล เศรษฐกิจ และสังคมของเกษตรกรผู้เลี้ยงไก่พื้นเมือง รูปแบบการเลี้ยงไก่พื้นเมือง และปัญหาข้อเสนอแนะเกี่ยวกับการเลี้ยงไก่พื้นเมืองของเกษตรกรในเขตเมืองหลา แขวงอุดมซัย สาธารณรัฐประชาธิปไตยประชาชนลาว โดยเก็บรวบรวมข้อมูลเกษตรกรผู้เลี้ยงไก่พื้นเมือง จำนวน 319 คน วิเคราะห์ข้อมูลโดยใช้สถิติพรรณนา ค่าความถี่ ค่าร้อยละ ส่วนเบี่ยงเบนมาตรฐาน ค่าสูงสุด และค่าต่ำสุด ผลการศึกษา พบว่า เกษตรกรส่วนใหญ่เป็นเพศหญิง อายุ เฉลี่ย 31.07 ปี สำเร็จการศึกษาอยู่ในระดับชั้นประถมศึกษาหรือต่ำกว่า อยู่ในสถานภาพสมรส มีจำนวนสมาชิกในครัวเรือนเฉลี่ย 6.55 คน มีรายได้ภาคการเกษตรเฉลี่ย 5,813.54 บาทต่อเดือน การถือครองที่ดินในครัวเรือนส่วนมากมีที่ดินของตัวเองร้อยละ 94.4 มีจำนวนพื้นที่ถือครองที่ดินในครัวเรือนเฉลี่ย 11.6 ไร่ โดยเกษตรกรมีการติดต่อกับเจ้าหน้าที่ส่งเสริมการเกษตรเฉลี่ยปีละ 2.82 ครั้ง และเข้าร่วมการฝึกอบรมและดูงานด้านการเกษตรเพียงร้อยละ 31.7 เกษตรกรส่วนมากได้รับข้อมูลจากสื่อวิทยุ ร้อยละ 34.2 เกษตรกรส่วนมากไม่ได้เป็นสมาชิกขององค์กรในชุมชนร้อยละ 59.6 สำหรับรูปแบบการเลี้ยงไก่พื้นเมือง พบว่า เกษตรกรร้อยละ 62.5 เลี้ยงไก่พื้นเมืองแบบกึ่งขังกึ่งปล่อย ให้ธัญพืชเป็นอาหารหลัก (ร้อยละ 86.8) เกษตรกรให้อาหารวันละ 2 ครั้ง

เช้า และ เย็น (ร้อยละ 75.5) เกษตรกรมากกว่าครึ่งหนึ่งไม่ได้ใส่ใจในการให้น้ำไก่ (ร้อยละ 51.7) ไม่มีการทำวัคซีน (ร้อยละ 60.5) ระยะเวลาการเลี้ยงไก่พบว่า เกษตรกรร้อยละ 45.5 ใช้เวลาเลี้ยง 5 เดือน และไม่ได้เลี้ยงเพื่อจำหน่าย (ร้อยละ 57.4) มีจำนวนไก่ที่เลี้ยงเฉลี่ย 36.21 ตัว เกษตรกรมีประสบการณ์ในการเลี้ยงไก่พื้นเมืองเฉลี่ย 9.81 ปี มีแรงงานในการเลี้ยงไก่เฉลี่ย 3.62 คน และแหล่งเงินทุนในการเลี้ยงไก่ส่วนใหญ่เป็นของเกษตรกรเองร้อยละ 61.8 นอกจากนี้ปัญหาที่พบคือปัญหาด้านอาหาร น้ำ และการจัดการฟาร์ม รวมทั้งด้านสุขภาพสัตว์ ด้านสวัสดิภาพสัตว์ ด้านสิ่งแวดล้อม มีเพียง 1 ด้านเท่านั้นที่เกษตรกรไม่พบปัญหาได้แก่ ด้านองค์ประกอบฟาร์มไก่พื้นเมือง

คำสำคัญ : ไก่พื้นเมือง ข้อมูลพื้นฐานเกษตรกร เกษตรกร เมืองหลา

Abstract

This study aimed to explore 1) socio-economic attributes of farmers raising native chickens., 2) Pattern of Native chickens farming system in Muang La, Udomxay Province, Laos PDR. and 3) Figure out the problem and suggestion for native chickens raising of farmers in Muang La district, Udomxay province, Lao PDR. A set of questionnaires was used for data collection administered with 319 farmers who raising native chickens in Muang La. Obtained data were analyzed by using descriptive statistics i.e. frequency, percentage, standard deviation, maximum and minimum. Findings showed that most of the respondents were female, 31.7 years old on average, lower to elementary school graduates and married, and they had 6.55 household members on average. The average income from the agricultural sector was 5,813.54 baht per month on average and most of them (94.4 %) had their own land on average, 11.65 rai. They communicate with district agricultural extension staff average 2.82 times annual. Only 31.70 percentage of the farmers had attended a training or observational study on agriculture production, about 34.2 % of farmers had got agricultural information from local ratio. Additionally, more than half of them (59.6 %) were not members of community organizations.

Native chicken farming system, 62.5 % of farmers raises native chicken under semi free-range system, the main feed was whole grain (86.8 %), unvaccinated (60.5 %), non-business raising (57.4 %) They reared 36.21 native chickens per head on average and most of the respondents perceived agricultural data or information through radio and they had 9.81 years of experience in native chicken rearing. Those had 3.62 chicken rearing work force and more than one-half of them (61.8 %) used their own investment fund. In addition, problems suggestion are food, water and farm management problems. including animal health animal

welfare in the environment, there is only one aspect that farmers do not encounter problems, elements of native chicken farm.

Keywords: Native chicken, Agricultural information, Farmers, Muang La

Introduction

Raising native chickens has been a long standing practice in Laos PDR. Because native chickens are easier to raise than commercial breeds, (Jaturasitthat et al., 2003), which farmers may feed with broken rice, rice and rice bran (Sisamai et. al., 2018). At present, the products of native chicken have become more popular consumption and income that 70-90 % of the family in rural area rearing native chickens. In fact, the native chicken is considered as a source of protein from meat and eggs to serve as household food and can also sell as a product to generate additional income for household Laos is considered a developing country that consumes meat, about 20 % which is derived from poultry. This is because the chicken meat has unique flavor, firm texture and low fat/cholesterol content (Jaturasitha et al. 2003; Jaturasitha et.al, 2008; and Duangchinda et al., 2009). It can be responding well to needs of consumers who care about good health being. In addition, it can also be a low cost protein source and suitable for household consumption (Jaturasitha et al., 2003)

Agricultural development is important in the management of policy and social-economic development plan of the government, become a prototype of food production for food security and create jobs for people more than 70 % of the population lives in rural area of the Lao People's Democratic Republic. At the same time, agricultural production is also a major source of income in reducing poverty for Lao people and covered about 30 % of GDP (Ministry of planning investment, 2017). Therefore, the Lao People's Democratic Republic puts importance on the agriculture and forestry. Interestingly, the 8th grand conference of the Laos government has established determined the direction and function of agricultural development in the area of economic projects, such as the integration of agricultural development to achieve food security. It may create a change in the direction of agriculture development to the modern farming system which emphasis on the increase production base, scientific and advance technology in accordance with the strength of each area. Animal husbandry is one of the essential elements for the sustenance of farmers, nearly 50 % of their income was from animals Bountong, Douangsavanh & Rigg (2004). Poultry is considered to play another important role in meeting the demand for meat. The target of economic

development plan and the state society strategy by 2025 has planned to produce 114,000 tons of poultry and 78,000 tons of eggs (Ministry of Agriculture, 2014). However, Muang La was continuously facing several natural disasters, damage agricultural products affecting the economy of the district lead to the increasing of the cost-of-living increases. The most of the farmers in Muang La still farming base on natural condition, less education and lack of scientific knowledge, the community still strongly follow traditional culture for the chickens raising. they mostly are in the form of house hold rearing with small number of chickens, there is no any commercial native chicken farm. According to report of Agricultural and forestry office of Muang La district revealed that there are only a few farmers access to promoting animal husbandry information causing the farmers has not yet been developed and lack of advance techniques to support them (Agricultural and forestry Office La District, 2019). Therefore, promoting agriculture is one of great importance to the famers in Muang La and in order to improve agriculture system to be better. Thus, this study is designed to evaluate the basic personal skill, general social characteristics of farmers, this information will be useful for planning to improve farm work skill and develop the native chicken raising potential to be better, bring benefits to the field implementation of the farmers.

Objectives

1. Study on socio-economic attributes of native chicken farmers in Muang La, Udomxay Province, Laos PDR
2. To evaluate pattern of native chickens farming system in Muang La, Udomxay Province, Laos PDR
3. Figure out the problem and suggestion Native chickens raising of farmers in Muang La district, Udomxay province, Lao PDR.

Methodology

This study selected Muang La as the located of the study because it was a high number of raising native chickens. Population in this study consisted of 319 household in Muang La, Udomxay province, Laos PDR and they were obtained by using the formula of Yamane (1973) with the reliability level at 95 % with an error of 0.05. A close-ended and open-ended questionnaire was used for data collection based on Socio-economic attributes i.e. frequency, percentage, standard deviation. maximum score and minimum.

Result

1. The socio-economic characteristics of native chicken famer in Muang La

Table1 showed, most of the respondents were female (61.1 %). The age range of the respondents was 17-80 years of age. The majority of the respondents were between 21 and 30 years old. Regarding educational attainment, it was found that more than one-half of the respondents (55.5 %) were elementary school or lower. This was followed by secondary school (22.6 %), high school (18.8 %) and vocational certificate/or bachelor's degree (1.6 %). For marital status, it was found that almost all of the respondents (90 %) were married.

Table 1. The general information of farmers in Muang La.

Personal characteristics	Quantity (person)	Percentage (%)
Gender		
Male	124	38.9
Female	195	61.1
Age (year)		
< 20	43	13.5
21 - 30	156	48.9
31 - 40	62	19.4
41 - 50	33	10.3
> 50	25	7.8
$\bar{X}$ = 31.09 SD = 11.14 Min - Max = 17 - 80		
Education		
Elementary school or lower	177	55.5
Secondary school	72	22.6
High school or vocational	60	18.8
Higher diploma or college certificate	5	1.6
Bachelor degree or higher	5	1.6
Marital status		
Single	29	9.1
Married	287	90.0
Separated/divorced	1	0.3
Widowed	2	0.6

The results of economic factors of farmers found that the number of household members were 5-7 people (45.8 %), followed by more than 7 people (32.3 %), the average

household member was 6.55, the number of farmers who held their own land was 301 households (94.4 %), followed by their parents' land, (4.1 %), and rent other people's land (1.6 %). The number of farmers who owned land, with holding area at 5 - 10 rai was 43.9%, followed by holding 10 - 15 rai (21.9 %), where farmers have an area holding average at 11.65 rai per household. The highest of land holding was 43.75 rai and the lowest was 3 rai. Regarding family income, the largest of people fell in to 3,001-5,000 baht per month income range was 24.1 %, followed by less than 3,000 baht was 23.2 % and about 5,001-7,000 baht included 21.3 %. As a whole, their an average income was 5,813.54 baht per month; the lowest 1,024 and the highest was 25,596 baht (Table 2).

Table 2. The number and percentage of the respondents based on economic factors

Family characteristics	Frequency (person)	Percentage (%)
Family member (person)		
< 4	70	21.9
5 - 7	146	45.8
> 7	103	32.3
$\bar{X}$ = 6.55 SD = 2.59 Min - Max = 2 – 19		
Land holding		
Owned	301	94.4
Other people	5	1.6
Parents/relatives	13	4.1
Area of land holding (rai)		
< 5	32	10.0
5 - 10	140	43.9
10 - 15	70	21.9
15 - 20	44	13.8
> 20	33	10.3
$\bar{X}$ = 11.65 SD = 8.03 Min - Max = 0 – 43.75		
Family income (baht/month)		
< 3,000	74	23.2
3,001 - 5,000	77	24.1
5,001 - 7,000	68	21.3
7,001 - 10,000	58	18.2

Family characteristics	Frequency (person)	Percentage (%)
> 10,000	42	13.2
$\bar{X}$ = 5,813.54 SD = 3,734.33 Min - Max = 1,024 - 25,596		
Income from the agricultural sector		
(baht/month)		
< 1,000	37	11.6
1,001 - 3,000	153	48.0
3,001 - 6,000	87	27.3
> 6,000	42	13.2
$\bar{X}$ = 2,670.47 SD = 1,871.78 Min - Max = 0 - 10,239		
Income from the non-agricultural sector		
(baht/month)		
< 1,000	96	30.1
1,001 - 3,000	110	34.5
3,001 - 6,000	26	8.2
> 6,000	87	27.3
$\bar{X}$ = 3,143.07 SD = 3,584.63 Min - Max = 0 - 23,890		

The results of social factors was found that farmers had an average of 2.82 times contacts with agricultural extension officers per year, with the highest number contacting was 7 times per year and the lowest was never contact (33.8 %), the number of farmers who contacted with agricultural extension officers was 66.2 %. The annual contact with agricultural extension officers was more than 4 times was 34.1 %. In the case of attending a training and observational study, it was found that more than half of the respondents (68.5 %) was not attended a training or observational study. Most of the respondents perceived agricultural data or information through radio most, followed by media and government official (34.2, 29.2 and 20.2 %, respectively) and newspaper/magazine was found least (2.2 %). It was also found that the respondents perceived agricultural data/information 7.27 times per year on average; the highest was 17 times and the lowest was at twice. In the case of being a group member, it was found that most of the respondents (59.6 %) were not group member in the community whereas 37.3 % were member agricultural housewife group and 3.1 percentage were member of clients of the agricultural extension bank.

2. The native chicken farming system in Muang La

The results showed (Table 3) that semi free range system farming (62.5%), fallows by free range system 22.6% and indoor system 12.2%. Semi free range system is a system that farmer raising chicken by letting them free range in the daytime after feed in the morning, farmer use their garden surrounding house as farming area, 86.8 % feeding of whole grain without processed feeds and only 13.2% feed by commercial or complete feed, and feeding two times a day morning and evening (75.5 %), followed by feeding one time per day (19.1%) and three times a day (5.3%) this results marked that farmers have lack of knowledge of feed management mostly they use whole grain feed, is not considerate of nutrition content such as protein, the 51.7% of farmer pay no attention on water feeding, they believed that chickens could find water by them self, the majority system was in the semi free range system, unvaccinated, (60.5%) use some traditional herbals during disease (64.9%) thus causing the rate of death about 89.34 % and only 10.66 % alive since they try to keep raising far away from community such at their rice farm moreover they have limit vaccine access, the purpose of native chicken raising 57.4 % of farmer were produced for family food supply only not for economics purpose. The farmers were produced for family food supply and some for sale (42.6%). On average, the respondents reared 36.21 native chickens per person; the highest was 180 and the lowest was 3 native chickens. Regarding experience in native chicken rearing, it was found that more than half of the respondents (56.1%) had 6-10 years of experience and this was followed by less than 5 years (17.9%). As a whole, the respondents had 9.81 years of experience in native chicken rearing on average; the highest was 25 years and the lowest was only one year due to young age. The average labor of household was 4 people, the number of household labor that could rear native chickens was 3.62 persons. The family had numbers most comprised 12 persons and least number comprised only one person. More than one-half of the respondents (61.8%) used their own capital and the rest got a loan from the agricultural extension bank and the village saving fund 2.5 and 0.3%, respectively Table3.

Table 3. The native chicken farming information

Description	Frequency (person)	Percentage (%)
Farming system		
Indoor	39	12.2
Semi-free range	208	65.2
free-range	72	22.6
Feed management		
Commercial pellet	42	13.2
Whole grains	277	86.8
Paddy/rice	208	65.2
Corn	69	21.6
Feeding per day		
1 time	61	19.1
2 times	241	75.5
3 times	17	5.3
Water for chickens		
Never feed	165	51.7
Feed	154	48.3
Vaccination		
Never use	193	60.5
Use	126	39.5
Medicinal plants		
Never use	112	35.1
Use	207	64.9
Number of native chicken		
< 20	121	37.9
21 - 40	98	30.7
41 - 60	54	26.9
61 - 80	18	5.6
> 80	28	8.8

$\bar{X}$ = 36.21 SD = 28.08 Min - Max = 3 – 180

Description	Frequency (person)	Percentage (%)
Farming experiences (year)		
< 5	57	17.9
6 - 10	179	56.1
11 - 15	48	15
16 - 20	27	8.5
> 20	8	2.5
$\bar{X}$ = 9.81 SD = 5.15 Min - Max = 1 - 25		
Labors (person)		
< 2	97	30.4
3 - 4	140	43.9
> 4	82	25.7
$\bar{X}$ = 3.62 SD = 1.63 Min - Max = 1 - 12		
Source of fund		
Own fund	197	61.8
Loan from the village saving fund	1	0.3
Loan from Agricultural extension bank	8	2.5
Loan from project of nutrition for pregnant women and children	113	35.4

3. The problem and suggestion Native chickens raising of farmers in Muang La

There are several difficulties related to the development of chicken farming potential for farmers, this study we observed 8 factors Good Agricultural Practice of farmers in Muang La, it was found that only one factor that farmer did not faced problem (the components of farm). Other factors fund several problems such as feeds and water, farm management, animal health care and farm environment management. Base on the problems mentioned above, the criteria has been suggested for the development farming potential in total 8 issues, such as the criteria need for proper training of native chicken farming methods was counted in 59.7 %, followed by methods of disease prevention was 51.9 % and needs funding for raising chickens, feed preparation, vaccination, chickens raising manual, use of herb for disease prevention and waste separation were 44.7, 44.1, 36.6, 29.1, 26.9 and 22.2 % respectively shown in

Discussion

Currently results show that 61.1 % of farmers are female with average age of 31.09 years old, this finding was suggested that most of the farmers are young house wife and was well agree with the behaviors of the community in Muang La that household poultry raising works are belong to house wife (female work), it is different from Tiangnil et al. (2006) reported that native chicken farming condition of Borivan village, Khao Hin Xon, showed that 68.4 % of farmer were male with an average age of 52.9 years. Regarding educational attainment, more than half of the respondents (55.5 %) are under elementary school suggest that they raise native chicken as traditional farming system, as part time farming only this kind of farming not only in Muang la but most of rural community of Lao PDR people are practice the same style. The family member of farmers ranging from 2-19 people with 3-4 labors work on native chickens farming, spend only part time for chicken raising (average 21 native chickens per person), demonstrate that they plan to raise chicken for family consumption more than economy purpose. The famers owned large of land (average 11.65 rai per household), average income 5,813 baht per month, these data suggest that they do other farms more than chicken farm, especially plantation farming, only a few farmers commutate to agricultural extension officer, most of them never attended a training or educational trip about chicken raising the reason may due to they did not interesting and limitation of training program in rural area.

The farming system most of them use semi free range system included 62.5 %. With feeding two times a day, let chicken free range around their house area, for feeds use whole gain as main feeds, it was well agreed with the studied of Watchara et. al, (2015) who studies farming systems and production potentials of thai native chickens of farmers in Phayao province, showed that number of native chickens in Phayao was 90 % of the farmers raised the chickens under semi-free range system, raising is a garden or free area surrounding their house, feed chicken in the morning then let chicken free during the daytime, feed whole gain of corn and rice. Moreover, farmer did not play attention on food nutrition, unvaccinated, but use traditional herbals during disease infected thus causing the rate of death about significantly high (89.34 %) these finding different from Nguyen et al. (2010) was reported that when feed with increasing protein content 21 % could improve body weight gain and feed conversion ratio.

Regarding experience in native chicken raising show slight high half of farmers have average 9.81 years of experience in native chicken raising, about 61.8 % invest by their own fund this point also one of the reasons that they cannot do commercial farm. As Charroenmoon et al. (2015) reported that most of the farmers were facing high cost of feeds and feeds materials, farmers did manage feed properly, it may case the cost of farming, because nature feeds are relatively limited as the impact of disaster causing farmer to face this issue. Moreover, Kubkaew & Mataray (2004), Kusonyoung & Jarasboonhirun (2012) reported that most of the farmer are still follow the model of raising native chickens by allowing them to eat naturally with addition feed of rice and rice bran in order to reduce feed cost.

For animal health, farmers are lack of knowledge in the treatment, many farmer never hear about vaccine therefore this finding was well agree with Kubkaew & Matarat (2004) which revealed that only a small number of native chicken farmers in Mahasarakham province had vaccinated prevent the disease of chicken and most of them never treat native chickens when infected and injured, Laopaiboon & Jitpranee (1999) reported that local farmers in Khonkaen province farmer never vaccinates for native chickens and due to model of free range raising system which let chickens feed naturally and breed naturally it may causing the genetics problem within the same breed this related to the research of Amnuay, 2010 was reported that farming conditions of general farmers with semi-free range allow for livelihood and mating pattern, this make it impossible to distinguish the pure bred that are born, even if their external features indicated their purebred, resulting in low growth rate, small egg and low egg productivity.

From the several problems mentioned above, farmers requested a need to develop potential for native chickens such as farmers need training on how to raise native chickens properly base on the Good Agriculture Practice principles along with local skill such as feeds preparation by natural material that available obtain local area. Laeno et al. (2015) reported that the most need of local native chicken farmers was the training of feed management skill and followed by marketing.

Suggestions

Suggestion for future improvement

1) Provincial and district agricultural offices should promote chicken raising technique and continuously monitor the performance to help encourage farmers to know the importance of raising native chickens

2) The Department of Agricultural Extension should provide more information about native chicken farming through television and radio channels, because farmers are receiving the most information from these two channels

3) Provincial agricultural department and districts office should provide funding sources with low interest rates, such as agricultural extension banks or create village funds to allow farmers to access funds for farming, especially for native chickens. Since farmers are currently unable to access funding

4) The department of agriculture should establish a training center for animal husbandry under the good agricultural system in the community so that interested agencies and the general public can learn and practice, which will enable them to apply the gained knowledge to increase the efficiency of production

5) Related organizations should establish of a good and efficient network to promote, it can promote a network for native chickens to exchange knowledge, skills, and breeds in order to increase knowledge, and income of farmers, it also conserves native chicken breeds as well

Suggestions for future research

1) Study of the process of supporting from government, communities and farmers in the preparation of farming plans for farmers who raising native chickens as well as studying the operation plan to achieve the efficiency and suitability and sustainable for the community.

2) Factors affecting potential of farmers for native chickens should be studied in order to develop a model for enhancing of potential farmers who raising native chickens

New knowledge and the effects on society local and communities

This study will provide basic information to government agencies, mainly animal husbandry department, department of agricultural extension and cooperatives, ministry of agriculture and forestry, provincial department of agricultural office and the district agriculture office including the private sector this information could be used in planning policy, production extension and planning for technology transfer of native chicken farming to farmers in the community will know the importance of raising local chickens more for example, native chicken is the best source of protein that can be produced by itself, and it is also a career that can make some incomes for farmer's family.

Acknowledgement

The researchers would like to thank the coordinator of nutritional project for mothers and children and the coordinator of nutrition and food project of Muang La, Udomxay province as well as all farmers in this study who kindly coordinated with researchers.

References

Agricultural and Forestry Office La District. (2019). *Implementation of the action plan for agriculture and rural development*, La district: Lao PDR.

Bountong, B., Douangsavanh, L., & Rigg, J. (2004). Building sustainable livelihoods in Laos: Untangling farm from non-farm, progress from distress.. *Lao journal of agriculture and forestry, 35*(5), 607-619. DOI:10.1016/j.geoforum.2004.02.002

Charroenmoon, K., Duangjinda, M., Laopaiboon, B., Saenchaisuriya, P., Phasuk, Y., & Kanhariang, S. (2015). Raising Thai Native Chicken and Satisfaction with Farmers in Flooding Area in Khon Kaen Province. *KHON KAEN AGR. J, 43*(1), 995-1000. (In Thai)

Duangjinda, M., Laopaiboon, B. Vongpralub, T. Sanchaisuriya, P. Nantachai, K. sarawish, s. and Raksonk, W. (2009). *Development of chicken broods-pradoohang dam, a local breed in Thailand project. A research report*. Bangkok: The Thailand Research Fund office. (In Thai)

Jaturasittha, S., S. Saithong, A. Phongphaew, T. Apichartsrungkoon, and A. Leotaragui. (2003). *Quality of Carcass and Meat of native chicken and 4 Hybrid breeds: A research report*. Bangkok: The Thailand Research Fund office. (In Thai)

Jaturasitha, S., T. Srikanchai, M. Kreuzer, M. Wicke. (2008). Differences in carcass and meat characteristics between chicken indigenous to Northern Thailand (Blackboned and Thai Native) and imported extensive breeds (Bresse and Rhode Island Red). *Poultry Science, 87*(1), 160-169. DOI:10.3382/ps.2006-00398 (In Thai)

Kubkaew, K., & Matarat, S. (2004). Production and technological intelligence, raising the butcher chicken according to the project. *Regional Animal Journal 4, 8(*18), 9-36. (In Thai)

Kusonyoung, M., & Jarasboonhirun, I. (2012). Study of breed and condition of native chicken rearing of Small farmers in Udon Thani Province. *Livestock Journal Region 4*, *16*(30), 44-71. (In Thai)

Laeno, w., Kunkaew, w., Buranawit, K., & Ardkham, B. (2015). Farming Systems and Production Potentials of Thai Native Chickens of Farmers in Phayao Province. *Journal of Community Development and Life Quality, 4*(1),137-145. https://so02.tci-thaijo.org/index.php/JCDLQ/article/view/130393/98763 (In Thai)

Laopaiboon, B., & Jitpranee, S. (1999) *Research report on the study of chicken production. Native in the village of Muang District Khon Kaen Province*. Faculty of Agriculture. Khon Kaen University. (In Thai)

Ministry of Agriculture. (2014). *Agricultural Strategy by 2025 and Vision to 2030*. Ministry of Agriculture. Lao.

Ministry of Planning Investment. (2017). *8th Five -Year National Socio - Economic Development Plan (2016-2020).* Vientiane: Department of planning.

Sisamai, I., T. Thongphone,V. Nathong, P. Kham., & K. Lampheuy. (2018). Effect of using cassava leaf meal in diet on growth performance of improved-chicken breed. *Journal of Agricultural Science, Technology and Development, 3*(1), 293-409. https://fag.nuol.edu.la/index.php/en/journal/volume-3,-issue-1,-january-june-2018 (In Thai)

Tiangnil, S., Dejasasawat, A., Sophakun, U., Ngoiphala, N., & Sukprasert, C. (2006). The study of the condition of the native chickens of the farmer of Acropolis Village Development Study Center Khao Hin Son, due to royal royal. *Journal of the Animal Health and Hygiene Department, 4*(7), 80-105. (In Thai)

Yamane, T. (1973). *Statistics: An Introductory Analysis*. (3rd ed.). New york: Harper and Row Publication.