

Monitoring System on Nine Primary Commodities' Price in Indonesia

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Abstract—Nowadays computerized systems are used broadly to support human being activities. One of the examples is a monitoring system on nine primary commodities' price applied in Indonesia. The government has a big concern to monitor those such commodities' price because of its strategic function for human. As it is well known that there are nine commodities in Indonesia categorized as sembako. Sembako stands for Sembilan Bahan Pokok which means nine primary commodities. They are rice, corn, wheat, soya bean, meat, milk, sugar, cooking oil (coconut oil) and iodine-salt. The commodities have important function to fulfill daily human basic needs. This is why Indonesian Government put a great effort fix up sembako remain affordable and available everywhere. This research is purposed to develop an information system to monitor sembako's price, as an early warning system. The data is collected from referent markets from all the states in Indonesia centralized in a system which is popular as Market Information System. The system is installed at Trading Ministry Office of Indonesian Republic. Methods of analysis were undertaken by identifying factors constituting the price of each commodity. The output of this study is an early warning system in relation to establish properly government policies when sembako's price are going unstable, or are signing to reach a maximum allowed price.

Index Terms—Early Warning, monitoring system, primary commodities, sembako.

I. INTRODUCTION

Nowadays, computer applications are used in broader ways to support human's activities. One of the examples is a monitoring system on nine primary commodities' price applied in Indonesia. According to the Indonesian Cabinet of Ministry definition, nine primary commodities well known as sembako are nine commodities which have strategic functions for human being. They are rice, corn, soybean, meat (beef, chicken), milk, cooking oil (coconut oil), wheat, sugar and iodine salt. They play an important role to fulfil basic human needs. For an illustration, more than 80% (eighty percent) of Indonesian people consume rice every day as a main source of carbohydrate. Rice is almost an un-substitutable carbohydrate source in Indonesia. Because of the important role and strategic functions, Indonesian Government put a big effort concerning either to provide the products remain affordable or to serve them available in the whole Indonesian Region. However, in fact, sometimes the problems come up. The price's commodities

were going to higher and higher. This situation can lead to an un-tolerable price. There are many reasons potentially cause the problems. The first factor is scarcity of the stock products in the marketplace. Scarcity caused by a destroying endemic diseases which can lead to a failure harvest season. The second factor is on-farming and off-farming cost of each commodity.

The aim of this research is to develop an information system for monitoring daily price of sembako's price in all states in Indonesia. It can be functioned as an early warning system (EWS) for Indonesian Government by monitoring daily price in order to develop appropriate strategies or policies to control the price in the marketplace.

II. LITERATURE REVIEW

A. Rice (*Oryza Sativa*)

Rice is popular as a main source of carbohydrate. More than eighty percent Indonesian people eat rice daily though they have others sources of carbohydrates such as potatoes, bread, etc. It is almost un-substitutable source of carbohydrate. Only in an extreme condition, when rice hardly to find such as in a situation of disaster, flooding, etc then Indonesian people would like to consume another source of carbohydrate. Rice can also be used as raw materials in food industries such as rice noodle industry or as glue in textile industries.



Source: broad sources of websites
Fig.1. Nine primary commodities in Indonesia.

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B. Corn(*Zea Mays*)

In Indonesia corn is the second main source of carbohydrate, and is used as raw material either for any such food industries (maize, etc), or for any domesticated animal woof industries (chickens, and others poultry husbandry). In the marketplaces, corn normally can be found in a bulk forms (seeds) and also in powder. Corn is usually being consumed directly by baking or boiling it. Before year 1990, corn was used only for fulfilling human needs on food. After the era, there was a trend to use corn for industrial needs. Nowadays, Indonesia is still importing a big portion of corn because of industrial uses.

In general, there are three main factors constituting the overall corn price. The first is international corn price which means the price of imported-corn at the international market (this is including transportation cost to deliver corn to Indonesia). The second is currency exchange rate, and the third is costs associated with importing process such as incoming tax, customs, etc.

C. Soybean(*Glycine Max*)

Soybean is the third source of nutrient after rice and corn. Soybean is a potential source of protein. In Indonesia, soybean is mostly used as raw material for many food industries such as tofu and tempe (fermented soybean bar). In Indonesia, tofu and tempe are the cheapest protein source, and the most popular foods. In general, there are three factors affecting the soybean's price. They are international price of imported-soya bean, currency exchange rate, and costs associated with importing activities (incoming-tax, customs, etc). Meanwhile, on the other hand, local soybean's price is directly affected by the season (scarcity) .

D. Meat

Meat is a main protein source which comes from animal such as chickens, cow or bull. In Indonesia, fish is the most popular protein source but Indonesian Government did not make any regulation yet on fish, because fish can be collected freely from the sea. As a consequence, Indonesian Government set up a big attention to chicken's price. In addition, beef is also popular. The demand per capita of beef is 6.5 kg/ capita/ year. Indonesia imported 30%-35% of the overall national demand on beef per year.

E. Milk

Milk is a white liquid produced by the mammary glands of mammal. Milk is a protein source for human and is used as raw materials for a broad range of food industries. In Indonesia, the highest consumption rate come from sweetened milk, followed by powder milk. Indonesia is a very depending nation on supply of milk from oversea. Based on the data of year 2010, Indonesia could produce milk not more than 20% of the whole national demand. In the other words, Indonesia imported milk for over than eighty (80%) percent of its national demand.

F. Cooking (Coconut Oil)

Cooking oil comes from coconuts or others palm trees. Its form is a liquid at temperature room. Cooking oil is purposed as frying agent for foods. Cooking oil is beneficial for human body because it consists of essential fat which cannot be produced by human body. In accordance to set

cooking oil's price being stable, the Government settled a big effort such as a market intervention, applied export tax, etc. The coconut trees are easy to grow in most of Indonesian region.

G. Wheat Flour

Wheat flour has an important role in daily life because of its use in many big industries such as noodle industry. Wheat comes from *Triticum spp* plants, which is hard to be planted in Indonesia. That is why Indonesia imported wheat to fulfill all of the national demand on wheat. Indonesia which has more than 200 (two hundreds) millions citizen, has the third biggest consumption rate of wheat in the world. APTINDO (Association of wheat Producer in Indonesia) in year 2010 notified that 95% of the end user is food industries, and the rest are SME (Small Medium Enterprises). In general, there are three factors affecting wheat's price. They are international wheat price, production cost, and demands.

H. Sugar

Cane sugar is a simple glucose and can be found as a crystal of sucrose. The purposed is to sweeten food. Cane sugar is not only used for households, but also broadly used in many food industries. Its consumption rate (household purpose) is averagely 3.3 million tons per year. Indonesia can fulfil 50-60 % of its national demands on sugar domestically, and the rest is to be fulfilled by importing it. The rate of consumption per capita is 12 kg per year. In general, main factors affecting sugar price are: gap on supply and demand, cost of production, distribution cost. The peak demand on sugar usually happens before Indonesian national holiday.

I. Iodine Salt.

Iodine salt is NaCl (Natrium Khlorida) which has been enriched by iodine. These compounds are essential for human body in relation with the growth of human brain. Iodine salt put should match the SNI (National Standard of Indonesia), which means iodine content in the salt should 30-80 ppm (part per million). In average., the salt consumption's rate per day per person is 150 – 200 microgram, and the maximum limitation is 2000 microgram per person per day.

III. METHODOLOGY

The methodology of this research is simplified in Fig. 2 as following:



Fig.2. Research methodology.

Staging Description:

- A. Understanding Research's Goals.
- B. Literature Review
- C. Data Collection and Reporting
- D. Data Processing and Analyzing
- E. Building and installing Information System
- F. Developing Recommendation

A. Understanding Research Goals

As mentioned previously, the purposes of this research is to develop an information system for monitoring sembako daily price, as an early warning system for Indonesian Government to establish appropriate strategies.

B. Literature Review

Several related literature was being reviewed as a basic concept to identify factors constituted commodities price. The subjects are commodities characteristic, supply and demand pattern in Indonesia, factors constitutes price, distribution system, trends of price at the marketplaces, etc. Some modeling approach was also resumed in relation for developing forecasting modeling..

C. Data Collecting and Reporting.

Primary data was daily collected from referent markets. Referent markets are preference market in the community in each state. All they come from thirty three (33) provinces in Indonesia. Meanwhile, secondary data was collected from previous works and research accordingly from Local Government, Centre Bureau of Statistic (BPS), Centre of Trading and Industry Affairs (Kadin), etc. Daily reporting price is available during office hour at weekdays, but is not at weekend. The data was documented on a system which popular as Market Information System at The Trading Ministry Office. The system is managed and is operated by several Information Technology Specialists.

D. Data Processing and Analyzing

Data from all referent markets will be recorded and documented. They would be averaged and defined as an average price of each district. The system will give notification if after a period there is a trend to be forecasted would across the maximum allowed price.

E. Building and Installing Information System

Hardware and software on monitoring information system were being installed at a big panel accordingly with the pattern of system analyzing. The information system will give an alert notification when there is a trend to be forecast that the price's trend is going to reach the maximum allowed price.

F. Developing Recommendation

There is a necessity to identify factors constituting the price to be checked in the marketplaces following by developing appropriate strategies to be undertaken to avoid instability of nine primary commodities' price. List of recommendation depends on each commodities.

IV. DISCUSSION

In the process of establishing the systems, there were many difficulties and problems emerged to be fixed for better future development. They are listed accordingly as following:

- Because of its variety and simplification, each primary commodity is limited to a particular type.

As for example are rice (only medium level of rice not premium rice), milk (only powdered milk and sweetened condensed milk), cooking oil (only bulk type), etc.

- Hard to gather data fully from all the state of Indonesia in daily basis. Sometime data was not documented and reported from the marketplaces because of technical and non technical obstacles. It can lead to a biased mathematical calculation.
- Lack of supporting devices on data reporting. As a consequence, several blank data was found from states. Officer at the Trading Ministry Office should contact the states to get the data.
- Fact findings that commodities' price is not solely affected by human factors such as a rising on-farm cost and off-farm cost, but also affected inevitably on the season and climate changing. As it is well known that agriculture industry is very sensitive due to the weather and also any endemic disease. Forecast modeling on price, or price prediction cannot just be simplified by ignoring inevitable factors. It produces a big error.

V. RECOMMENDATION

The project is still being developed and planned to be completed in year 2013. Several actions are needed to be undertaken for better future developments such as following:

- Hardware and software package should be well equipped at all state (local government offices).
- Forecasting on commodities' price should include seasonal and climate change factors (combining qualitative and quantitative forecasting).
- If there is any fluctuation on price of commodities, a broad variety options can be undertaken by Indonesian Government which are categorized as short term, middle term, and long term strategies.

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