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DEVELOPMENT OF SOYBEAN CULTIVATION AS LEADING COMMODITY IN REGIONAL AGRIBUSINESS AREA

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ABSTRACT

The objective of current study is to evaluate agribusiness performance of soybean included the on farm and marketing subsystems, besides, the development of soybean as one of superior agricultural commodities and its contribution of soybean upon the gross domestic product (GDP) of Sumedang. The results indicated that agribusiness performance of soybean consisted of farm inputs procurement, on farm production, harvesting and processing, marketing and supported infrastructure and its supporting subsystems. Soybean as one of superior commodities has been well developed due to the availability of human and natural resources, existing markets, production technology and business partnership program. The contribution of soybean upon regional GDP during the years of 2008 – 2016, by the 2008 constant price, was between 0,071% and 0,357% and its contribution upon regional agricultural sector was price was between 0,248%– 1,144%. Whereas soybean contribution based on the current price was between 0,068% and 0,621% and between 0,239%-1,959% respectively. During those periods the contribution of soybean upon the GDP as well as on agricultural sector was fluctuated and tend to be declining.

Contribution/ Originality

Study on cultivation development of soybean as one of leading agricultural commodities in relation with its regional agribusiness area was conducted in Sumedang district. The current study evaluates the agribusiness performance of soybean using primary data of 92 respondents.

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1. INTRODUCTION

Soybean is one of the main food commodities after rice and corn. Soy is a food commodity source of vegetable protein which is very important in diet. In addition to the relatively cheap price, nutritional value is also high. Most households consume them in the form of tofu and tempeh. Therefore, the largest consumers of tofu and tempeh industries (Swastika *et al.*, 2008). The next rank is the feed industry.

Empirically, domestic soybean production growth is slower than demand. Therefore, to close the annihilation every year Indonesia is still importing soybeans. The need for soybean in 2015, 2,246 million tons, while production of 780 million tons, to meet the needs, Indonesia imports 1,466 million tons of soybeans (Swastika *et al.*, 2008; Supadi, 2009).

The low domestic production capability in soy supply when compared to demand requires efforts to correct the gap. These efforts can be pursued by: the growth of seed industry in production centres; superior seed assistance; fertilization technology; increased intensity of counselling; the intensity of DPT control; aid of thresher tool to reduce losses, increase surjan system intensity for swamp land; additional land area from 700 thousand ha to 2 million ha; and the addition of land area through partnership (Sarawa, 2012).

The impact of efforts to increase soybean productivity has been able to increase productivity from 13 quintals per ha to 15.4 quintal per ha for national level, 14 quintals per ha to 15.7 quintal per ha for West Java and 14.8 kunintal per ha 15.9 quintal per ha for Sumedang District. The pattern of development is also increased between 10 to 20 percent (Subandi, 2014, Sumedang Central Statistics Office, 2016). The level of soybean consumption in Sumedang District per year is about 14,400 tons, and consumption is average 40 tons per day. Soybean consumption level in Sumedang District can only be fulfilled 15% from Kopti West Java, the rest must be met from outside Sumedang, whereas the potential of land resources is still wide, soybean market potential is very promising, but the application of technology and partnership is still not optimal (Central Bureau of Statistic, Sumedang District, 2016).

Subandi (2012) said the word production means process of producing, and to produce in this relation is defined as to manufacture, to construct, to make, to grow or “to create”. In this world something done by people is just assembling of the existing components or changing its form or its chemical elements or compounds. To create (khalaqa) something new is the will or the deed of the Almighty God, what man does is just (ja’ala) to make or to change or to assemble. Even, not all ja’ala can be conducted by man, man can not make blood out of food nutrition, and cannot convert the sperm into clot-bone-flesh in the processes of human embryo. That is why, man finds science or technology and does not create them. Muslims are encouraged to produce and prohibited to destruct.

1.1. Agribusiness concept

The Wendi (2012) agribusiness system is a subsystem in a larger system so that the real subsystem can still be detailed. Based on the understanding of the system, the study of agribusiness can certainly be done more structured and systematic. The study can be done by explaining or explaining what constitutes the agribusiness subsystem.

The agribusiness system includes activities in the input subsystem (input), the production subsystem (farm) and the output subsystem (output). The subsystem can be explained as follows:

1.1.1. Agroinput subsystem

This subsystem is in the level of supply of means of production concerning procurement and distribution activities. These activities include planning, management and production facilities, technologies and resources in order to provide inputs or inputs of farming businesses to meet the criteria of timely, appropriate quantity, quality, precise and precise price. The production facilities include fertilizers, seeds, pesticides, tools and agricultural machinery.

1.1.2. Farming subsystem

This farming subsystem is an organization of nature (land), labor, and capital that is shown to agricultural production. This organization includes the activities of fostering and developing farming in order to increase the primary agricultural production. Farming includes all forms of production organizations ranging from small to large scale (plantations, farms), including agricultural cultivation that uses land intensively such as aquaculture, porforiculture, hydroponics, etc. (Downey and Steven, 2007; Drillon, 2007; Mofokeng and Mashingaidze, 2018).

1.1.3. Agroindustry subsystem / processing of results

This activity is not only a simple processing activity at the farm level. but concerns overall activities ranging from post-harvest handling of agricultural products to advanced processing levels with a view to adding value added from the primary production. Thus the process of stripping, cleaning, extracting, freezing, drying, and improving quality (Ericson, 2008; Tabeekh *et al.*, 2017).

1.1.4. Marketing subsystem

The marketing subsystem includes agricultural and agro-industry products for both domestic and export markets. This main activity is the monitoring and development of market information and market intelligence in the domestic market and overseas market. Perpetrators of this activity include private companies, cooperatives, government agencies, banks, or individuals (Muhammad, 2006).

1.1.5. Support subsystem

This subsystem is a supporter of pre-harvest and post-harvest activities that include facilities of banking, banking, agribusiness counselling, agribusiness infrastructure, agribusiness cooperatives, state-owned and private and others.

1.2. Concept of contribution of soybean commodity to gross regional domestic product (GRDP)

The method of calculating GDP at constant 2008 prices is four ways, as follows:

1.2.1. Revaluation

This method is done by assessing production and cost between each year and the price in the base year 2008. The result is the output and cost between at constant 2008 prices, then GRDP at constant prices is obtained from the difference between output and intermediate cost.

1.2.2. Extrapolation

This method is done by multiplying the added value in the base year of 2007 with the production index. The production index as an extra-ploator can be an index of each produced production or index of various production indicators, e.g. labor, number of firms and others deemed appropriate to the calculated activity jens.

1.2.3. Deflation

This method is done by dividing the value added each year with the price index. The price index used as a deflator is usually the Consumer Price Index (CPI).

1.2.4. Multiple deflation

In this multiple deflation, what is deflected is the output and cost of the intermediate. While the added value obtained from the difference between output and cost between the deflation results. The price index used as a deflator for output calculations at constant prices is usually the Large Trading Price Index (IHPB) in accordance with the scope of the commodity. While the price index for the intermediate cost is the price index and the largest Input component ([Central Bureau of Statistic, West Java, 2014](#)).

Out of the descriptions is constructed the research flow-chart as Figure 1 below:

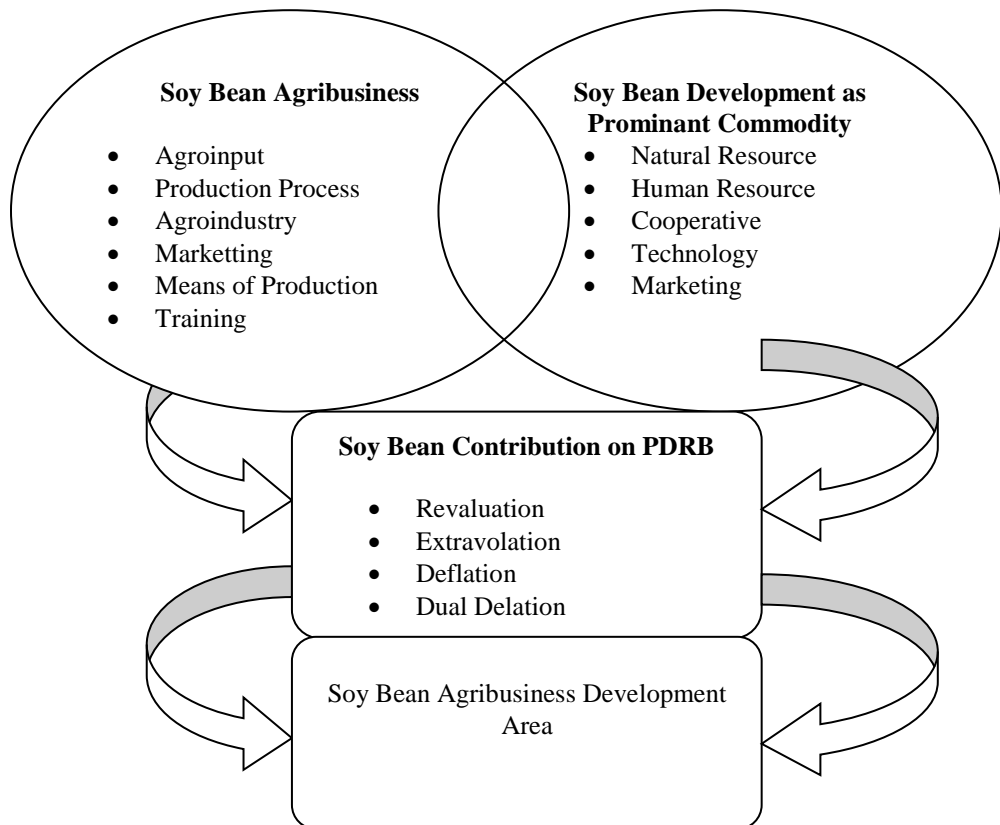


Figure 1: Research flow chart

2. METHODOLOGY

2.1. Research methods

The research method applied was survey that is a method by conducting observation to a number of samples that are considered representation, from a population.

2.1.1. Population and samples

Target population (unit of analysis) of this research is a member of Soybean Farmer Group in Sumedang district. The sampling unit includes Soybean Farmers Group in Sumedang District.

1) Sumedang district has the most Soybean Farmer Group compared to other district in West Java Province. The number of Soybean Farmers Group in Sumedang district has 78 groups with 3,056 members of farmers spread in 16 sub-districts, 39 groups.

2) Achievement of Soybean Farmer Group is relatively heterogeneous from the champion: the First National level to Soybean Farmers Group formed by forced to participate in the success of soybean program.

2.1.2. Sampling technique

Determination of sample and population to be studied were done by using Sample Planned of random cluster of two stages, with districts as cluster.

2.2. Definition and operational variables

1) Soybean agribusiness is a description of activities undertaken in the process of soybean agribusiness, which includes the procurement of farming production facilities, farming process, processing and marketing, facilities and infrastructure subsystem and development subsystem.

a) The maintenance of the subsystem for the procurement of agricultural production means is the description and availability of production facilities needed in soybean farming activities that include information, technology, knowledge, procurement of fertilizers, seeds and pesticides.

b) The soybean subsystem's subsistence is a description of one's activities, or a family conducting cultivation of soybean crops from planting to marketing results including site selection planning, commodities, technology, and farming, intensification, conservation and rehabilitation patterns.

c) Post-harvest subsistence and soybean processing is a description of the activities undertaken since soybean is harvested until it is marketed before or after it has been processed into another product.

d) The performance of the marketing subsystem is the marketing phase of the farm products (primary products and processed products) in terms of the type of sales channels so that the goods reach the final consumer.

e) The subsystem of facilities and infrastructure is a means and infrastructure that support in conducting farming activities such as capital and road infrastructure.

f) Development subsystem is a subsystem that supports the implementation of soybean agribusiness system, this subsystem consists of government services, institutional, counselling and so forth.

1) Soybean farmer is someone who do soybean farming activities

2) Production result is total of physical result in the form of soybean in a production cycle which is calculated per year since the planting start productive (kintal per year).

3) Revenue is the product multiplied by the selling price / unit (rupiah / year).

4) Leading commodities are agricultural commodities that have certain advantages such as high agro-climatic suitability, clear market orientation, high added value creation ability, can increase food security have government policy support and have been cultivated by the local community.

5) The development of soybean commodity as a pre-eminent commodity is the performance achieved by the development of soybean commodities is:

a) The potential of natural resources is the suitability of a region in seeking a certain commodity or soybean commodity.

b) The potential of human resources is the ability of a region in terms of human resources available in implementing soybean farming

c) A partnership is a collaboration between two or more with the same objectives.

d) Production process technology is technology used in soybean farming.

- e) Market potential is the market's ability to absorb production.
 - f) Gross Regional Domestic Product (GRDP) is the sum of added value created by the production factor, thus PDRB is a real picture of the economic activities of the actors in producing goods and services (Rp).
 - g) Gross Regional Domestic Product (GRDP) at constant prices is a clear picture of the results of economic actors' activities in producing goods and services which are valued at fixed prices for a certain year (Year 2007) (Rp).
 - h) Gross Regional Domestic Product (GRDP) at current prices is a clear picture of the results of economic actors' activities in producing goods and services that are valued at the prevailing prices in the year concerned (Rp).
- 6) Soybean output is the sum of soybean production multiplied by soybean price (Rp).
- 7) The cost of soybean is the cost incurred in soybean farming diperole

2.3. Data analysis techniques

The data analyzed consisted of quantitative and qualitative data. The analytical techniques used are as follows:

- 1) To know the system of soybean agribusiness is described descriptively. The description of soybean agribusiness includes:
 - a) Procurement of production facilities of soybean farming. Procurement of production facilities of soybean farming include fertilizer, seeds, and pesticides.
 - b) Soy production. In soybean production includes the processing of soil, planting, maintenance, fertilization and harvesting.
 - c) Post-harvest and processing. Processing in this research is limited only post-harvest handling because in Sumedang District there is no processing of soybean for the next.
 - d) Marketing. Marketing conducted by soy farmers in Sumedang District
 - e) Facilities and infrastructure. Facilities and infrastructure include capital and road infrastructure used by farmers in farming.
 - f) Training. Training includes from relevant agencies or institutions
- 2) To know the development of soybean as a leading commodity is described which is covering:
 - a) Potential Natural Resources
 - b) Potential Human Resources (HR)
 - c) Partnership
 - d) Market potential
 - e) Production process technology
- 3) To know the contribution of soybean to Gross Regional Domestic Product (PDRB) and agriculture sector, used secondary data using formula ([Central Bureau of Statistics of West Java, 2016](#)):

PDRB = Soybean Output - Cost Between Soybeans

Output = Total Soybean Production x Soybean Price

Intermediate Cost Soybeans = Intermediate Cost Ratio Soybeans x Soy Output

Cost Ratio Soybean = 3.3% is constante of Statistical Bureau of Sumedang

$$\text{Contribution to GRDP} = \frac{\text{GRDP of Commodity (i)}}{\text{Total GRDP of District(i)}} \times 100\%$$

$$\text{Contribution} = \frac{\text{GRDP of Commodity (i)}}{\text{GRDP of Agricultural Sector of District (i)}} \times 100\%$$

Where:

GRDP of commodity (i) is soybean GRDP in Sumedang district.

Total GDP of District (i) is GDP of Sumedang District.

GRDP of Agriculture Sector is GRDP of agricultural sector of Sumedang district.

3. RESULT AND DISCUSSION

3.1. Soybean agribusiness development

1) Agribusiness Development of Superior commodities

Sumedang Sub District has a large agricultural area of $\pm 2,291.9$ hectares. Almost all the land is planted with soybean but not all farmers are doing good soybean cultivation techniques. While the varieties are widely grown in Sumedang District is a superior variety and local varieties.

Soybean plant in Sumedang District is one of the leading commodities, because the agro-ecosystem and the potential of Sumedang District is suitable for planting soybean. Where Sumedang District is at an altitude between 60 m-364 m above sea level. With this superior commodity program, soybean is directed to the development of agribusiness, so that the District is expected to be one of soybean production in Sumedang District.

3.2. Development of agribusiness development

The guidance that is carried out is mostly technical, namely the ways and steps implemented in the agribusiness system. This approach is expected to increase farmer's competence in farming.

Actually, this cultivation of soybeans has been done by the farmers in Sumedang District, but still simple and the results were prioritized for their own consumption. However, when there is government assistance, the development of agribusiness is directed to the commercial. So in terms of development of this soybean agribusiness, local government is not too difficult in developing it. This is because the farmers have done it since.

3.3. The role of government and private institutions in agribusiness development

The role of government in the development of soybean agribusiness is more in the point of emphasis on Training and guidance. This task is given to the Agricultural Counselling Center (ACC) and the Agricultural Service with coordination between sub-district and district level. This Training is done regularly once a month and every time the planting season, using the method of question and answer after the party gave the material convey the material submitted, this is done to facilitate in knowing various problems faced by farmers in doing this soybean agribusiness.

3.4. Soybean agribusiness system

The performance of soybean agribusiness system is based on the study of the subsystems of the soybean agribusiness system which includes the subsystems of production facilities, production, post-harvest and processing, marketing, facilities and infrastructure and Training.

3.4.1. Procurement subsystem for production facilities

The subsystem for the procurement of production means includes the fulfilment of farming production facilities. Procurement of production facilities, among others, the procurement of seeds, fertilizers, pesticides, and agricultural equipment that can usually be obtained from kiosks that provide existing production facilities at the district and district levels. Types of soybean varieties that are cultivated in Sumedang district are mainly superior and local varieties. From the research result of farmers using superior variety that is 75 people (81,481 percent) and who use the.

3.4.2. Training subsystem

Agribusiness activity in district of Sumedang is supported by several institutions of Food Crops Agriculture service Office of Sumedang District and Agricultural Counselling Center (ACC),

Sumedang District conducts counselling for soybean cultivation to each farmer group once a month and at every beginning of planting season. This is as an effort in supporting the development of agribusiness-based agriculture. The government in cooperation with the Agricultural Counselling Center (ACC) provides counselling about good soybean cultivation.

3.4.3. Facility and infrastructure subsystem

The use of existing capital for soybean farming is still inadequate so it is still open for capital assistance. The capital required is the capital that will be invested for the procurement of tools and agricultural machinery. The condition of road infrastructure in Sumedang District is generally good can be passed by two-wheeled vehicles and four wheels. With the support of good road infrastructure this facilitates the transportation of farm products by farmers for sale.

3.5. Soybean cultivation development as a leading commodity

1) Potential Natural Resources

The production of agricultural commodities is largely determined by the potential and availability of land resources (soil and climate), both in relation to increased productivity through intensification or expansion of the area or extensification. The potential of natural resources can be seen in terms of available land area, as well as land productivity which is reflected by the level of land suitability for certain soybean commodities. Area of agricultural land in Sumedang district 3,902 ha. From the area of agricultural land is the area of harvest for soybean commodity in the first planting season of 914 ha.

Area of farming can determine the amount of total income that will be received by farmers. This is dikarenakan wide land will get the volume of business and economic size of a farming business. The area of respondents' land in Kecamatan Sumedang generally has an average of 0.408 ha.

2). Potential human resources

Human resources are the main factors dynamically able to manage the factors of production to achieve optimal resource productivity. The population of Sumedang sub-district in 2016 numbered 23,090 people. The population is a driver but at the same time also a burden of development. Seen from its main livelihood, totaling the majority of the population of Sumedang Sub-district has a major livelihood in the agricultural sector. In table 6, the majority of the population of Sumedang district depend on agricultural employment of 16,581 people or 76.28%. The dominant population of Sumedang district works in the agricultural sector, it shows the potential of human resources as a driver of the agricultural sector has a great opportunity.

3.5.1. Business development through partnership cooperation

Soybean farmers in Sumedang Sub-district Sumedang district actively participate in farming institutions by participating as members of soybean farmer groups in their respective villages of domicile. As for their motivation to be a member of farmer group that is they feel benefited by some halseperti by becoming member of farmer group will not miss information about technological innovation good cultivation, postharvest handling, and market information and marketing of soybean. In addition, by actively participating in the activities of the group will strengthen the relationship between inter-village soybean farmers.

3) Production process technology

The application of developed technology will affect the level of productivity. Low productivity levels can be seen from the comparison of the ability of the varieties of seeds cultivated with the resulting productivity. For example new varieties, these varieties have a production rate of 1.2 to 1.5 tons per ha of dry beans.

4) Market Prospects

Soybean is much needed in the form of dried beans. Market demand is mostly required for the tempeh and tofu industry as well as for the provision of seeds. Currently, the need for soybean is filled with imports from other countries, so the business prospects of soybean with the efforts made are expected to meet domestic demand (Central Bureau of Statistics, 2016).

The demand for soybean commodities as industrial raw materials, especially for the tempeh-tofu industry which shows a sharp increase, gives a considerable opportunity for the change of production orientation. Motivation of production that was intended to meet the needs of own consumption gradually lead to commercial purposes.

5). Contribution of Soybean to Gross Regional Domestic Product (GRDP) and Agricultural Sector at the Prices in the period of 2010-2016

GRDP of soybean commodity at constant price in 2008 and the prices in the period of 2008 - 2016. Based on secondary data obtained the calculation of contribution of soybean to regional Gross Regional Product (GRDP) on the basis of price valid for 9 years from year 2008 to 2016 that is year: Year 2008 by 0,071 percent, in 2009 by 0,068 percent, in 2010 by 0,146 percent, in 2011 by 0,189 percent, in 2012 by 0,406 percent, in 2013 0,621 percent, 2014 of 0,514 percent, 2015 by 0,451 percent and 2016 0.291 percent. The contribution of soybean to the biggest regional Gross Regional Product (GRDP) is obtained in 2013 which is 0.621 percent, it can be interpreted that Sumedang Subdistrict from soybean commodity contributes to GRDP of Sumedang District 0.621 percent. For more details can be seen in Figure 2 below.

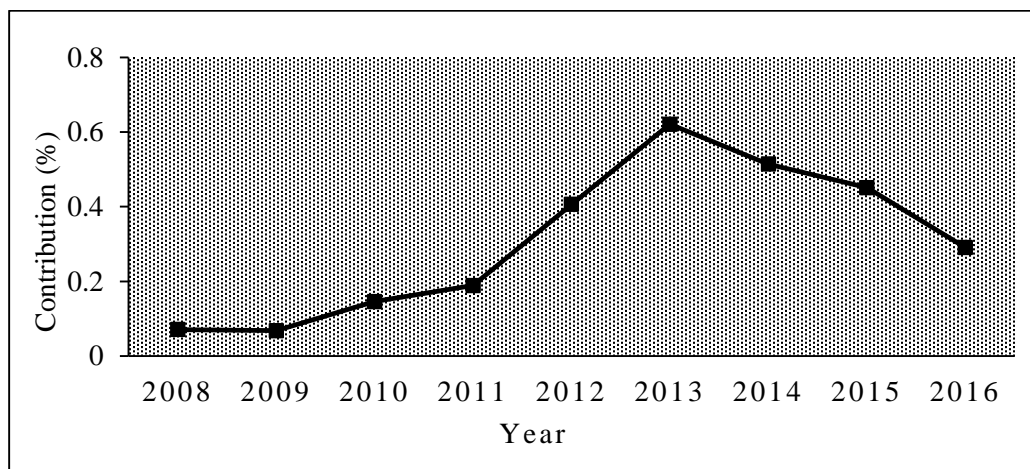


Figure 2: Contribution of Soybean to GRDP of Sumedang District based on the Price in the Period of 2008-2016

For the agricultural sector, the contribution of soybeans 2008 to 2016 is: in 2008 by 0.245 percent, in 2009 by 0.239 percent, in 2010 by 0.523 percent, in 2011 by 0.687 percent, in 2012 by 1.466 percent, in 2013 by 1.959 percent, in 2014 of 1.509 percent, by 2015 by 1.348 percent and by 2016 by 0.819 percent. The largest contribution of soybean occurred in 2013 is 1.959 percent, this means Sumedang District gives the input of soybean commodity to the agricultural sector by 1.959 percent. For more details can be seen in Figure 3 below

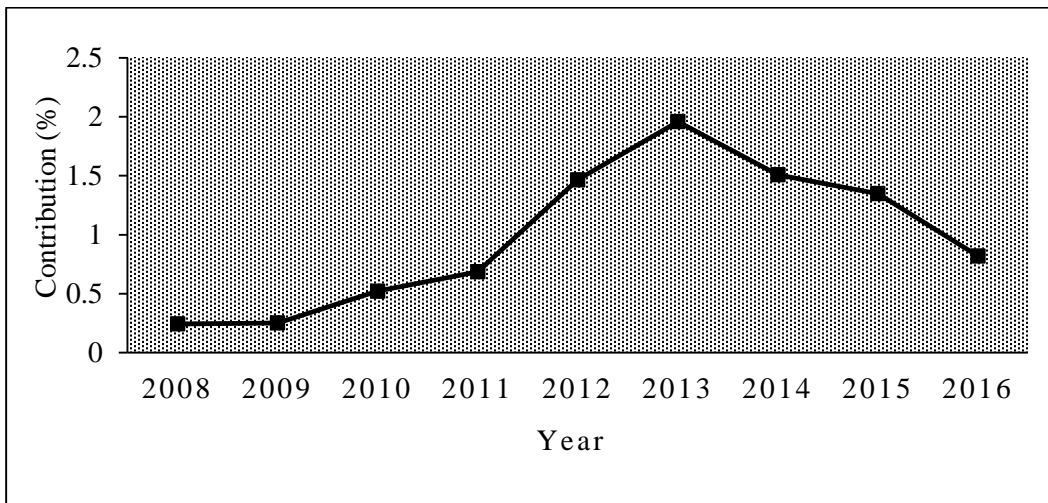


Figure 3: Contribution of soybean to agricultural sector in Sumedang district based on the price in the period of 2008-2016

6) Contribution of Soybean to Gross Regional Domestic Product (GRDP) and Agricultural Sector at Constant 2008 Prices in the period 2008 - 2016

Based on secondary data obtained by the calculation of contribution of soybean to Gross Regional Domestic Product (PDRB) of Sumedang District and agriculture sector. The contribution to PDRB District Sumedang from 2008 - 2016 is: 2008 amounted to 0.071 percent, in 2009 of 0.071 percent, in 2010 by 0.102 percent, in 2011 by 1.137 percent, in 2012 by 0.358 percent, in 2013 by 0.358 percent, in 2014 by 0.263 percent, by 2015 by 0.260 percent and by 2016 by 0.189 percent. The largest contribution of soybean obtained in 2011 and 2012 is 0.358 percent, this means Sumedang District is able to provide input to Gross Regional Domestic Product (PDRB) of Sumedang District of soybean commodity by 0.358 percent. For more details can be seen in Figure 4.

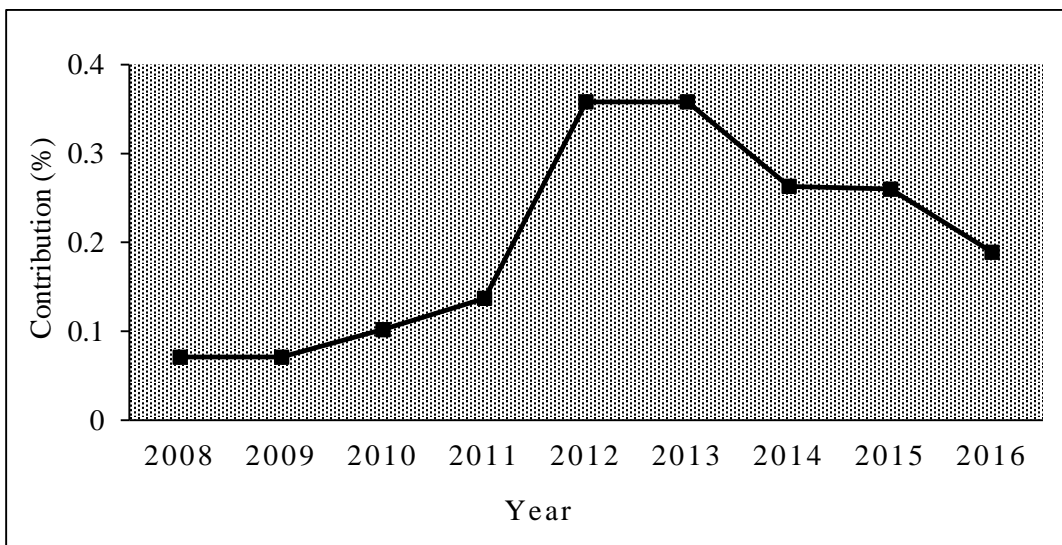


Figure 4: Contribution of soybean to GRDP of Sumedang district based on the constant price of 2008 in the period of 2008-2016

The contribution of soybean to the agricultural sector in 2008 was 0.248 percent, in 2009 by 0.249 percent, in 2010 by 0.359 percent, in 2011 by 0.474 percent, in 2012 by 0.268 percent, in 2013 by 1.144 percent, by 2014 by 0.801 percent, 0.795 percent, by 2016 by 0.586 percent. In 2013, soybeans give the biggest contribution to agriculture sector, which is 1.144 percent, it means Sumedang district from soybean commodity can give input to agriculture sector 1,144 percent for more details can be seen in Figure 5.

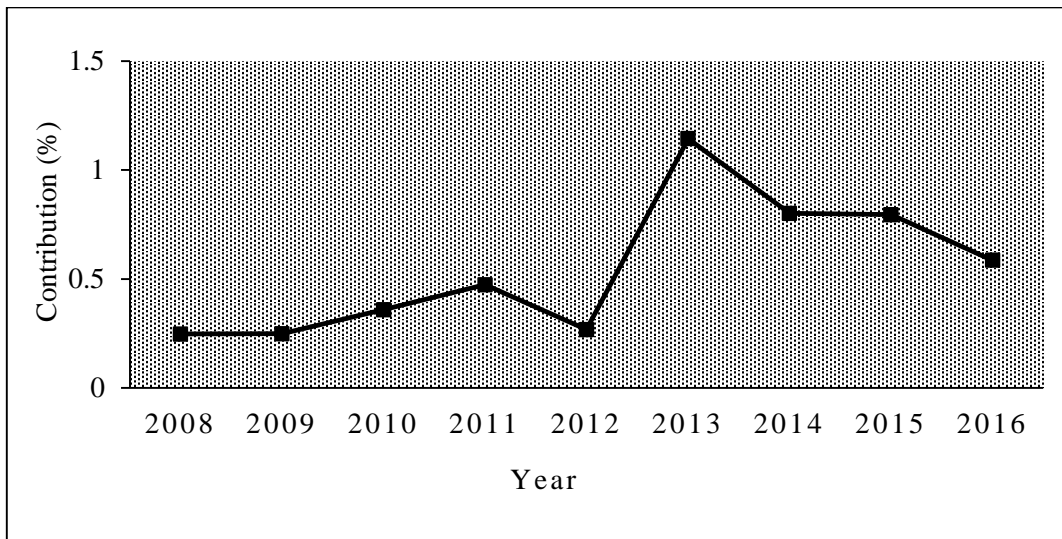


Figure 5: Contribution of soybean to agricultural sector of Sumedang district based on the constant price of 2008 in the period of 2008-2016

The contribution of soybeans based on the constant price of 2008 for the last nine years from 2008 - 2016 fluctuated, this is because agricultural products are heavily influenced by climatic conditions (rainfall, temperature, weather, altitude) and product prices. Although production decreases, if the selling price is high it will increase the GRDP. The amount of production that tends to fall will affect the contribution of soybean commodities to the GRDP.

Developing crop production is also needed to find way of biological protection as it is stated by [Subandi *et al.* \(2017\)](#) it is very important to find another host to keep the parasitoid *T.japonicum* available at all the time, but the hint of difficult life and culture of *T. japonicum* and the intermediate host will be the consideration in formulation of treatment in the experiment to be carried out. Application of parasitoid *T.japonicum* species with intermediate or alternative or fictitious host of rice moth (*Corcyra cephalonica*) will make the control of stem borer (*C. auricilius*) more intensive and sustainable.

4. CONCLUTION

Based on the results of the discussion can be drawn the following conclusions:

4.1. Soybean agribusiness performance includes:

- 1) The subsystem for the procurement of production facilities includes the procurement of fertilizers, seeds and pesticides at the sub-district level usually obtained from kiosks means of production or stalls at the sub-district level, as well as at the district level.
- 2) Production subsystems conducted by farmers include soil cultivation, planting, maintenance, fertilization and harvesting.

- 3) Post-harvest and processing conducted by soybean farmers in Sumedang sub-district include drying, peppering, cleaning and storage, no further processing.
- 4) Marketing subsystem, including marketing of soybean in the form of dry beans. Usually farmers sell to collecting traders in their respective villages or to farmer groups.
- 5) The subsystem of facilities and infrastructure such as the capital used by farmers entirely using their own capital and road infrastructure that there is quite good.
- 6) The development or empowerment subsystem in Sumedang district has been given attention from the Food Crops Agricultural Office Service of Sumedang District and the Agricultural Counseling Center of Sumedang District in this case gives counseling every once a month and at the beginning of the growing season.

The development of soybean as a leading commodity in Sumedang district is good enough. This can be seen from the quality of human resources supported by informal education such as counseling and agriculture courses, the dominance of agricultural land cultivated soybean industry demand for soybean - tempeh and soy sauce.

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